INSTALLATION GUIDE

DI 104 EN A

MICROCOMPT+ LOADING TERMINAL DEVICE

Described in the EC-type examination certificate N°: LNE- 13624

A	2016/04/25	Creation	SH/DSM	SH
Index	Date	Nature of modification	Written by	Approved by

CONTENTS

1. OVERVIEW

The loading terminal device MICROCOMPT+ ALMA is an electronic calculator specifically designed for metering applications tailored to loading arms for trucks, reservoir cars or ships. This calculator, built into an Explosion proof package designed for use in zone ATEX 1, provides all features required for oil loading operations. It allows for the handling of:

- ⇨ Management of predetermination
- ⇨ Metering from turbines, PD-Meters, Coriolis flowmeters generating double pulse trains
- ⇨ The control of the loading valve that may be in digital, dual flow, incremental or analogue mode
- ⇨ Temperature acquisition via a PT100 3-wire input
- ⇨ Gas presence detection acquisition and associated purge sequences
- ⇨ Processing of the arm position sensors (top loading) and all data relating to the management of loading docks (grounding, dye system, anti-overflow system, connection to vapour recovery arm)
- ⇨ Management of additive injection for 8 injectors (5 local + 3 on extension box)
- ⇨ Management of high-flow blenders (metering, regulation, temperature) for the production of finished products requiring incorporation of components such as Ethanol, FAME ...
- ⇨ Management of dye injections
- ⇨ Conversion of volume to the reference temperature
- ⇨ Archiving of metrological operations for a minimum of 90 days and 5000 data points.
- ⇨ Communication with a DCS or SCADA system via RS485 connections.

This calculator is designed to allow integration into an MID measuring system in accordance with the requirements of OIML R117-1. As such, it has MID certification provided by LNE under No 13624. This allows it to form an essential component in measuring system for liquids other than water.

2. CERTIFICATION

2.1. ATEX certification

The items below are those in effect on the date of publication of the document

INERIS 07 ATEX 0057X

ATEX marking (from the NT IN ATEX 505 instruction sheet):

According to Directive 94/9/CE:	
Name and address of manufacturer:	ALMA 13127 VITROLLES CE 0080
Description of type	**EJBA** (Manufacturing N°) (Year of construction)
Attestation CE of type	**INERIS 07 ATEX 0057X**
Category	Ex II 2 G or Ex II 2(1) G
Marking code	Exd II B T4 or T6 Gb or Exd [ia Ga] II B T6 Gb
T.amb	-20°C to 55°C
T. Cable (only for T4 class)	110°C

Compliance of package with standards:

- EN 60079-0: 2009
- EN 60079-1: 2007
- EN 60079-11: 2012

2.2. LNE certification

The items below are those in effect on the date of publication of the document

Certificate of assessment No LNE- 13624 in accordance with WELMEC 8.8 guide, enabling MID construction of measuring systems for liquids other than water with the following main features:

The applicable information is that contained in the latest revision of the certificate mentioned above.

Use	Volume or Weight
Volume scale intervals	0.01 m^3 or 0.1 m^3 or 1 m^3 or 0.001 L or 0.01 L or 0.1 L or 1 L
Mass scale intervals	0.1 kg or 1 kg or 0.1 T or 1 T
Maximum indication	999 999 *scale intervals*
Temperature scale intervals	0.1 °C
Minimum measured quantity (depending on usage)	*500 scale intervals in class 0.3* 200 *scale intervals* in class 0.5 *100 scale intervals in class 1*
Accuracy class	*0.3* / 0.5 / *1*
Mechanical class	M2
Electromagnetic class	E3
Temperature range	-25 °C / +55 °C

In the context of operating facilities for the loading of trucks or cars, the calculator is typically implemented in accordance with a class 0.5 certification according to the requirements of the OIML.

The MICROCOMPT+ calculator enters the construction of measuring systems such as:

- TURBOCOMPT (MICROCOMPT+ calculator & Adriane turbine meter) according to LNE Certificate No 22081 can be implemented according to modules B + D or B + F.
- MIXCOMPT (MICROCOMPT+ calculator & Adriane turbine meter or MIV10.2D injector) according to LNE Certificate No 23911 can be implemented according to modules B + D or B + F.

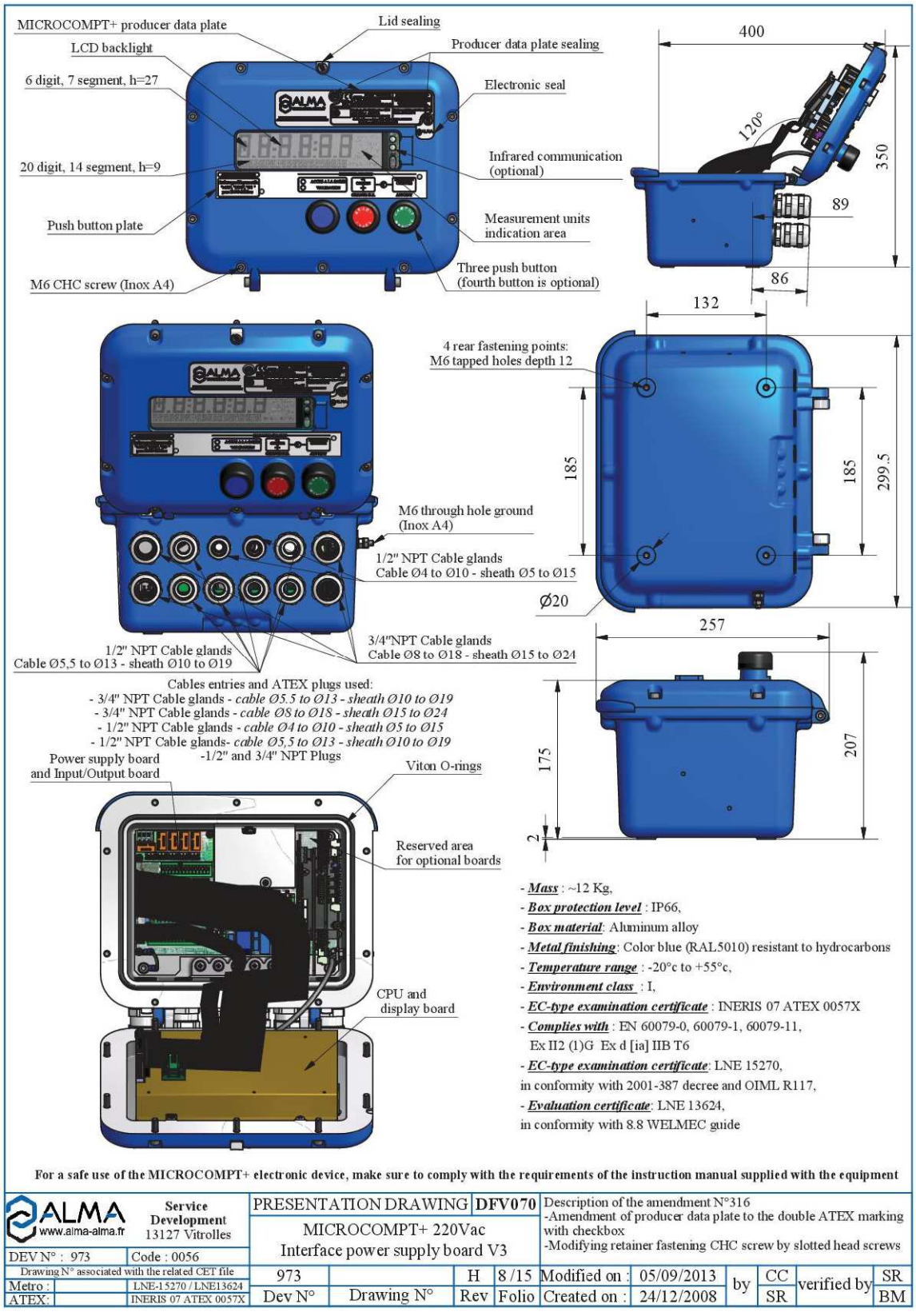
It is also an essential component in measuring systems for liquids other than water and especially for hydrocarbons according to certification module G.

3. DIMENISONS AND MOUNTING

Dimensions (sealed enclosure): L = 300 mm / H = 260 mm / D = 207 mm

Weight: 17 kg

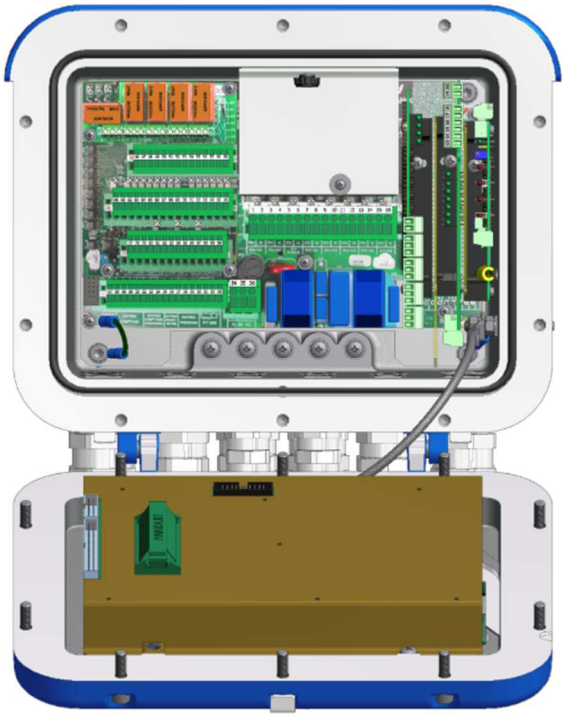
Mounting: Rear with 4 screws - M6 depth 12 mm



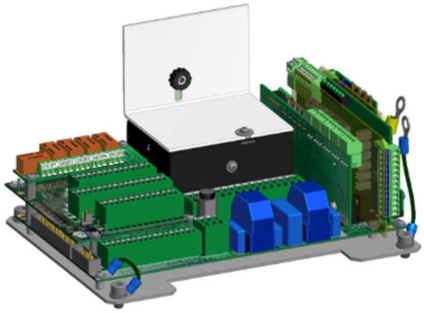
4. COMPOSITION

The MICROCOMPT+ calculator consists of an aluminium enclosure. The standard model can receive 12 cable glands. This avoids the use of intermediate junction boxes in many cases.

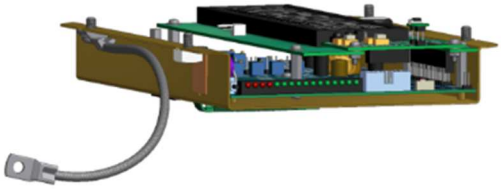
The enclosure is opened by loosening the 10 screws on the front panel. This provides access to the two main electronic boards.



The open MICROCOMPT+ enclosure



The power supply board (at bottom)



The CPU board (fixed to front surface)

The AFSEC+ display board, installed on the door of the calculator incorporates the "intelligent" part of the calculator and includes the microprocessor, RAM, LCD display, electronic sealing device. No connections are missing on this board, and it is also factory sealed.

The power supply board resting on the bottom of the enclosure is used to complete all the necessary electrical connections.

The front of the calculator incorporates a backlit LCD display with an area sufficient for 6 large characters (h: 27 mm) for the display of measurements. It also includes a set of icons to display the type and unit associated with the displayed value. A second line of 20 characters (h: 9 mm) displays user instructions, alarms and additional useful information.

Three push buttons allow for various input or validation operations that may be required for the use and configuration of the calculator. Finally, the front surface incorporates the device used for switching from operating mode to configuration mode.

NB: Access to advanced configuration mode, called "metrology", is protected by the presence of a seal. This must be broken to access these features.

NB: The cable glands are installed at the factory during manufacture of the equipment depending on the usage configuration required. It enables ALMA to ensure complete traceability as an ATEX equipment manufacturer. Locations unused by glands are always supplied with plugs.

Depending on the configurations required, additional boards may be needed. These may only be installed at the factory.

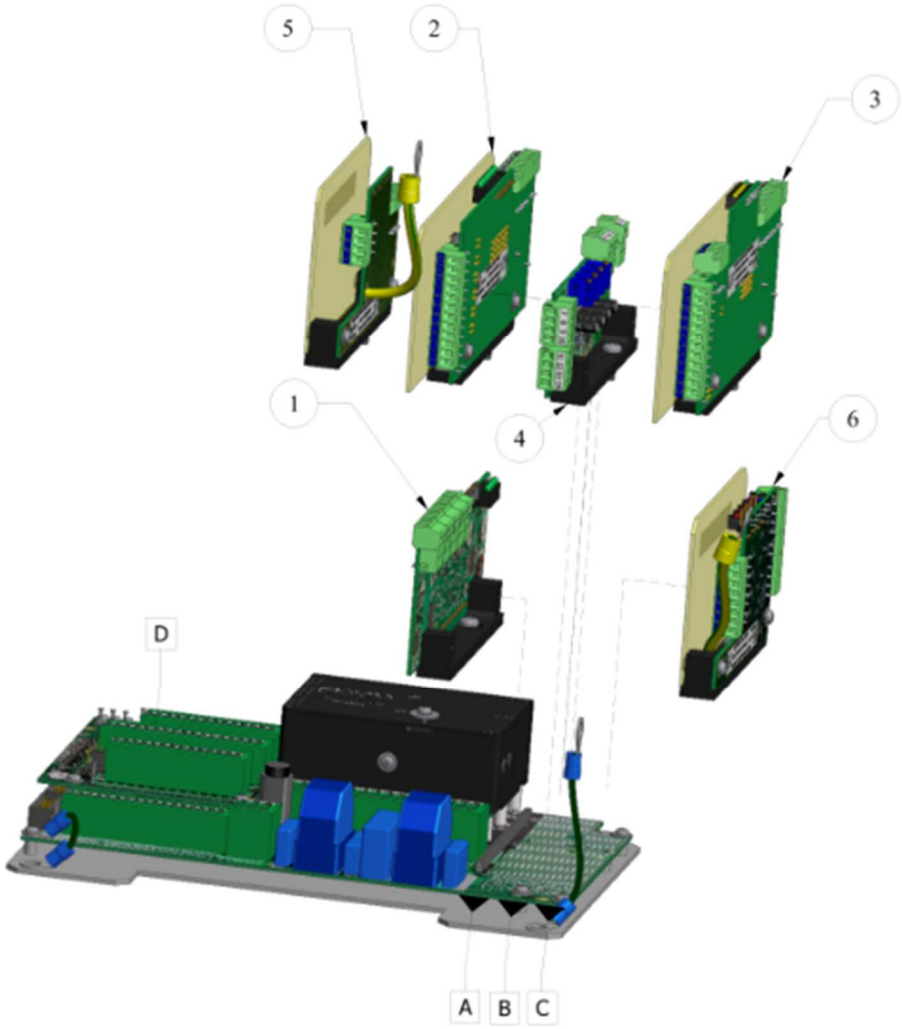
- DUAL board extension
- Intrinsically safe interface board - 6 lines & frequency divider *

- Intrinsically safe interface board - 8 lines *
- Intrinsically safe interface board - 8 lines *
- Power supply board - 4 Intrinsically safe gas detector
- Relay expansion board

Up to 4 additional boards can be installed. Only one board of those listed (*) can be installed at a time.

Boards must be positioned according to the table below:

Position	Boards
A	DUAL extension board (1)
B	Intrinsically safe interface board - 6 lines (2) or Intrinsically safe interface board - 8 lines (3) or Preamp board - FH (4) or Anti-overflow sensor board (5)
C	4 Intrinsically safe gas detector power supply board (6)
D	Relay extension board (7)



5. POWER SUPPLY

The MICROCOMPT+ calculator requires only one supply of 230 V / 2 A. The distribution to the actuators (valves) is provided directly from the power supply board. For a loading arm and all equipment supported by the MICROCOMPT+ calculator, the only power supply required is 230 V to the MICROCOMPT+ calculator.

The internal consumption of the calculator is 20W max. To determine the necessary power, we must add together the consumption of the various actuators that are controlled simultaneously by the calculator.

Internal consumption	20 W
Consumption for control of 2 main valve command SVs	+ ____ W
Consumption for control of 2 secondary valve command SVs	+ ____ W
Consumption for control of 1 additive command SV	+ ____ W
Consumption for control of 1 dye command SV	+ ____ W
Total	**= ____ W**

NB: When the MICROCOMPT+ is used as part of a metrological system, uninterruptible power supply could be used.

Protection rating: IP 66

Supply voltage connection 230 V

Function	Terminal	Signal	Other function
Supply 230 V	34	GND	
Supply 230 V	35	Phase	
Supply 230 V	36	Neutral	

The power supply board is equipped with a fuse of type: T2A 250 V

6. CONNECTIONS

The MICROCOMPT+ calculator can be equipped with 12 cable glands (2 in ¾ NPT each side and 8 in ½ NPT for the central part). The configuration is to be specified when ordering.

Type of gland

- A: ½ NPT – Cable Ø 10 to Ø 19
- B: ½ NPT – Cable Ø 5 to Ø 15
- C: ¾ NPT – Cable Ø 5 to Ø 24
- D: ¾ NPT – Cable Ø 5 to Ø 19

Usable type according to location

C or D	A or B	A or B	A or B	A or B	C or D
C or D	A or B	A or B	A or B	A or B	C or D

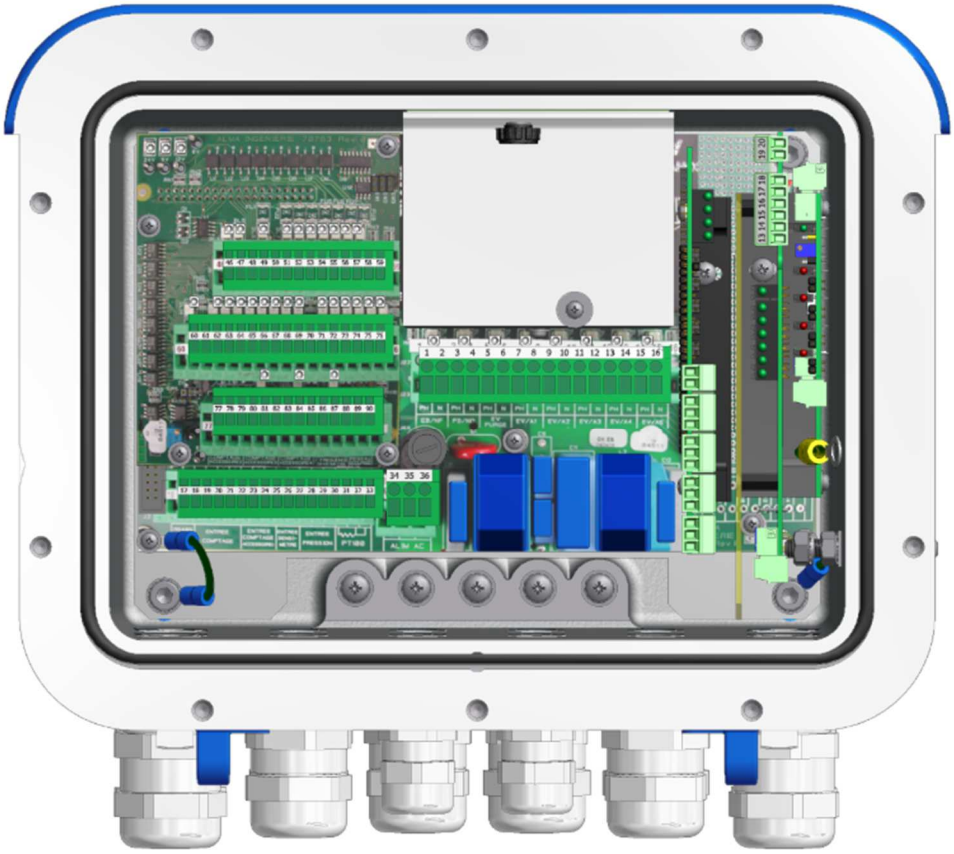
The installed cable glands form part of ATEX traceability, ALMA does not supply other glands. In addition, the cable entries for which no gland is specified receive an ATEX plug.

The cable glands are designed to receive cable type:

- U1000 RVFV xxG1.5
- xxIP09EGFA

- xxIP09EGSF

View of the power board at enclosure bottom



The installer must take special care with electrical connections. Intrinsically safe connections must be grouped on the same side of the enclosure and crossed lines inside should be avoided.

The annexes to this document present typical interconnection solutions for different connections.

7. COMMUNICATION

The MICROCOMPT+ comes as standard with 2 RS485 connections supporting the Modbus Slave protocol. One of the links can be used to read / write, and the other for read-only.

Each of the read links provides access to all the values and states concerning the oil loading process.

The writable connection allows an external system (supervision, transfer system) to route loading authorizations (type of product, quantities allowed, injection rate and blending required, etc.)

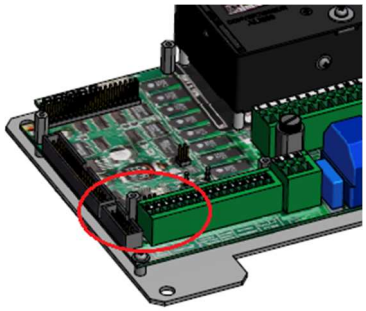
The read only link can also be used to transfer the content of the metrological transaction log to associated computer equipment

The format and content of available information on these communication interfaces are specified in the dedicated ALMA notice No ST2040.

Electrical connection of Modbus RS485 connections

Function	Terminal	Signal	Other function
Network RS485 N°1	17	+	
Network RS485 N°1	18	-	
Network RS485 N°2	89	+	
Network RS485 N°2	90	-	

For each of these connections, it is possible to set up a load line by installing the appropriate straps.

 Connection No1 – On board at bottom SW3 - for + SW4 – for charge SW5 – for -	For connection No2 - on top board SW1 - for + SW2 – for charge SW3 – for -

8. ADDITIONAL DOCUMENTS TO CONSULT

Document ALMA NT3274 references all of the errors that can be generated by the MICROCOMPT+ calculator and the appearance of criteria and actions taken following the appearance of these errors.

Document ALMA ST2040 describes all the information accessible through RS485 computer connections via the Modbus protocol

The MU 7036 user manual and GU 7036 user guides describe all operating and configuration menus for the implementation and configuration of different features.

ATEX certificate.

Instruction manual.

9. FEATURES

9.1. Internal automation

The MICROCOMPT+ calculator incorporates all features necessary to monitor system integrity. It records its power supply, the integrity of its memory, the status of its display. It detects differences between its metering lines, temperature measurement and the quality of signals. If necessary, it generates the appropriate error and interrupts the current flow operation. In standby, any detection of metering generates an error and where a quick-closing valve is installed, it is made to close.

9.2. Management of a measuring system

In most cases, the MICROCOMPT+ calculator is dedicated to the management of a single measuring system consisting of, at a minimum, a meter delivering a dual pulse and an authorization valve to control the flow of the product. In addition, a presence of gas detection system and a temperature sensor are installed in the piping upstream of the meter.

Prior to the completion of a load, the different dock and arm sensors, suited to the type of load, must deliver a signal authorizing the use (grounding system, anti-overflow system, steam arm connected, orientation and lowering of arm). The signals from these contacts and checks for the absence of gas delivered by the appropriate sensors are verified throughout loading, and their absence causes the cut off of the load through closure of the valve.

In this mode of operation, the calculator controls the charging valve to ensure flow of the product until the completion of a specified quantity. The amount to be performed may, depending on the mode used, be introduced via the computer link, not editable by the user, or be entered locally via the 3 push buttons limited to a maximum value in the configuration settings or sent by computer.

After local validation of the commencement of the operation, the calculator controls the opening of the loading valve by applying a one small flow phase at the beginning and end of the operation. The flow

rate is controlled during the entire operation and the calculator regulates as necessary when the valves used so permit. The values of small and large flow rates and volumes required in low flow rate are configured and defined depending on the conditions of use of the facility. For top loading operations, an additional sensor (Sécurim) can be fitted to the loading arm. Where this is the case, on commencement of compartment loading, the calculator maintains low flow rate as long as the sensor does not indicate that it is sufficiently immersed.

Being a usable equipment in commercial operations, the calculator performs, throughout the metering operation, the controls established by recommendation OIML-R117-1 to verify that the flow rate range is respected at all times. Similarly, the calculator continually ensures that there is no unacceptable deviation between each of the metering lines (pulsed input) to which the meter is connected. Where appropriate, it declares the appropriate error and stops the flow by closing the loading valve.

Temperature measurement via a PT100 3 wire sensor is performed continuously throughout the loading operation. The calculator determines the average temperature of the load in addition to the instantaneous temperature. The calculator ensures that at any time the measured temperature is within the high and low limits set at configuration. Where appropriate, it declares an error, and if necessary, closes the loading valve.

The calculator uses in its configuration a density of measured product at 15°C. This value can be introduced locally via a protected configuration dialogue but also sent by computer link. When configured to calculate the converted volume, the calculator uses the volume measured at temperature, the average temperature, and the density at 15° C. The calculation is performed according to the conversion mode, with the following possibilities:

- Table API-54A ASTM - ISO 91/1 (unrefined products)
- Table ASTM-API 54B - ISO 91/1 (refined products)
- Standard NF M 08-017 (LPG and Bitumen)
- Standard NF EN 14214 (FAME)
- Official Bulletin of the French Customs No 6665 for Ethanol at 15° C
- Official Bulletin of the French Customs No 6665 for FAME at 15° C
- Official Bulletin of the French Customs No 6665 for ETBE to 15° C

When loading and once the MICROCOMPT+ calculator determines that there is no flow, all the data related to the operation is saved in the internal electronic log. For each item, the calculator specifies whether the measurement is performed in compliance with metrological rules (adherence to flow range, adherence to temperature range, etc.) The measurement is saved and assigned a timestamp for consultation when necessary. This mechanism is based on the day number in the preceding year (calendar) and the order number in the day. Being a calculator that can form part of an assembly used for operational measurement, this log constitutes a metrological trace of operations in the case of disputes between the owner of the facility and its clients.

During loading, the internal totalizer without reset is incremented in the calculator memory. This counter is available via the display and pushbuttons.

All information mentioned above, volume at temperature, rate, instantaneous and average temperature, converted volume, density, totalizer, are accessible through computer link via the Modbus protocol. Information on contact status, errors and the additional information provided by advanced calculator functions expand upon this basic information.

The calculator can function when connected to a piping system which sends possible loading data, or operates independently. In the latter mode, there are no restrictions related to the volume or type of authorized finished product.

The following chapters set out the advanced features of MICROCOMPT+ calculator which include the ability to carry out on-line additive and dyeing operations during loading and high flow rate blending operations. With this equipment and these features, the calculator extends its capacity to provide a multitude of different finished products with the same initial installation.

For the various features mentioned, these are always performed in addition to the management of the totality of primary measurement tasks.

9.2.1. Management of additives

The MICROCOMPT+ includes the capacity to manage up to 5 additive injectors, for metering and control. The inputs / outputs for this feature are shared with the dye and blending management process. Pooling makes the capacities set out below available.

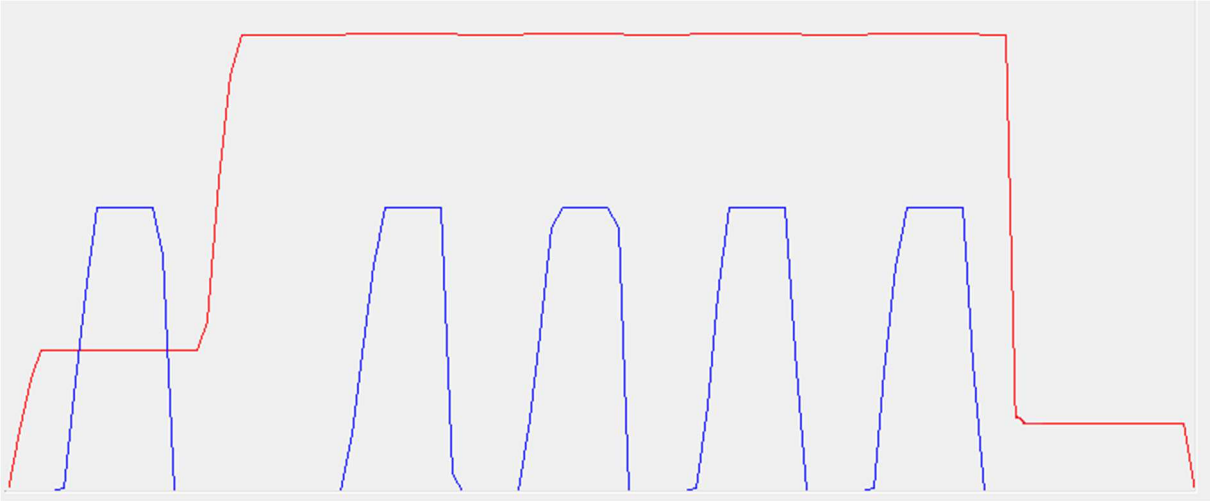
- Management of 5 additive injectors
- Or management of 1 Metrological dye injector and 3 additive injectors
- Or management of a blender and 3 additive injectors

For each injector, the MICROCOMPT+ has a metering input with square pulses up to 450 Hz and a 230 V output.

The MICROCOMPT+ can, depending on load requirements, control an additive injector from those available. The injection device is based on one additive injection for each product. The volume of the product range is handled in MICROCOMPT+ configuration. The amount of additive to be injected is an aspect which defines the loading operation. This injection mechanism takes into account various parameters in order to obtain an optimum injection result:

- An early range volume during which no injection is performed
- A late range volume during which no injection is performed
- The range volume

For each loading operation, besides the injector to be used, MICROCOMPT+ takes into account the amount of additive to be injected. According to the general configuration and specification of the loading order, the MICROCOMPT+ automatically adjusts the injection sequences. Moreover, in the same loading authorization, MICROCOMPT+ implements an injection correction mechanism between ranges to optimize the amount to be injected into the range T based on the completion of range Tn injections.



In red, the main product flow rate - In blue, the additive injections

The loading authorization with an additive which is given to MICROCOMPT+ calculator must specify the injector to use. This authorization may also contain the injection rate in PPM from 5 to 32000. These values must of course be compatible with the injector capabilities ensuring the measurement and control of additive flow. This ability to specify injector injection volume instructions makes it possible to pool the equipment for the same additive injection. This authorization is given to inject via the computer network or can be done by selecting predefined recipes in the calculator when it is used independently. When the injection rate to achieve is not specified, the injection is done using the rate that has been configured on the injector during the commissioning process.

For each entry count and therefore each injector, the calibration process is used to set the pulse weight.

Besides the built-in correction mechanism, the additive management process determines the zero additive, sub-additive, over-additive errors. The thresholds of sub and over-additive are configurable in percentages for all the injectors. The check is performed by determining the ratio between what is required and what is counted. Depending on the commissioning configuration common to all the injectors, the occurrence of errors due to the additive may cause the control of the flow to be stopped by stopping the loading arm.

The results related to the supplementation of each loading operation (injected volume in ml, injection of satisfaction in%, associated errors, non-resettable totalizer) are available in read via the calculator network.

9.2.2. Management of dyeing

The dye management device integrated within MICROCOMPT+ provides for the creation of a metrological measurement (MID) assembly. It is a second measuring system (EMB) which strictly complies with OIML recommendations. This management is based, as a minimum, on a double square pulse metering process of up to 450 Hz and solenoid valve control. The control of the dye injection valve is associated with the primary measurement assembly.

NB: The implementation of a metered dyeing measurement assembly requires the use of 2 metering lines. This implies that in this metrological operating mode, the amount of additive injectors is reduced from 5 to 3. If the dyes are not of metrological type, the inputs and outputs for additive or dye injection are standard and the maximum number is 5.

The dye injection process has the same basic characteristics as an additive process. It is complemented by operating rules that ensure the injector functions metrologically. The process carries out, as for all primary measuring, controls of under flow, over flow, the presence of gas (via the dedicated detection device connected to MICROCOMPT+). These errors when they occur cause the stoppage of the dye-measuring system and the stoppage of the main measurement arm assembly. Control over the QMM is also effected and is considered for the declaration of the metrological validity of dye measurement.

In addition, two dedicated devices for dyeing are integrated and activated during the commissioning configuration, as desired by the operator.

The first device, called "anti-fraud", causes dye injection upon resumption of the flow on the main measurement assembly after a flow stoppage other than at end of loading. Depending on the volume remaining to be completed after this device is switched on, it is possible that at the end of the loading operation, the calculator indicates over-dyeing. This device is intended to prevent any attempt to change compartment between the end of a dye injection and the end of a product segment.

The second device handles potential "pollution error" reports at the end of loading operation. This error is reported when the volume of product between completion of the last dye injection and the end of the loading operation is insufficient to ensure that the pipe section between the injection point and the truck or wagon is sufficiently rinsed. This value is expressed in % of the segment volume (10 to 30%).

For dye injector management, the MICROCOMPT+ calculator can support the management and control of an additional valve called an "anti-pollution" valve. This valve is in this case opened, prior to the first injection, and closed after the last injection. When this valve is installed with position sensors (open / closed) connected to the calculator, the mismatch controls are implemented and any error causes the stoppage of the measuring system.

When the dye injector is reported as metrological, the injection volume in a segment cannot be less than the QMM set by the configuration.

The additive and dye injection process can be used in parallel in the same loading operation.

As for the additive, the MICROCOMPT+ calculator offers via computer link a dye-related set of information (injected volume in ml, injection satisfaction rate in%, associated errors, non-resettable totalizer).

To prepare a MIXCOMPT type metrological dye metering assembly in accordance with certificate LNE N ° 23911, the following should be used:

- A certified injector ALMA MIV10.1D or MIV 10.2 D LNE N ° 22829
- A VAF counter of type JZ010 or JZ015 according to certificate NMI N° TC7364 associated with a VAF ALMA kit.

9.2.3. Management of blending

The blending or blending system is intended to handle injections of components into the main product for rates between 5 and 85%. The management integrated within the MICROCOMPT+ calculator is based on a double pulse train metering procedure, operating up to 450 Hz, and regulation valve with incremental or analogue control. This device constitutes a second measuring system (EMB) allowing for proportional injection linked to the primary measurement assembly of the loading arm. These devices are mainly used for the incorporation of ethanol or oil during the production of biofuels.

The mechanisms in place in the MICROCOMPT+ calculator allow this set of EMB measurements to be metrological where necessary.

The MICROCOMPT+ calculator can manage blending with feedback from into account hydraulic systems which may be either upstream or downstream:

- Upstream, the product metered by the EMB measuring system is mixed with the flow of the main product before the main product is metered.
- Downstream, the mixed product and the main product are metered separately. The incorporation of the product blending in the main product is carried out after metering.

NB: When a blender is used, the electrical connection is made to the common terminals with the additive injectors 1 and 2. In this case, the number of additive injectors available is reduced from 5 to 3.

Besides the management of the blending valve and double metering lines, the blending feature handles the acquisition of temperature and gas detection data associated with the secondary product.

The same controls as for the main product are made concerning the validity of measurement, compliance with flow rates and temperature ranges and gas detection.

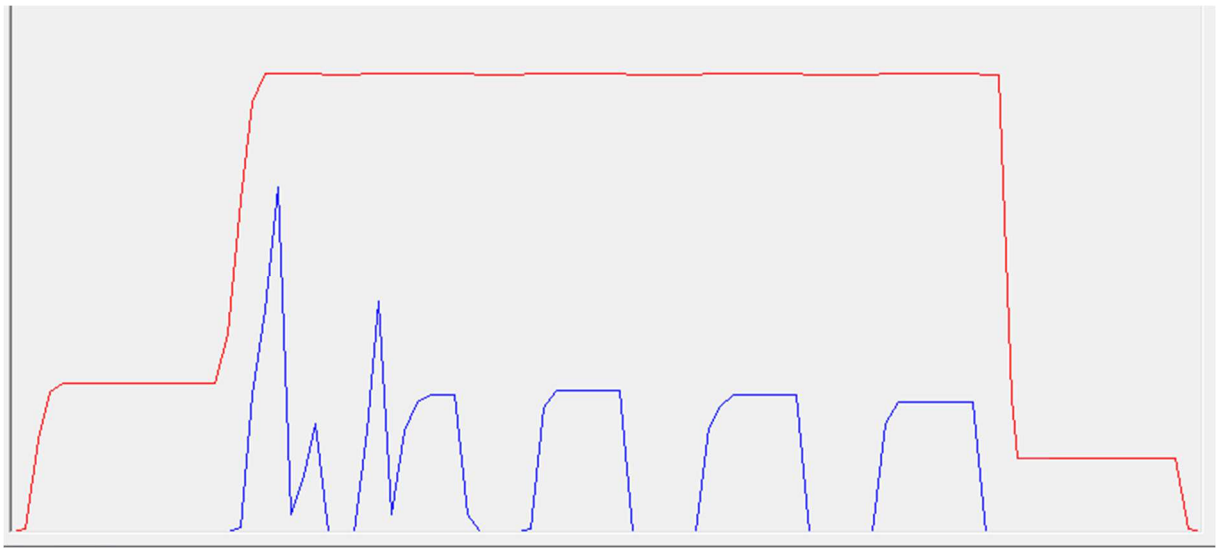
In addition, the blending algorithm checks compliance with the blending rate achieved with respect to the request and generates an error where appropriate.

The blending algorithm can operate in three distinct modes. The method used is configured in the internal settings of the calculator during start up. The choice depends on the needs of the operator and is also generally based on hydraulic supply conditions.

Segment mode

This operating mode is similar to that used for additive management. The system performs the necessary injection in each segment. From segment to segment, the system adjusts the volume to be injected to obtain the ideal rate at the end of the segment according to what has already been completed.

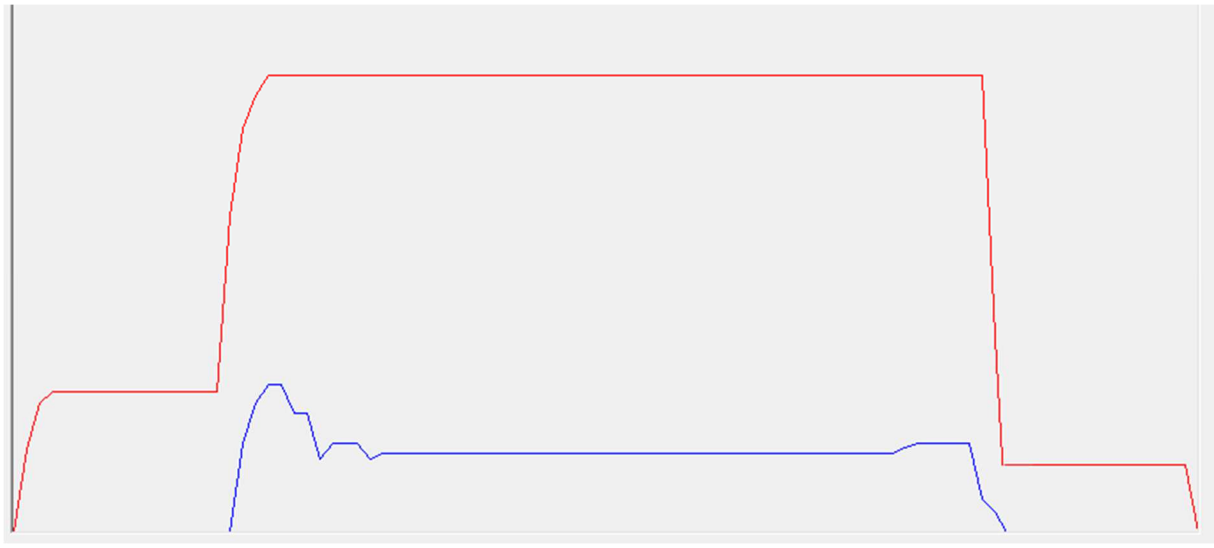
Mixing is done only during the high flow rate phase.



In red, flow rate of main product - in blue, flow rate of the secondary product (blending)

Follower Mode

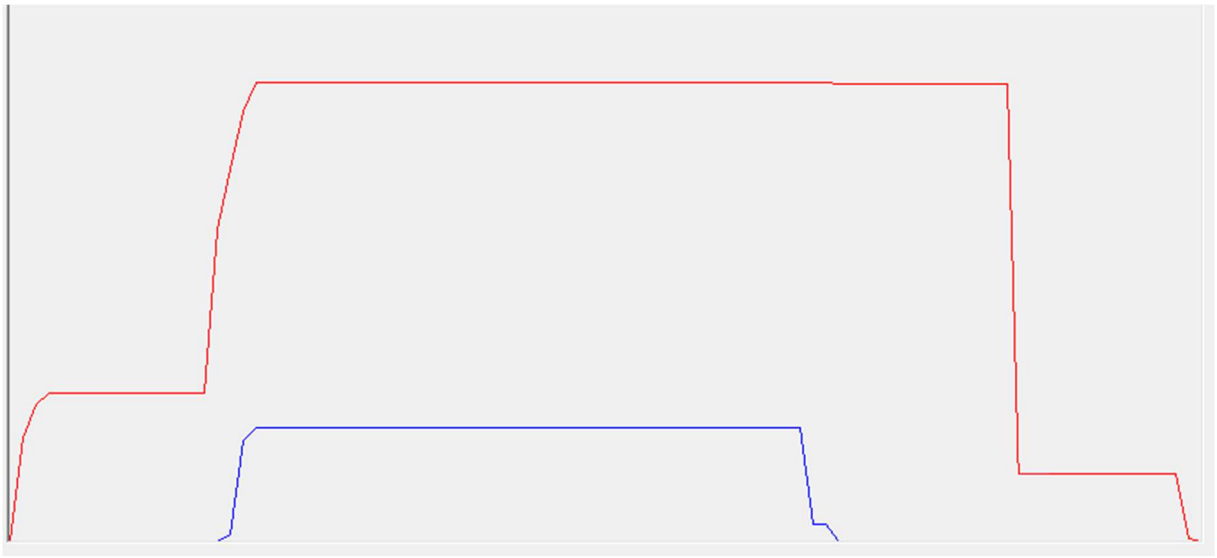
The follower mode adjusts flow rate control to ensure a continuous injection throughout the high flow rate stage



In red, flow rate of main product - in blue, flow rate of the secondary product (blending)

Bunker Mode

This mode forces the injection regardless of the segment volume. The injection of the required volume is done in one stage once full flow commences.



In red, flow rate of main product - in blue, flow rate of secondary product (blending)

The MICROCOMPT+ calculator allows a set of metrological MID measurements to be created for the blending device. This MIXCOMPT type assembly, in accordance with certificate LNE N° 23911, requires the use of an ALMA turbine meter of type Adriane in accordance with certificate LNE certificate No 12393.

9.3. Handling of errors

For each of the operating features, control devices are in place. If necessary, the system generates the appropriate error which is indicated on the display and made available in the available data set. Where appropriate, the use of the loading facility can be interrupted until removal of the cause of the error. All errors are outlined in document ALMA NT3274.

10. ADVANCED DESCRIPTION

10.1. Metering of main product

The MICROCOMPT+ calculator automatically handles two metering lines for the main meter. The processed signals are pulse type (open collector). The maximum permissible frequency is 450 Hz. In addition, an optional board with the frequency divider function (1/8, 1/16, 1/32) is inserted between the sensor and the metering input.

The calculator determines the flow rate from the received pulses and pulse weight setting. It controls the quality and consistency of the received pulses. It also ensures compliance with metrological rules to check the consistency between the metering lines. If necessary, it generates a blocking error. A calibration dialogue allows for calibration of the pulse weight.

When the installation is not intended for operational use and the sensor delivers only one metering line, terminals 20 and 21 must be connected.

Electrical connection - metering (open collector input)

Function	Terminal	Signal	Other function
Sensor power supply	19	+12 V	
Metering Line 1	20	V1	
Metering Line 2	21	V2	
0 V	22	+0 V	

10.2. Main product valve control

Several types of valve controls can be configured. Possible types are digital (single speed), dual stage valve commands, and regulating valve controlled by incremental outputs and regulating valve control via analogue positioner.

The calculator adopts the regulation and control algorithm based on the specified type of valve. Internal MICROCOMPT+ devices manage the "seek" function that allows the calculator to anticipate the closure command in order to complete predetermination at the correct value. This device implements continuous learning in order to handle variations in the product feed process as well as possible. The calculator also controls the response of the valve according to the commands carried out and the measured flow. If necessary, it generates the errors associated in particular with non-closure of the valve. The electrical connection according to the valves is given below.

Electrical connection – digital valve controller (digital output)

Function	Terminal	Signal	Other function
Flow control	3	+230 V (Phase)	
Flow control	4	+230 V (Neutral)	

Electrical connection – dual stage valve controller (digital output)

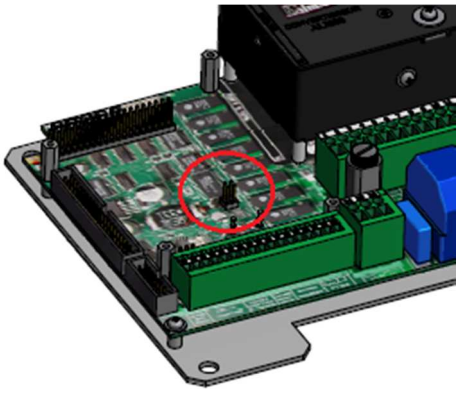
Function	Terminal	Signal	Other function
High flow rate control	1	+230 V (Phase)	
High flow rate control	2	+230 V (Neutral)	
Low flow rate control	3	+230 V (Phase)	
Low flow rate control	4	+230 V (Neutral)	

Electrical connection – incremental valve controller (digital output)

Function	Terminal	Signal	Other function
NC pilot control	1	+230 V (Phase)	
NC pilot control	2	+230 V (Neutral)	
NO pilot control	3	+230 V (Phase)	
NO pilot control	4	+230 V (Neutral)	

Electrical connection – analogue valve control (4-20mA output)

Function	Terminal	Signal	Other function
Positioning control	58	Signal x mA	Secondary product valve control
Positioning control	59	0V	



To use this operating mode, make sure to position the Strap SW2 on the power board

10.3. EMB-dye or secondary product metering

For secondary product management (blending) or metrological dye, the same device as the main product is utilised, with the same characteristics.

Electrical connection - metering (open collector input)

Function	Terminal	Signal	Other function
Sensor power supply	23	+12 V	Metering of additive
Metering Line 1	24	V1	
Metering Line 2	78	V2	
0 V	25	+0 V	

10.4. Secondary product valve control

For the secondary product, only the control valve models for incremental and analogue outputs are available. The same operating features as the main product valve control are in place.

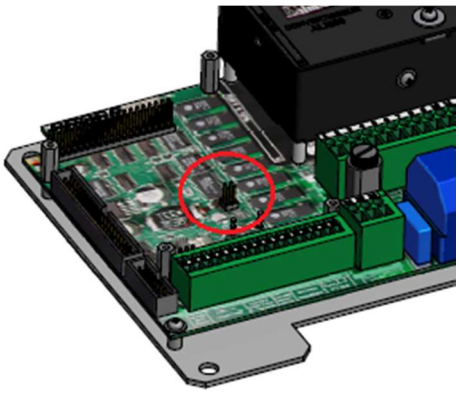
NB: For analogue regulating valve control, the feature is not available simultaneously for the main product and secondary product. Only one of the two can use this control mode.

Electrical connection – incremental valve controller (digital output)

Function	Terminal	Signal	Other function
NC pilot control	7	+230 V (Phase)	Control of blending or additive valve
NC pilot control	8	+230 V (Neutral)	
NO pilot control	9	+230 V (Phase)	
NO pilot control	10	+230 V (Neutral)	

Electrical connection – analogue valve control (4-20mA output)

Function	Terminal	Signal	Other function
Positioning control	58	Signal x mA	Main product valve control
Positioning control	59	0V	



To use this operating mode, make sure to position the strap SW2 on the power board

10.5. EMB dye injection valve control

Colour injection control is performed only during digital operation as described above.

Electrical connection – EMB valve controller (digital output)

Function	Terminal	Signal	Other function
Control of dye SV	7	+230 V (Phase)	Control of blending or dye valve
Control of dye SV	8	+230 V (Neutral)	

10.6. Metering of additive

Additive metering inputs are of the same type as for the main product. The same characteristics apply. For additives, only one metering line is required per additive. Remember, it is possible to connect up to 5 additive metering ports. This is reduced to 3 where the management of metrological blending or EMB dye metering is implemented. A calibration dialogue allows calibration of the pulse weight for each injector.

Electrical connection - metering (open collector input)

Function	Terminal	Signal	Other function
Sensor N°1 power supply	23	+12 V	EMB-dye or secondary product metering
N°1 metering	24	V1	
0 V N°1	25	+0 V	
Sensor N°2 power supply	77	+12 V	EMB-dye or secondary product metering
N°2 metering	78	V1	
0 V N°2	79	+0 V	
Sensor N°3 power supply	80	+12 V	
N°3 metering	81	V1	
0 V N°3	82	+0 V	
Sensor N°4 power supply	83	+12 V	
N°4 metering	84	V1	
0 V N°4	85	+0 V	
Sensor N°5 power supply	86	+12 V	
N°5 metering	87	V1	
0 V N°5	88	+0 V	

10.7. Control of additive injection valve

Colour injection control is performed only during digital operation as described above. Remember, it is possible to connect up to 5 additive metering ports. This is reduced to 3 where the EMB metrological management of blending or the injection of dye is implemented.

Electrical connection – additive injection valve controller (digital output)

Function	Terminal	Signal	Other function
Control of additive solenoid valve N°1	7	+230 V (Phase)	Control of blending or dye valve
Control of additive solenoid valve N°1	8	+230 V (Neutral)	
Control of additive solenoid valve N°2	9	+230 V (Phase)	Control of blending valve
Control of additive solenoid valve N°2	10	+230 V (Neutral)	
Control of additive solenoid valve N°3	11	+230 V (Phase)	
Control of additive solenoid valve N°3	12	+230 V (Neutral)	
Control of additive solenoid valve N°4	13	+230 V (Phase)	
Control of additive solenoid valve N°4	14	+230 V (Neutral)	
Control of additive solenoid valve N°5	15	+230 V (Phase)	Blending gas purge control
Control of additive solenoid valve N°5	16	+230 V (Neutral)	

10.8. Temperature of main product

The acquisition of the main product temperature is via a PT100 3 wire sensor. The usual measurement range is -20 ° C / + 50 ° C. The temperature is displayed and managed to a precision of one tenth of a degree. A calibration dialogue is used to calibrate temperature measurements. The MICROCOMPT+ manages errors relating to compliance with the measuring range. In addition, according to configuration, high and low temperature operating limits can be specified and associated errors generated. These events will block the use of the system.

Electrical connection of temperature sensor (3 wire PT100)

Function	Terminal	Signal	Other function
Temperature measurement	31	PT100 (+)	
Temperature measurement	32	PT100 (-)	
Temperature measurement	33	PT 100 (0 V)	

10.9. Temperature of secondary product

The acquisition of secondary product temperature and its processing is done according to the same process as the main product.

The temperature acquisition for secondary products requires the use of an additional board of type "DUAL".

Electrical connection of temperature sensor (3 wire PT100)

Function	Terminal	Signal	Other function
Temperature measurement	Dual +	PT100 (+)	
Temperature measurement	Dual -	PT100 (-)	
Temperature measurement	Dual 0	PT 100 (0 V)	

10.10. Permissives (earth, anti-overflow, steam arm, external authorization...)

The MICROCOMPT+ calculator used for managing a loading arm has a set of digital inputs for process management.

Bottom loading: These inputs are all of dry contact or open collector type.

Function	Terminal	Specificity	Other function
External authorization	62		
Emergency stop	62		
Earth system	66	**Required**	
Anti-overflow system	68	**Required**	
Steam arm connection	69	**Required**	
Quality selection (0 bit) if standalone	63		
Quality selection (1 bit) if standalone	65		
Quality selection (2 bit) if standalone	72		
Filter blockage detection	73		
Gas detection on mechanical gas purger	71	Gas detection by purge / block system	
GND	70		

Top loading

Function	Terminal	Specificity	Other function
External authorization	62		
Arm oriented to right dock	63	**Required**	
Arm oriented to left dock	64	**Required**	
Earth system on right dock	65	**Required**	

Earth system on left dock	66	**Required**	
Arm lowered	68		
Deadman valve open	69	**Required**	
Anti-overflow	72		
Filter blockage detection	73		
Gas detection on mechanical gas purger	71	Gas detection by purge / block system	
GND	70		

All entries marked as mandatory are permissive which firstly prohibits the start-up of the loading sequence and also stops it as soon as any information disappears.

Securim

The connection of this type of intrinsically safe equipment requires the use of an additional board of type "intrinsically safe interface board - 6 line."

For the use of the first interface line, the sensor is connected between terminals 1 and 2 of the blue terminal block (terminals 1 to 12). Terminal 13 of the interface board must be connected to the red wire on the available supply board. The interface board must also be supplied with power via terminals 19 and 20. The white wire (24V) of the power board must be connected to terminal 19 and the black (0V) of the power board must be connected to terminal 20. The straps of the interface board must be positioned correctly to allow the selection of NO or NC signal. See chapter on intrinsically safe interface boards.

Special features of operation:

Sécurim (top loading): When this device is used, as the Securim system does not show sufficient recovery from the end of the arm dip tube through the product, the MICROCOMPT+ calculator controls the low flow rate loading valve independently of the volume sent. The use of this feature is optional.

Clogging: When this device is used, the indication of clogging prohibits the high flow rate command. The use of this feature is optional.

Quality selection: This set of ports, whose use is optional in standalone mode (not connected to a conduit system assigning loading permits), enables the selection of the product quality authorized for loading.

The codification determined by the input status is linked to the list of qualities configured in the calculator for standalone operation.

Quality	Port 72 (2 bit)	Port 65 (1 bit)	Port 63 (0 bit)
No selection			
Quality N°1			X
Quality N°2		X	
Quality N°3		X	X
Quality N°4	X		
Quality N°5	X		X
Quality N°6	X	X	
Quality N°7	X	X	X

10.11. Pressure measurement

The MICROCOMPT+ calculator can support pressure measurement via two analogue 4-20 mA ports These measures, one by a measuring system, are not involved in the loading process. The values are displayed as well as included in data accessible via the RS 485 links.

Electrical connection - pressure measurement on EMA (4-20 mA)

Function	Terminal	Signal	Other function
EMA Pressure Measurement	29	Signal (x mA)	Passive loop
EMA Pressure Measurement	30	0 V	
EMA Pressure Measurement	29	Signal (x mA)	Active Loop
EMA Pressure Measurement	28	+24 V	

Electrical connection - pressure measurement on EMB (4-20 mA)

Function	Terminal	Signal	Other function
EMB Pressure Measurement	Dual / Press M	Signal (x mA)	Passive loop
EMB Pressure Measurement	Dual / Press GND	0 V	
EMB Pressure Measurement	Dual / Press M	Signal (x mA)	Active Loop
EMB Pressure Measurement	Dual / Press 24V	+24 V	

10.12. Error

The calculator is equipped with a 24V output that is controlled when a major error is found.

This is particularly the case for:

- Error related to the response of a valve (the loading valve does not close within the specified time)
- Overflow detection (initial information from either the analysis of the bottom loading truck sensor system or the sensor installed on the top arm)
- Product leak (the calculator detects the metering but does not pilot the valve - the volume must be greater than 10 L for use of units in litres)
- Additive / dye leak (metering of detection at additive / dye entry without injection control)
- Emergency stop input copy report.

Function	Terminal	Signal	Other function
VARC request	57	+24 V	
GND	50	GND	

10.13. Pump requests

The calculator has a set of digital outputs to postpone product / additive / dye pump requests as needed. These pump requests are also available in the information accessible via RS485 computer links.

Digital outputs are available in 24V / 0.2 A.

Some outputs can be common to several functions. Their availability for the pump request feature may not be available following the implementation configuration.

Electrical connection for pump request

Function	Terminal	Signal	Other function
Main product pump request	56	+24 V	
Secondary product pump request (blending)	51	+24 V	Additive / dye 1 pump request
Additive / dye 1 pump request	51	+24 V	Secondary product pump request
Additive / dye 2 pump request	52	+24 V	
Additive / dye 3 pump request	53	+24 V	
Additive / dye 4 pump request	54	+24 V	
Additive / dye 5 pump request	55	+24 V	
GND	50	GND	

10.14. Gas detection and purge

To meet OIML recommendations and allow MID operation use, gas detection features upstream of the measuring system must be implemented. To manage these, the MICROCOMPT+ can support the

management of ALMA DG3001 analogue sensors as well as digital sensors. The DG3001 model can report the presence or absence of gas but also its correct operation.

From a process point of view, the detection of the presence of gas or reporting of a defective sensor stops loading and prevents it from starting. Loading cannot resume until the error is corrected.

The acknowledgment of the presence of gas error causes the start-up of a controlled purge sequence when a valve is associated to perform the operation. The purge valve is commanded as well as the product pump request. The sequence continues until the return of the liquid detection + 0.5 s and to the maximum setting for a period that has been configured in the application settings.

This gas purge detection feature is available for each of the two sets of measurement.

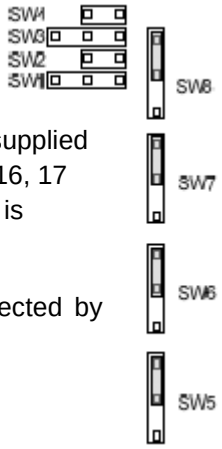
The connection of gas detection sensors requires the use of additional boards of type "4DG." Moreover, in the context of the use of EMB with gas detection, the additional board type "Dual" should also be used.

Electrical connection - gas detection (sensor model DG3001)

Function	Terminal	Signal	Other function
Gas detector DG3001 - EMA	4DG / 1	+	Terminal 15 of the 4DG board must be connected to the brown wire of the power board
Gas detector DG3001 - EMA	4DG / 2	-	
Gas detector DG3001 - EMB	4 DG / 3	+	A connection must be installed between terminal 16 of the 4DG board and terminal DG of the dual board.
Gas detector DG3001 - EMB	4 DG / 4	-	

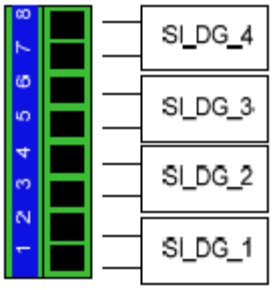
Terminal 14 of the 4 DG board must be connected to the Black wire (0V) of the power board.

The switch fitted to the board should be positioned in the positions below



The DGs (gas detectors) are supplied with voltage via terminals 15, 16, 17 and 18 on which the "+" (12V) is connected.

The 0V of the board is connected by the earth wire at terminal 14.



The board allows up to 4 gas detectors of type DG3001. However usually, only the first 2 are used.

NB: DG3001 type gas detectors are intrinsically safe equipment.

Gas detection can also be sent from a logical input in the case of purge / blocker use. The connection is mentioned in the chapter on permissives.

Gas purge electrical connection (digital output)

Function	Terminal	Signal	Other function
Gas Purge command EMA	5	+230 V (Phase)	
Gas Purge command EMA	6	+230 V (Neutral)	
Gas Purge command EMB	15	+230 V (Phase)	Additive control N°5
Gas Purge command EMB	16	+230 V (Neutral)	

10.15. Gas separator management

The MICROCOMPT+ calculator can support the management of ALMA dynamic gas separators. This equipment includes two DG3001 type gas detectors and a purge valve. When configured to implement this feature, the MICROCOMPT+ provides dynamic control over the purge based on the signals sent. Management of the separator is associated with the EMA measuring system.

The calculator controls the purge valve when the high level sensor indicates the presence of gas and continues until the sensor indicates the presence of liquid. Filtering occurs around the detection points of liquid and gas.

As long as the low level sensor does not indicate the presence of gas, loading is not interrupted.

If the low level is reached, loading is suspended. The purge sequence is then in manual mode and can be controlled until recovery using the low level sensor.

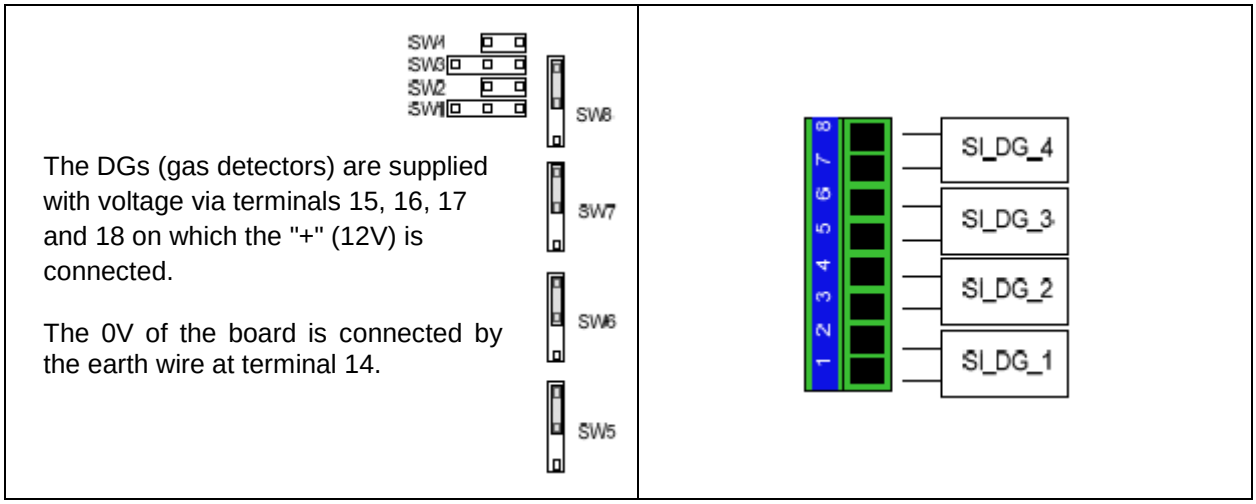
Electrical connection - gas detection (sensor model DG3001)

Function	Terminal	Signal	Other function
Gas detector DG3001 - Low level	4DG / 1	+	Terminal 15 of the 4DG board must be connected to terminal 19 of the power board
Gas detector DG3001 - Low level	4DG / 2	-	
Gas detector DG3001 - High level	4 DG / 3	+	Terminal 16 of the 4DG board must be connected to the brown wire of the power board
Gas detector DG3001 - High level	4 DG / 4	-	

Terminal 14 of the 4 DG board must be connected to the Black wire (0V) of the power board.

Caution: In this configuration, terminal 19 is used for gas detection, and it cannot receive power from the metering sensor. This supply is then to be connected to one of the following terminals according to availability (23/77/80/83/86).

The switch fitted to the board should be positioned in the positions below



The board allows up to 4 gas detectors of type DG3001. However usually, only the first 2 are used.

NB: DG3001 type gas detectors are intrinsically safe equipment.

Gas purge electrical connection (digital output)

Function	Terminal	Signal	Other function
Gas Purge command EMA	5	+230 V (Phase)	
Gas Purge command EMA	6	+230 V (Neutral)	

10.16. Copy of metering

The MICROCOMPT+ calculator can generate metering copies for third party systems. This mechanism allows you to specify the required copy report. However, it may not exceed a frequency of 100 Hz.

NB: Both feedback lines are out of phase by 180 °.

The signal is of open passive collector type.

Electrical connection - metering copy (digital output)

Function	Terminal	Signal	Other function
Metering copy line 1 - Product	46	+	
Metering copy line 2 - Product	47	+	
0V	78	-	

10.17. Anti-pollution valve (dye)

The calculator allows you to implement, when the dye injector is number 1, the management of an anti-pollution valve for dye injection. Via system configuration, the following setting are available:

- If order only to open or distinct commands for opening and closing
- If position sensor closed
- If position sensor open

Depending on the configuration, the calculator determines, depending on the process, the commands required and the state of the valve. Valve mismatch is generated if, after a time delay following a manoeuvre, the valve is not in the expected state. The value of the time delay is configurable via the setup menus.

During predetermination requiring dye injection, prior to the start of piloting of addition of the main product, the antipollution valve is ordered to open.

The opening of the loading valve starts when the pollution valve is detected at open.

At the end of the last dye injection, the anti-pollution valve is ordered to open.

An anti-pollution valve discrepancy error stops the loading sequence and prohibits the use of arms until the situation is normalised. Furthermore, a discrepancy generates a pollution error report. This implies that the following loading sequence must be done with the dye to include a rinse sequence at the end of loading.

Electrical connection for anti-pollution valve state (dry contact or open collector)

Function	Terminal	Specificity	Other function
Anti-pollution valve contact open	75		
Anti-pollution valve contact closed	76		
GND	70		

Electrical connection for anti-pollution valve 24 V / 0.2 A (digital output)

Function	Terminal	Signal	Other function
Anti-pollution valve contact open request	51	+24 V	Additive / dye 1 pump request
Anti-pollution valve contact close request	51	+24 V	Additive / dye 1 pump request
GND	50	GND	

11. RECORDS / METROLOGICAL LOG

As mentioned above, the MICROCOMPT+ calculator has an internal metrological log for the recording of all operations. In general, an operation begins with the assignment of a loading authorization and ends at the end of predetermination (expected amount reached or stoppage by the user). The volumes measured while no authorization is active, which may be the result of "leakage", are also logged when the associated error is observed.

The data available in the log are based on the configuration used:

- ⇨ Identification of the day (time stamp)
- ⇨ Product
- ⇨ EMA Volume at temperature
- ⇨ EMA Average temperature
- ⇨ EMA Volume converted (V15) (1)
- ⇨ EMA MV15 (1)
- ⇨ Loading side (in the case of bay tops) (2)
- ⇨ Mixing ratio (adjusted set point) (3)
- ⇨ EMB Volume at temperature (3) (4)
- ⇨ EMB Average temperature (3)
- ⇨ EMB Volume converted (1) (3)
- ⇨ EMB MV15 (1)(3)

(1) When configuring, set the volume conversion by the calculator
(2) For facilities on top bays
(3) For blender mode facilities
(4) For the metrological dye injection facilities

The metrological log can store at a minimum 5,000 operations for a minimum of 90 days.

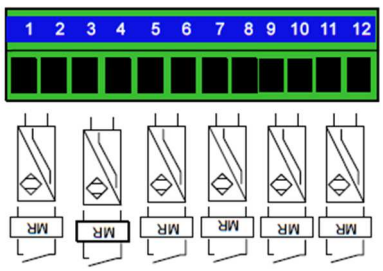
The metrological log data can only be read via a consultation dialogue with 3 pushbuttons. They can also be read through a RS485 computer link.

12. INTRINSICALLY SAFE INTERFACE BOARDS

Two types of intrinsically safe interface boards are available as needed. Only one of the two boards can be installed in the MICROCOMPT+.

Intrinsically safe 6-line interface board - Frequency Divider

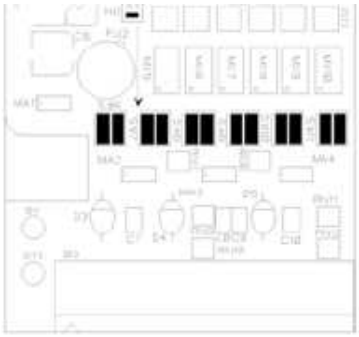
This type of board is mainly used when the digital sensors used are intrinsically safe. The sensor is connected to the pairs of terminals labelled from 1 to 12. Terminals 13-18 provide a digital signal to then be connected to the terminals or the power board connections.



Terminal 13 → Line 1
Terminal 14 → Line 2
Terminal 15 → Line 3
Terminal 16 → Line 4
Terminal 17 → Line 5
Terminal 18 → Line 6

Terminal 19 → 0 V (black wire power supply board)
Terminal 20 → 24 V (white wire power supply board)

For each line, the direction of NO / NC switches may be configured via the straps listed below and marked SW6 to SW11.

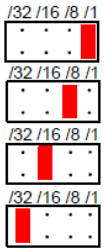


Principles for outputs

Normally Open

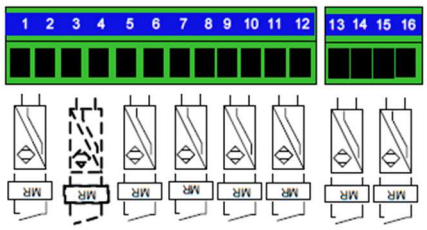
Normally Closed

When the frequency divider function is implemented, the board loses its intrinsically safe function. In the case of such use, the connected sensors must be provided with adequate ATEX protection. This type of feature is used when the meters deliver a metering frequency greater than 450 Hz

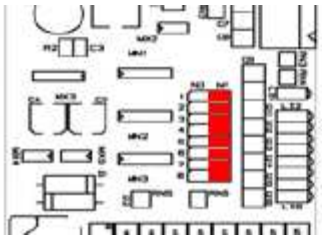
Frequency divider	
 No frequency divider Frequency 8-divider Frequency 16-divider Frequency 32-divider	Frequency divider is available for 1 to 5 lines by using straps labelled SW1 to SW5.

Intrinsically safe 8 line interface board

This type of board is mainly used when the digital sensors used are intrinsically safe. The sensor is connected to the pairs of terminals labelled from 1 to 16. Terminals 17-24 provide a digital signal to then be connected to the terminals or the power board connections.

	Terminal 17 → Line 1 Terminal 18 → Line 2 Terminal 19 → Line 3 Terminal 20 → Line 4 Terminal 21 → Line 5 Terminal 22 → Line 6 Terminal 23 → Line 7 Terminal 24 → Line 8 Terminal 26 → 0 V (black wire power supply board) Terminal 25 → 24 V (white wire power supply board)

For each line, the direction of NO / NC switches may be configured via the straps listed below and marked 1 to 8.



Principles for outputs

Normally Open

Normally Closed

These boards are usually installed and configured at the factory.

13. RELAY OUTPUT BOARD

An additional output board equipped with 5 relays can be installed if necessary. This board allows for interfacing with the 24 V power supply board output signals if applicable. Relays handle a voltage of 250 V at 5 A.

Connection table

Board input terminals	Line	Board output terminals
0V		
S1	N°1	C1 - Common
		F1 - Normally Closed
		F1 - Normally open
S2	N°2	C1 - Common
		F1 - Normally Closed
		F1 - Normally open
S3	N°3	C1 - Common
		F1 - Normally Closed
		F1 - Normally open
S4	N°4	C1 - Common
		F1 - Normally Closed
		F1 - Normally open
S5	N°5	C1 - Common
		F1 - Normally Closed
		F1 - Normally open

When using this type of board, the enclosure should be opened before cutting power, which may be connected to the output terminals Cx / Fx / Ox.

14. EXTENSION OF INJECTION CAPABILITY

The MICROCOMPT+ calculator allows for the connection of a set of additive injection or dye systems or a blending system.

The internal connection capability of the calculator is described in the table below

	Number of additives	Number of metrological dyes	Blending system
Only additives	5		
Additives + Colour (metrological)	3	1	
Additives + blending system	3		1

These possibilities satisfy the vast majority of requirements. However, for installations where this proves to be insufficient, it is possible to implement a complementary extension calculator named ACDA, allowing for access to the capabilities described below for one loading arm.

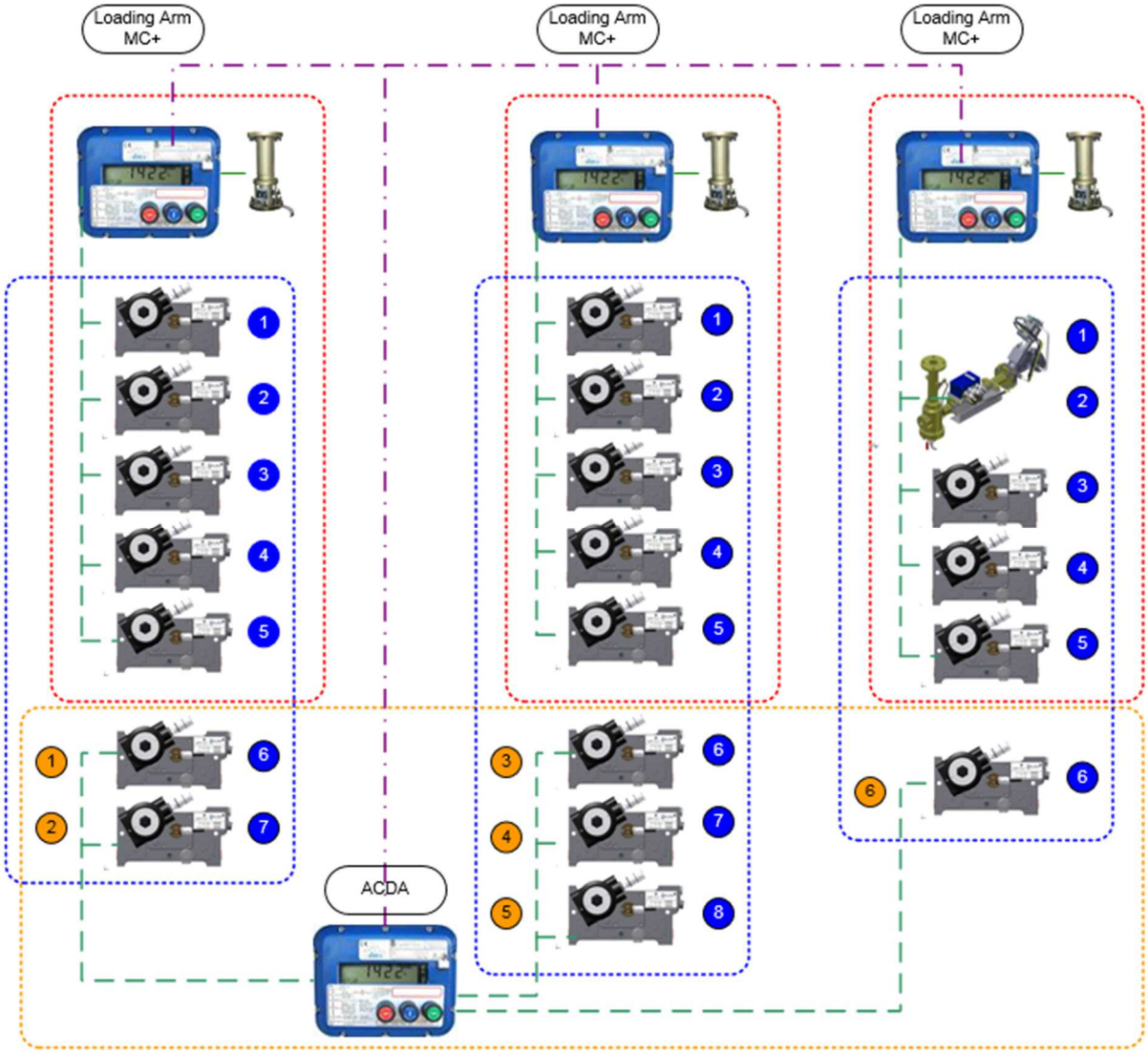
	Number of additives		Number of metrological dyes		Blending system
	On arm calculator	On extension calculator	On arm calculator	On extension calculator	On arm calculator
Only additives	5	3			
Additives + Colour (metrological)	3	3	1	1	
Additives + blending system					1

Moreover, this expansion calculator can be shared between multiple arm calculators within the same bay. The extension communicates with the arm calculator(s) via an RS485 link (line No 2 of calculator arms).

The ACDA extension calculator can receive one of the following, at a maximum:

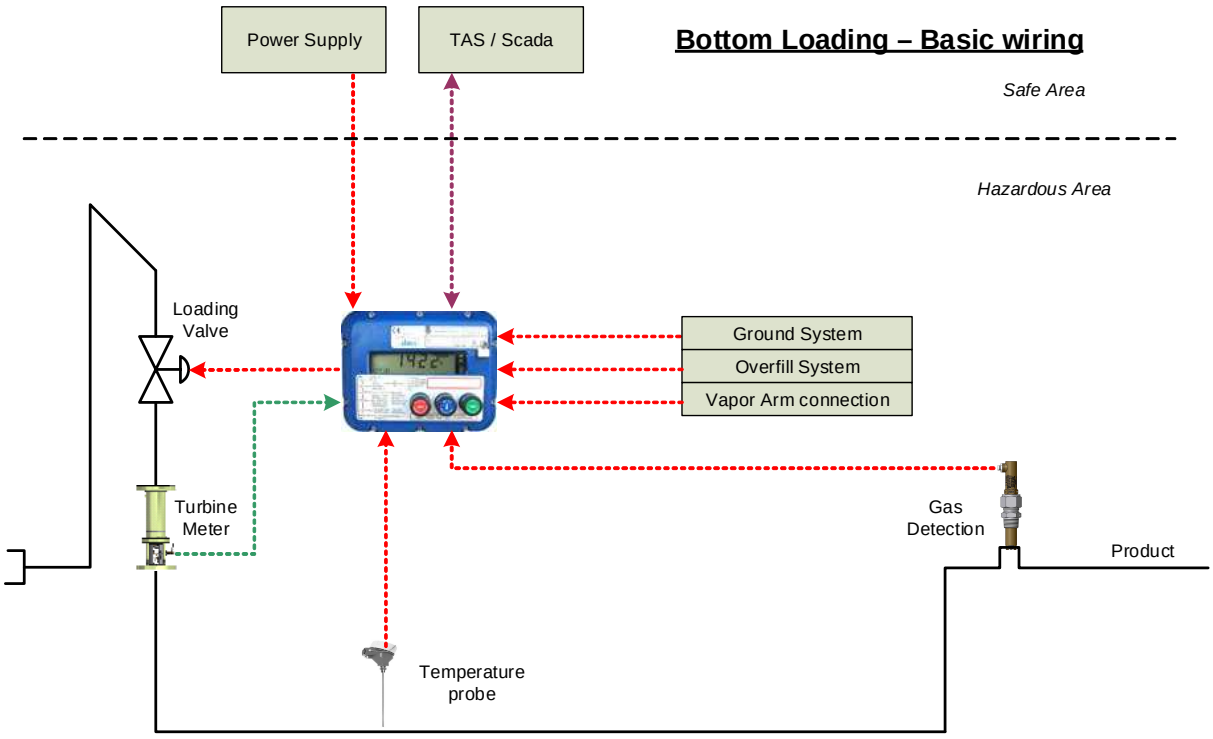
- ⇨ 8 additive injectors
- ⇨ 6 additive injectors + 1 metrological dye injector
- ⇨ 4 additive injectors + 2 metrological dye injectors

Example of extension of the injection capability of metering calculators within a bay.

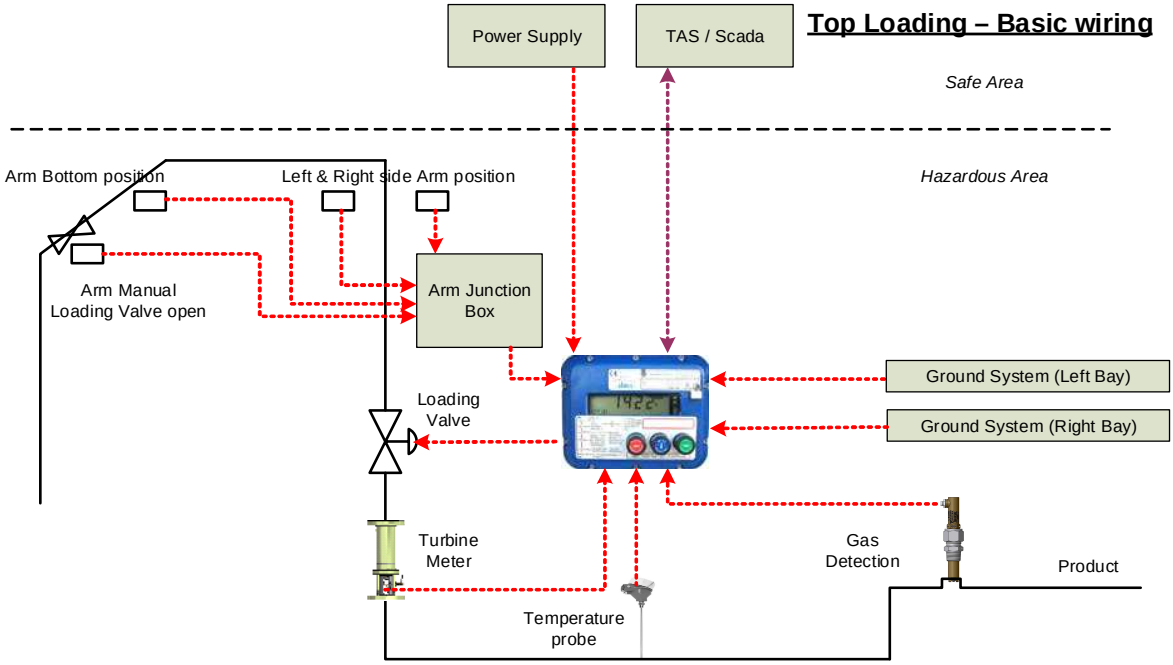


15. APPENDICES

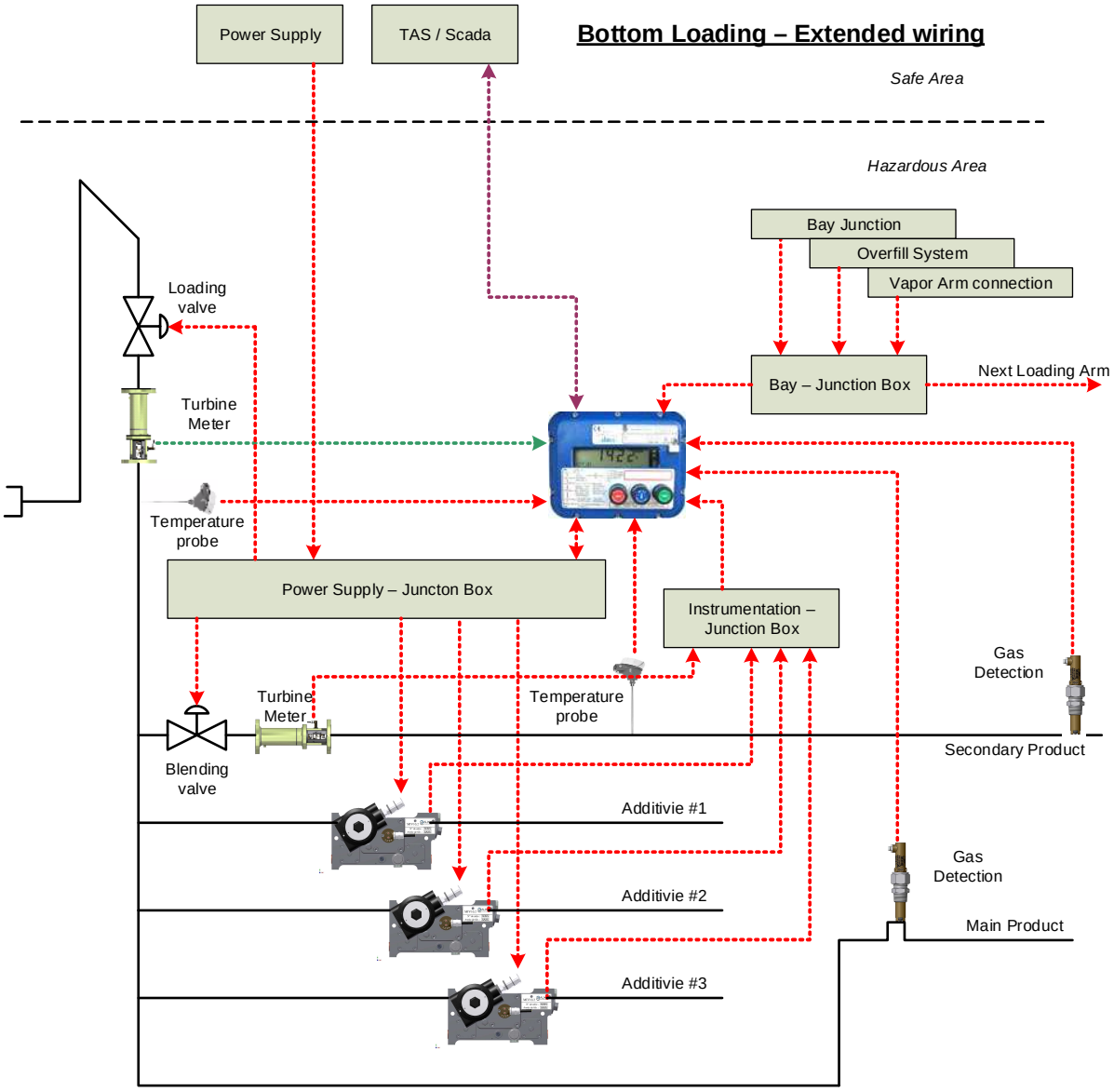
Typical basic interconnection schematic diagram for bottom loading arm



Typical basic interconnection schematic diagram for bottom loading arm



Typical advanced interconnection schematic diagram for bottom loading arm (blending system is in upstream injection mode in this example)



ATEX certificate - Extract

(2) Equipment and protective systems intended for use in potentially explosive atmospheres
Directive 94/9/EC

(1) EC-TYPE EXAMINATION CERTIFICATE

(3) Number of the EC type examination certificate: **INERIS 07ATEX0057X**

(4) Equipment or protective system:

ELECTRONIC TYPE EJBA

(5) Manufacturer: **ALMA**

(6) Address: BP 80549, La Bastide blanche
F-13814 VITROLLES

(7) This equipment or protective system and any other acceptable alternative of this one are described in the annex of this certificate and the descriptive documents quoted in this annex.

(8) INERIS, notified body and identified under number 0080, in accordance with article 9 of Council Directive 94/9/EC of the 23rd March 1994, certifies that this equipment or protective system fulfils the Essential of Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, described in annex II of the Directive.

The examinations and the tests are consigned in report No P91497/08.

(9) The respect of the Essential Health and Safety Requirements is ensured by:

- conformity with:

EN 60079-0	:	2006
EN 60079-1	:	2004
EN 60079-11	:	2007

- specific solutions adopted by the manufacturer to meet the Essential Health and Safety Requirements described in the descriptive documents.

Only the entire document including annexes may be reprinted. IM1337AC

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Parc Technologique Alata BP 2 F-60550 Verneuil-en-Halatte
tél + 33(0)3 44 55 66 77 fax + 33(0)3 44 55 66 99 internet www.ineris.fr
Institut national de l'environnement industriel et des risques
Etablissement public à caractère industriel et commercial - RCS Senlis B 381 984 921 - Siret 381 984 921 00019 - APE 743B

EC-Type Examination Certificate N° INERIS 07ATEX0057X

(10) Sign X, when it is placed following the Number of the EC type examination certificate, indicates that this equipment and protective system is subjected to the special conditions for safe use, mentioned in the annex of this certificate.

(11) This EC type examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system, these are not covered by this certificate.

(12) The marking of the equipment or the protective system will have to contain:

Ex II 2 G

Verneuil-en-Halatte, 2008 12 10

ATMOSPHERES EXPLOSIVES ORGANISME NOTIFIE INERIS NOTIFIED BODY EXPLOSIVE ATMOSPHERES

Director of the Certifying Body,
By delegation
T.HOUEIX
Certification Officer

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MID evaluation certificate - Extract

LNE
Le progrès, une passion à partager

cofrac
CERTIFICATION DE PRODUITS ET SERVICES
Accréditation n°5-0012
Liste des sites accrédités et portée disponible sur www.cofrac.fr
CIM11-V9-05-2013

CERTIFICAT D'EVALUATION

EVALUATION CERTIFICATE

N° LNE- 13624 rév. 5 du 26 février 2016

Modifie le certificat 13624-4

Délivré par *Issued by* : Laboratoire national de métrologie et d'essais

En application *In accordance with* : Guide WELMEC n°8.8 de décembre 2008 décrivant une procédure harmonisée pour un système volontaire de reconnaissance des évaluations modulaires d'instruments de mesure, OIML R117(95) relative aux ensembles de mesurage de liquide autre que l'eau

WELMEC guide n°8.8 of december 2008 aimed to describe a harmonized procedure for a voluntary system of modular evaluation of measuring instruments, OIML R117(95) Dynamic measuring systems for liquids other than water

Délivré à *Issued to* : ALMA - 4 A Boulevard de la Gare Porte 1
FRANCE - 94470 - BOISSY SAINT LEGER

Producteur *Producer* : ALMA - Bâtiment 4 - La Bastide Blanche - FRA 13127 VITROLLES

Concernant *In respect of* : Dispositif calculateur-indicateur électronique MICROCOMPT+ utilisé comme partie d'un système de mesurage continu et dynamique de quantités de liquides autres que l'eau.

Electronic calculator-indicating device MICROCOMPT+ intended to be used as a part of a measuring system for continuous and dynamic measurement of quantities of liquids other then water.

Caractéristiques *Characteristics* : Les caractéristiques du dispositif MICROCOMPT+ sont décrites en annexe du présent certificat.

The characteristics are described in appendix to the evaluation certificate.

Les principales caractéristiques et conditions d'évaluation figurent dans l'annexe ci-jointe qui fait partie intégrante du certificat et comprend 15 page(s) en annexe. Tous les plans, schémas et notices sont déposés au Laboratoire national de métrologie et d'essais sous la référence de dossier P140202 -3.

The principal characteristics, evaluation conditions are set out in the appendix hereto, which forms part of the approval documents and consists of 15 pages in annex. All the plans, shematic diagrams and documentations are recorded under reference file P140202 -3.

Etabli le 22 février 2016
Issued on February 22nd, 2016

Pour le Directeur Général
On behalf of the General Director

Laboratoire national de métrologie et d'essais
LNE
Thomas LOMMATZSCH
Responsable du Pôle Certification
Measuring Instruments Division Manager

Remarque *remark* : Ce certificat ne peut être cité dans un certificat d'examen CE de type sans l'autorisation du fabricant cité ci-dessus
This evaluation certificate cannot be quoted in an EC Type examination certificate without permission of the manufacturer quoted above.

Laboratoire national de métrologie et d'essais
Établissement public à caractère industriel et commercial • Siège social : 1, rue Gaston Boissier - 75724 Paris Cedex 15 • Tél. : 01 40 43 37 00
Fax : 01 40 43 37 37 • E-mail : info@lne.fr • Internet : www.lne.fr • Siret : 313 320 244 00012 • NAF : 743 B • TVA : FR 92 313 320 244
Barclays Paris Centrale IBAN : FR76 3058 8600 0149 7267 4010 170 BIC : BARCFRPP

Preliminary factory certificate - Specimen

FORM FAB 590 J / Constat VP

ALMA	CONSTAT DE VERIFICATION PRIMITIVE INITIAL VERIFICATION REPORT Calculateur indicateur	N16 5748
	Alma, F13127 VITROLLES	Page 1/1

Délivré à / *Delivered to :*

Concernant la vérification d'un calculateur pour liquides autres que l'eau
Concerning calculator verification for the measurement of liquids other than water

Type : **MICROCOMPT +** ***Chargement Camions/Wagons***

N° CET : **LNE-15270 du 12/11/2013** N° CEV : **LNE-13624-4**
Pattern approval Nr *Evaluation certificate Nr*

Nombre d'instruments : **1**
Instruments number :

N° de série du MICROCOMPT + : **A0579**
serial Nr

Dispositif complémentaire: **Non** Type : **Sans** N° série :
Ancillary equipment :

Constructeur : **ALMA**
Manufacturer :

Date de la vérification : **29/03/2016**
Date of verification :

Vérificateur : **Frédéric BUZON**
Auditor :

Signature :

QUALITY SYSTEM APPROVED ALMA F13127 VITROLLES N° LNE-20995 According to WELMEC Guide 8.8

SYSTEME QUALITE APPROUVE ALMA F13127 VITROLLES N° LNE-29577 Conforme au décret 2001-387

La vérification a été réalisée conformément au mode opératoire ALMA MO FAB 501
Verification has been made in accordance with ALMA operating guide MO FAB 501

Jugement / *Judgement* :

Le ou les instruments vérifiés satisfont aux conditions d'acceptation définies par la réglementation
The one or several verified instruments satisfy the regulation acceptance conditions

[X] Oui / *Yes* [ ] Non / *No*

Associate with MO FAB 501