# **OPERATING MANUAL**

# MU 7061 EN E

# **ELECTRONIC CALCULATOR-INDICATING DEVICE UNI**

As a part of measuring systems for measurement of liquids other than water



Е	2015/10/21	MPLS	DSM	AH
D	2013/10/22	Reference temperature is set via METROLOGICAL mode	DSM	АН
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# 1 GENERAL PRESENTATION AND DESCRIPTION

The ALMA UNI electronic calculator-indicator is intended to be used as a part of measuring systems for measurement of liquids other than water. Used alone it's a non-interruptible calculator belonging to accuracy classes 0.5 or 1. Associated to the MPLS device, it's an interruptible calculator. It can be autonomous or associated to other devices such as MPLS or CTD+ key.

It can be installed in measuring systems mounted on tank trucks or on a loading terminal.

It can be installed directly on an ALMA ADRIANE turbine measuring device or in an independent case, then it is connected to an ALMA 2B00 pulse emitter.

When necessary, the ALMA UNI electronic calculator-indicator includes:

⇒ A 3-wires PT100 temperature sensor (example CT1001),

⇒ One or two ALMA gas detectors type Honneywell LLE105000.

The UNI electronic calculator-indicator is equipped with a wireless digital connection used to enable the control of the process associated with the measuring system; function performed by the pair UNI/MPLS.

In the case of an ALMA UNI electronic calculator-indicator within an interruptible measuring system, the wireless digital connection enables to preset the volume and to command the pouring to stop when there is a significant failure.

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

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

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

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

B	0	-	~	2	н
	Y.		8		9
	B.	3	1		н
18	4	~	1	3	11

BP5	Light the	display	during	10	seconds
-----	-----------	---------	--------	----	---------

Normal mode: return to previous menu

			1
	-	-	
	2.74	3.7	

BP4

	METROLOGICAL mode: increment the flashing figure when imputing a value or return to previous menu
BP3	Normal mode, metering off: select the menu Normal mode, metering on: display the values (immediate flow, temperature) METROLOGICAL mode: select the figure to be modified or select the menu
BP2	Normal mode: validate the selected menu or value METROLOGICAL mode: validate the displayed value or validate the selected menu In case of default: acknowledge the default
BP1	Reset the volume to zero before a new measurement. The data of the last measurement are then recorded

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# 2 USER RECOMMENDATIONS

When it is not used, it's better to close the UNI cover.

The front face glass must be regularly cleaned for easy readability and better communication with the CTD+ key.

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

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

# 3 OPERATION

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

- ➡ It ensures the acquisition and processing of the pulses from the pulse emitter or from the electronic card's coils.
- It calculates and displays volume in metering conditions based on Kfactor determined during the calibration of the turbine, corrected during the calibration of the measuring system.
  In some cases, this volume in metering conditions can be corrected depending on the flow rate and/or the type of liquid measured.
- If required, it calculates and displays the mean temperature of the liquid when it is measured by a PT 100 temperature sensor.
- ⇒ If required, it calculates and displays volume converted to base conditions. Volume is calculated by taking into account the mean temperature of the liquid during metering. Using a standard conversion formula, the conversion factor can be calculated according to density in base conditions.

Density is entered manually prior to metering via the METROLOGICAL mode.

- $\Rightarrow$  The UNI device volume is reset to zero manually.
- ➡ It memorizes and secures measurement information, which can be read from the user interface of the calculator-indicator.
- $\Rightarrow$  If the measuring system is interruptible, it presets the volume to be delivered.
- ⇒ It registers accumulated volumes in metering conditions, including when the calculatorindicator is in alarm.

The UNI calculator-indicator has 2 operation levels: the USER mode for operation: measurement, visualisation, supervision; and the METROLOGICAL mode for the configuration of the device by authorized personnel



# 4 USER MODE



The UNI can be either ON or OFF metering.

The displayed quantity depends on the configuration set in METROLOGICAL mode. The arrowpictogram located on the right hand of the display screen is used to point out Vm or Vb such as shown below:



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## 4.1 Menu METERING – MEtErin

#### Non-interruptible measuring system (calculator UNI alone)

At the end of measurement, press RAZ to record the last measurement and to reset the volume.



## Interruptible measuring system (calculator UNI associated to the MPLS)

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





# 4.1.1 Visualisation of values during delivery

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

- One time for flow rate,
- Two times for temperature (if the temperature option is activated).

Display returns automatically to the current volume.

## 4.1.2 Data recording and volume reset

For a non-interruptible measuring system, at zero flow conditions, press BP1 RAZ to record the last measurement data and to reset the volume to zero.

For an interruptible measuring system, appearance of the authorisation resets the volume to zero. Withdrawal of the authorisation causes recording of the last measurement at zero flow conditions.

## 4.1.3 Printing of a delivery ticket

For interruptible measuring systems only.

If a printer is connected to the MPLS device, simply insert a ticket into the printer at the end of measurement and the delivery ticket is printed (see ANNEX).

## 4.1.4 Transfer the measurement results to a computer – option

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

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

Refer to the maintenance sheet FM 8012 about transferring the measurement results of the UNI indicator device to a computer.



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#### 4.2 Menu VISUALISATION – ViSuALi



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

#### 4.2.1 Sub-menu METERING – MEtErin

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



# 4.2.2 Sub-menu TOTALISER – totALiS

This menu displays:

- O The totaliser of volume in metering conditions (Vm)
- The totaliser of volume converted to base conditions (Vb) if the temperature option is activated.

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# 4.2.3 Sub-menu MEMORISATION – MEMoriS

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



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# 4.3 Menu SUPERVISOR – SuPErVi



## 4.3.1 Sub-menu CALIBRATION – CALibrA

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



#### 4.3.2 Sub-menu SEASON – SEASon

Choose the season in order to change from summer to winter time (and back again).



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#### 4.3.3 Sub-menu PARAMETERS – PArAMEt

This menu displays the parameters set in METROLOGICAL mode.





#### 4.3.4 Sub-menu MAINTENANCE – MAintEn

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



#### 4.3.5 Sub-menu TRANSFERT - trAnSFr

This sub-menu is available with the 'Transfer Key CTD+' option. It is used to transfer to the key the parameters set in METROLOGICAL mode and the measurement results and to download it to a PC. The file format is '.csv'. Refer to the maintenance sheet FM 8012.



Transfer the parameters and the measurement results to the key

Set the number of days N for the transfer of the measurement results. If N=7, the measurement results of the last 7 days will be transferred.

NOTE: Do not plug the USB cable during data transfer

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#### 4.4 List of alarms

Should a fault occur, the UNI displays the word "ALArM" and the fault title on the display (using some or all of the seven digits) followed by the displayed value. The operator acknowledges the fault by pressing down BP2 (even when pouring). Apart from battery related faults, persistent faults cannot be acknowledged. Once the fault is acknowledged, the selected value is displayed alternately with "------" to indicate that the measured values are no longer guaranteed.

	DISPLAY	MEANING	ACTION
	Author	The autorisation has been removed during pouring	The measurement is ended
R	oVErFLo	Volume greater than 4 194 304 liters	Reset the device
USE	LoW_FLo	Flow rate less than the setting minimal flow rate	Check the hydraulic configuration and the flowing
	SEnSor1	High gas detector fault (GDh)	Use the maintenance menu to check the status of the detector
	SEnSor2	Low gas detector fault (GDI)	Use the maintenance menu to check the status of the detector
	FLoV_	Flow setting fault	Check the parameters
	FrEQ_	Frequency fault	Check the parameters
	COEFF_	Difference two coefficients is greater than 0,5%	Check the coefficients setup
	MEtEr	Problem of metering with the meter	Check the setup
	HiGH_FL	Flow rate greater than the setting maximal flow rate	Check the setup
	dAtE	Loss of date and time	Set date and time in metrological mode
	GAS	GDh is wet but GDI is dry	Check the hydraulic configuration / Check the detector status
	bobinE	Loss of pulse transmitter signal	Check the connection with the pulse transmitter
~	tEMPErA	Temperature less than -20°C or greater than 50°C	Check the temperature sensor (measure and calibration)
b	diSPLAY	LCD display fault	If steady alarm, substitution of the UNI
۲ <u>۶</u>	doG	Fault with card	If steady alarm, substitution of the UNI
AF	ProGrAM	Error on the cheksum of the metrological data	If steady alarm, substitution of the UNI
E E	rAM	Saved memory fault	If steady alarm, substitution of the UNI
-	MEMoriS	Bad writing into the memory	If steady alarm, substitution of the UNI
	FuLL	SIM memory full	If steady alarm, substitution of the UNI
	MEtro_	Configuration loss	If steady alarm, substitution of the UNI
	bAttErY	Low battery	Substitution of the batteries
	totAL_	Totaliser fault	If steady alarm, substitution of the UNI
	dEF_MEM	Loss of backup data concerning the last measurement	If steady alarm, substitution of the UNI
	dEF_CoM	Communication fault with IRDA link	Check the IRDA link
	rECEPt	Problem of communication protocol between the calculator- indicator UNI and the MPLS device	Check the compatibility of the software version of the MPLS device with the calculator-indicator UNI



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# 5 METROLOGICAL MODE



#### 5.1 Menu REFERENCE – rEFErEn

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

rEFErEn \_\_\_\_\_\_ 0000000

#### 5.2 Menu TURBINE - turbinE

Set the serial number of the turbine meter.

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# 5.3 Menu COEFFICIENT – CoEFFiC



Meter coefficient for low flowrate (pulses per liter).

Flowrate corresponding to COEFF\_1

Meter coefficient for high flowrate (pulses per liter).

Flowrate corresponding to COEFF\_2

Correction coefficient for low viscosity products

# 5.4 Menu PRODUCTS – Product

Definition of products.



Definition of products (from 1 to 9): - Name

- Density in kg/m<sup>3</sup> in base conditions. Set '000' to remove the product from the list displayed in user mode

Names and MVTB at 15°C displayed are default values.

# 5.5 Menu FLOWRATES – FLoWrAt



Minimum flowrate of the measuring system

Maximum flowrate of the measuring system

#### 5.6 Menu VOLUMES – VoLuMES



Minimum quantity to garanty the measurement

Set the end of metering volume in liters. *Not applicable without gas detectors* 

Set the delay for the additional volume (GDI dry). *Not applicable without gas detectors* 

Accuracy class of the measuring system. Authorized values: 0.5 or 1

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# 5.7 Menu TEMPERATURE – tEMPErA

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

- Two temperature measuring points: The measure must be done outside the range -20 to +50°C. Adjust the PT100 simulator to a value<-20°C, wait for 15 seconds before setting the temperature into the calculator. Then do the same for a value>+50°C.
- Single temperature measuring point: The measure must be done in the range -20 to +50°C.



# 5.8 Menu GAS SENSORS – SEnSorS

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



Both gas sensors are connected to the UNI device. BEFORE VALIDATION: Check that gas detectors are CONNECTED and DRY

# 5.9 Menu THRESHOLDS - V\_tHrES

Detection thresholds of metering inputs at zero flow and at maximal flow.



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#### 5.10 Menu DATE AND TIME – dAt\_tiM

Enter date and time.



# 5.11 Menu MPLS – MPLS

This menu must be activated in the case of an interruptible measuring system; the UNI calculator is then associated to an MPLS device.



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## ANNEX

Delivery ticket for interruptible measuring systems connected to a printer

Installation: Indicateur/Indicator: Date (/MM/20): Quantieme/Calendar: Numero/Number:	AA09C01 0000000123 21/10/2015 295 001
Heure de fin/ End time:	15:22
Produit/Product:	GAZoLE
Quantity delivered:	0000499 (L)
Totalisateur/Totaliser:	0010207
Index avant/before: Index apres/after:	0012886
En cas de litige, les re memorises par l'indica of dispute, the measur by the main indicating	sultats de mesurage teur font foi. In case rement results stored device providing proof.

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## **RELATED DOCUMENTS**

GU 7061	User Guide for UNI
GU 7074	User Guide for UNI MPLS
FM 8009	Replacement of the batteries of the UNI indicator device
FM 8012	Transfer the measurement results of the UNI indicator device to a computer
FM 8505	Adjustment of an ALMA measuring system equipped with a UNI indicator device
FM 8509	Adjustment of temperature in the UNI indicator device

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