OPERATING MANUAL

MU 7103 EN B

GCPMA

CERTIFIED METERING SKID

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1 GENERAL PRESENTATION AND DESCRIPTION

The ALMA GCPMA is an interruptible measuring system intended for:

- ⇒ Petroleum products loading on tank vehicles, tank cars, fixed tanks (LOADING);
- ⇒ Reception of petroleum products, tank vehicles, tank cars (UNLOADING).

The GCPMA measuring system is mainly composed of:

- ⇒ A turbine meter type ADRIANE
- ⇒ An electronic calculator-indicator MICROCOMPT+
- ⇒ A gas separator
- ⇒ A non-return valve LOADING
- ⇒ A diaphragm
- ⇒ A sight glass UNLOADING
- ⇒ A three-way manual valve for the measuring systems used for reception UNLOADING

Two serial links are available for the communication with external devices such as a printer (COM1) or a supervisor device (COM2).

Presentation of the MICROCOMPT+ calculator-indicator:



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

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2 OPERATING RECOMMENDATIONS

When the GCPMA is used as a loading measuring system, the meter and the pipeline between the meter and the delivery transfer point are kept full of liquid during any measurement and during standstill periods.

3 OPERATION MODE OF THE INDICATOR DEVICE

User mode

This is the normal using mode in exploitation. Refer to <u>USER MODE</u>

Supervisor mode

To access the supervisor mode, the key must be put at the right of the MICROCOMPT display. This mode is used to set the measuring system and to access the calibration menu.

Refer to <u>SUPERVISOR MODE</u> for setup.

Metrological mode

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



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4 USER MODE



Depending on the device configuration, the loading process may not be exactly the same as those described in the following sections.

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4.1 Menu LOADING

Delivery can be done thanks to the 'PRESET' mode or the 'FREE' mode. In both cases, during the measurement, some information may be displayed:

- Instantaneous flowrate: ONE TAP ON MENU + VALIDATION
- Temperature (°C) with active option: TWO TAPS ON MENU + VALIDATION
- Conversion factor with active option: THREE TAPS ON MENU + VALIDATION

Return to current display is automatic. DO NOT PRESS THE BUTTON STOP.

4.1.1 'PRESET' delivery mode

Delivery can be interrupted at any time by pressing STOP. This may be useful if an error is made when entering the preset volume. The value must be greater than the previous preset volume and has to match with the total volume to be loaded. In case of interruption, you can change the delivery mode from PRESET to FREE (see related section).



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4.1.2 'FREE' delivery mode

Delivery can be interrupted at any time by pressing STOP. In case of interruption, you can change the delivery mode from FREE to PRESET (see related section).



4.1.3 OPTION: Print the delivery document

This menu is available if the device is linked to a printer and if the related option (PRINTER \rightarrow ON) has been activated in METROLOGICAL mode. At the end of the delivery, you can print the loading ticket <u>or</u> the invoice if the option is ON. In that case, you have to set price and taxes data for the product loaded or to validate the values displayed. The proposed data are those which have been configured in SUPERVISOR mode.



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4.2 Menu UNLOADING

4.2.1 Unloading

During the measurement, some information may be displayed:

- O Instantaneous flowrate: ONE TAP ON MENU + VALIDATION
- Temperature (°C) with active option: TWO TAPS ON MENU + VALIDATION
- O Conversion factor with active option: THREE TAPS ON MENU + VALIDATION

Return to current display is automatic. DO NOT PRESS THE BUTTON STOP.



4.2.2 Option: Print the delivery document

This menu is available if the device is linked to a printer and if the related option (PRINTER \rightarrow ON) has been activated in METROLOGICAL mode. At the end of the delivery, you can print the loading ticket <u>or</u> the invoice if the option is ON. In that case, you have to set price and taxes data for the product loaded or to validate the values displayed. The proposed data are those which have been configured in SUPERVISOR mode.



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4.3 Menu VISUALISATION

This menu allows the display of the totalisers (general and product) and offers a display sequence of all the measurement results memorized by the GCPMA. Two sub-menus are available:

- LIST: all measurements results, from the last to the first one, sorted by day number and then by measurement number in the day;
- SELECTION: a particular measurement that is chosen by setting the day number and the measurement number.

For each measurement, the following information are given: volume at temperature (Vm), converted volume (Vb), product density, mean temperature, start and end times, index before and after the measurement.



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4.4 Menu PRINTING (OPTION)

This menu is displayed when the device is linked to a printer and if the related option (PRINTER > ON) has been activated in METROLOGICAL mode.



4.5 Menu MAINTENANCE

This menu is not used.

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4.6 List of alarms of the GCPMA

		DISPLAY	MEANING	ACTION
		STOP OPERATION	Intentional interruption of discharge	Continue, stop or finish the discharge
		EMERGENCY STOP	An emergency stop has been detected	Check the emergency stop
		COMMUNICATION FAULT	No more communication with the printer	Check the connection cable, on-off switch and fuse
~		POWER SUPPLY PROBLEM	Power outage during discharge	Check the cause / Restore power supply
Ш		LOW FLOW DEFAULT	Low flowrate (less than 15m ³ /h)	Check the hydraulic system (valve, strainer, nozzle)
S		HIGH FLOW DEFAULT	High flowrate (greater than maximum flowrate)	Check the hydraulic system (valve, pumping)
		ZERO FLOW DEFAULT	Zero flow	Check the hydraulic system (security valve)
		METERING PROBLEM	Metering problem with the measuring device	Check if the pulse transmitter is powered (red indicators)
		MANDATORY END	Discharge has to be stopped	End discharge
		AUTHORISATION LOST	Loss of loading authorisation	Deal with the problem on the control device
		LEAKAGE FAULT	Counting outside a measurement period	Check the tighness of the loading valve
	9	DISPLAY DEFAULT	Problem with display card	If steady alarm, substitution of the display card
	N N	WATCHDOG DEFAULT	Fault with display or power card or AFSEC+ card	If steady alarm, substitution of the faulty card
	ĕ	VOLUME CONVER. FAULT	Problem during conversion of volume	Substitution of the AFSEC+ electronic card
		TOTALISER LOST	Loss of totalizer	Substitution of the backup battery
~	<u> </u>	TEMPERATURE DEFAULT	Temperature determination failure	If steady alarm, see a reparator for trouble shooting
Ю		HIGH PUMP TEMP.	The temperature of the pump is too high	If steady alarm, see a reparator for trouble shooting
Ĕ		MEMORY LOST <pile></pile>	Loss of saved memory	Substitution of the backup battery
R		MEMORY LOST	Error on SIM memorization	Substitution of the backup battery
ΡA		COEFFICIENTS DEFAULT	Deviation between coefficient LF/HF greater than 0.5%	Modification of the low flow coefficient (K1)
Ш	Q	PROM DEFAULT	Loss of software or resident integrity	Substitution of the AFSEC+ electronic card
	Ι¥	RAM DEFAULT	Saved memory fault	Substitution of the AFSEC+ electronic card
	8	EEPROM MEMORY LOST	Loss of metrological configuration	Substitution of the AFSEC+ electronic card
		MEMORY OVER LOADED	SIM memory full	Substitution of the AFSEC+ electronic card
		DATE AND TIME LOST	Loss of date and time	Set date and time in metrological mode
		POWER BOARD LOST	The software and the power electronic board are not compatible	Deal with the problem
		DENSITY DEFAULT	Density out of range	Check the curve thanks to METROLOGICAL mode



5 SUPERVISOR MODE Image: state state

5.1 Menu CALIBRATION

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

First, fill the gauge (USER mode) with predetermination of the volume. Switch to SUPERVISOR mode, choose 'CALIBRATION > ENTER GAUGE VOLUME' and validate. Enter the reference volume and validate. The following information is then displayed:

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

To linearize the curve, follow these instructions:

- Fill the gauge in high flow [flow_{min}×3]≤high flow<[flow_{max}], and enter the volume read on the gauge in the menu 'CALIBRATION > ENTER GAUGE VOLUME' as described above;
- Fill the gauge in low flow [flow_{min}]≤low flow≤[flow_{min}×2], enter the volume read on the gauge in the menu 'CALIBRATION > ENTER GAUGE VOLUME' as described above;

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 Choose 'CALIBRATION > LINEARISATION/FLOW' and validate. It is then possible to read the coefficients and the flow rates data for the two tests carried out.

If the difference between the coefficients calculated by the MICROCOMPT is too important, the message "BAD DEVIATION (K1/K2)" is displayed. If the difference between the flowrates of the two tests carried out is too low, the message "FLOWRATES TOO CLOSED" is displayed.

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

- 'BAD DEVIATION K1/K2': Correction between both points >0.5%
- 'FLOWRATES TOO CLOSED': High flowrate value needs to be between low flowrate×3 and maximum flowrate
- 'LO-FLOW OUT OF RANGE': Low flowrate value is not between low flowrate and minimum flowrate×1.5
- 'ONLY ONE GAUGE': Only one test has been recorded
- 'NO VALID GAUGE': No test has been recorded.



5.2 Menu LANGUAGE

This menu is available if a translation catalogue has been uploaded in the MICROCOMPT.

LANGUAGE (FR)

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5.3 Menu PRODUCTS SETTINGS



5.4 Menu PRINTER SETTING

Choose the format for the delivery ticket.



5.5 Menu MODE

MODE (XX) → MODE→SUPERVISOR MODE→AUTONOMOUS MODE→CONTROL

5.6 Menu TIME ADJUSTMENT

Date and time are set in METROLOGICAL mode. The time may be adjusted $(\pm 2h)$ once a day through this menu.

TIME ADJUSTMENT 14.41

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5.7 Menu PARAMETERS

The configuration of the measuring system is displayed. It depends on the options that have been activated.



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6 METROLOGICAL MODE



6.1 Menu INDICATOR REFERENCE



Set the GCPMA serial number

6.2 Menu CONFIGURATION



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6.2.1 Sub-menu MODE

Choose the operating function of the GCPMA: GCPMA for LOADING or GCPMA for UNLOADING. The PRESET menu allows the activation of the function of preset the volume for the GCPMA for LOADING.



6.2.2 Sub-menu UNIT AND ACCURACY

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



6.2.3 Sub-menu PRODUCTS

For each product (from 1 to 16): The density is displayed and can be changed <u>ONLY I</u>F the conversion is activated (CONVERSION \rightarrow ON). The name of the products is set in SUPERVISOR mode. Correction can be applied by selecting CORRECTION \rightarrow ON.



6.2.4 Sub-menu CONVERSION

Activation of the 'conversion' option. Choose the volume displayed in user mode:

- VM: volume at temperature (gross volume),
- O VB: volume converted to the reference temperature

Choose 'CONVERSION \rightarrow OFF' if the volume is not converted.



6.2.5 Sub-menu INVOICING

Activation of the 'invoicing' option. The parameters are set in SUPERVISOR mode



6.2.6 Sub-menu PUMP TYPE

Option PUMP type. Choose the type of pump used: ATEX or NON ATEX. For an ATEX pump, set the temperature values, the limit operating temperature of the pump and the maximum allowed temperature before emergency stop.

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6.2.7 Sub-menu PRINTER

Fonctionnement avec imprimante ou non. Impression automatique ou manuelle des documents.



6.2.8 Sub-menu MEASURING

Authorization to start the delivery:

- AUTO: the delivery starts automatically,
- MANUAL: the beginning of the delivery is manual, it must be enabled by pressing OK (green button).



6.2.9 Sub-menu COMMUNICATION

Choose the communication mode.



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6.3 Menu MEASURING SYSTEM



6.4 Menu DATE AND TIME



Enter the day, the month and the year, and then enter hour and minutes.

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ANNEX

PARAMETERS:

Print the calculator parameters

SUMMARY:

2

Print the daily summary

GCPMA 4027 Version 01.05.00 of 17.01.13 Printed on the 21/01/13 at 15h40 Indicator: 03201	GCPMA 4027 Version 01.05.00 of 17.01.13 Printed on the 21/01/13 at 15h40 Indicator: 03201	
Summary of measurements of 21/01/13 Day 021 003 memorised results	Mode: loadingUnit and accuracy: 123456 LConversion: ouiDisplay: VmInvoicing: onBump: atox	
**** DAILY TOTALISERS **** GO (01) : 00000998 L +13°C FOD (02) : 00002408 L +13°C	Pump : atex T pump : 10.0°C T min : -20.0°C T limit : 40.0°C T max : 50.0°C Printer : on	
Total from 1 to 2: 00003406 L	Authorization : off Embedded computing: off Measuring system Coefficient K1 : 09.8148p/l Flowrate Q1 (PD) : 5.5m3/h	

	************ SETTINGS ************	
	Flowrate: Minimum flowrate : 8.0 m3/h Maximum flowrate : 50.0 m3/h Volume: Minimum discharge : 200 L LF->HF volume : 10 L HF->LF volume : 100 L Timing: LF->HF TIMING (s) : 4 0 flow timing (s) : 30 ************************************	
	Namesdensity at 15CorrectionGO(830 kg/m3)offFOD(730 kg/m3)off	

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TOTALISER:

Print the general totaliser

EVENTS RECORDED:

Print the events recorded

GCPMA 4027 Version 01.05.00 of 17.01.13 Printed on the 21/01/13 at 15h40 Indicator: 03201 62 recording(s) 12:38:14 Param@27= 75 12:37:59 Param@14= 1 12:37:48 Param@25= 85 12:37:35 Param@13= 1 12:36:52 high pump temp. ...

11:45:16 Switch on

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