OPERATING MANUAL

FLEXICOMPT AUTONOME+

MEASURING SYSTEM FOR GRAVITY MEASUREMENT



G	13/09/24	Software evolution (DIM)	DSM	XS
F	06/09/12	'IR-USB KEY' removal procedure, updating menus MAINTENANCE and VMFT	DSM	XS
D	24/04/12	'IR-USB KEY' option	DSM	XS
Α	26/02/09	Creation – Replace MM5014-EN-4	FM	DSM
Rev.	Date	Nature of modifications	Writter	Approb.

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1. GENERAL PRESENTATION AND DESCRIPTION

The FLEXICOMPT AUTONOME+ is intended to the gravity measurement of products other than water on various installations.

It can:

- measure products when they are delivered to the station,
- monitor the reception of products (lorry/wagon),
- split compartments,
- measure product returns,
- and issue tank charts.

The FLEXICOMPT AUTONOME + includes:

- an intrinsic security indicator-calculator device, type UNI, powered by 2 lithium batteries (4 years life expectancy) fastened to the hydraulic sleeve,
- a hydraulic measuring sleeve composed of:
 - an ALMA turbine meter, type ADRIANE DN80-80,
 - a sight glass located downstream of the turbine meter,
 - a vacuum breaker valve,
- an appropriate connector: a 4" coupler to connect onto the API adapter, a DN80 quick coupling to connect the unloading hose or any other connector (CAMLOCK, TODO, aviation,...)
- an appropriate unloading connector: a quick coupling to connect the unloading hose or any other connector (CAMLOCK, TODO, aviation,...).

The FLEXICOMPT AUTONOME + may be connected to a temperature sensor.

The 'IR-USB KEY' option is used to transfer measurements results to a key. The data may be downloaded from the key to a PC through USB cable.

Il est également possible de transférer séparément le fichier des paramètres métrologiques et de configuration du FLEXICOMPT AUTONOME+ pour un suivi complet de l'instrument (contrôle périodique, identification et aide au diagnostic).



The indicator-calculator device, type UNI guarantees the metering operations and manages the faults linked with the metering system.

The operating temperature for the UNI is between -20° C and $+50^{\circ}$ C.

On the front of the UNI, you can see five buttons:

	BP5	Light the display during 10 seconds
Modif:	BP4	Normal mode: return to previous menu Supervisor and Metrological mode: increment the flashing figure when imputing a value or return to previous menu
Select.	BP3	Normal mode, metering off: select the menu Normal mode, metering on: display the values (immediate flow, temperature) Supervisor and Metrological mode: select the figure to be modified or select the menu
Valid.	BP2	Normal mode: validate the selected menu or value Supervisor and Metrological mode: validate the displayed value or validate the selected menu In case of default: acknowledge the default
RAZ	BP1	Reset the volume to zero before a new measurement. The data of the last measurement are then recorded

2. USER RECOMMENDATIONS

2.1 MOBILE INSTALLATION

The vacuum between the connecting device and stripping valve on the FLEXICOMPT AUTONOME+ device must be rigid with a 15 degree angle, a 80mm minimum diameter and a length of less than 80mm.

2.2 STATIONARY INSTALLATION

The FLEXICOMPT AUTONOME+ measuring system device must be placed within a vertical plan and with a 15 degree angle between his axis and the horizontal axis.

The connecting pipe to the discharge valve must have a 80mm minimum diameter and a length of less than 80mm.

If the length of the pipe exceeds 80mm, only complete discharges of the tank are guaranteed.

The operator must make sure that all of the following conditions are met:

• During the measurement, the FLEXICOMPT AUTONOME+ is placed according to a vertical plan on a horizontal discharge valve. This requirement has been considered as satisfactory when the FLEXICOMPT AUTONOME+ downstream connector is on the lowest position than the upstream connector;



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• The flexible or rigid hose, placed between the FLEXICOMPT AUTONOME+ and the collecting tank must have a 80 mm minimum nominal diameter and a 8 m maximum lenght. It must allow an easy flow product when delivery.

The Alma FLEXICOMPT AUTONOME+ measuring system is a non interruptible device, so direct sale to the public is prohibited.

NB: the FLEXICOMPT AUTONOME+ cannot be used for pumped applications.

3. IGNITION AND OPERATION

The FLEXICOMPT AUTONOME+ measuring system operates with an empty hose. The operator connects it to the API adaptor and then connects the hose to the FLEXICOMPT AUTONOME+ outlet.

The operating procedure is as follows:

- After having reset the indicator to 0 (BP1 RAZ), the operator opens the tank valve. The metering starts as soon as the UNI indicator calculator device records impulses coming from the turbine. The metered volume is continually displayed on the UNI indicator-calculator device.
- For partial emptying:

The operator stops metering by closing the tank valve. The metering stops when the UNI indicator-calculator device notes that the two gas detectors are wet and flow rate is to zero.

- For complete emptying:

The operating procedure is identical to the partial emptying procedure but there is no voluntary action on the tank valve.



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4. USER MODE



The UNI metering can be either ON or OFF. Metering is ON between the first command level after initialisation or resetting the current volume to zero, and resetting the current volume to zero.

The calculator indicates the displayed quantity by selecting the symbol at the right of the value. When a volume is displayed, the two arrows located on the right of the display screen enable the calculator to indicate if it is a:

- Volume in base conditions. In this case, only the "L" and the arrow in front of Vb appear on the display screen.
- Volume in measuring conditions. In this case, only the "L" and the arrow in front of Vm appear on the display screen.





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.

Display returns automatically to the current volume.

4.1.2 **RESET**

At zero flow conditions, press BP1 RAZ to record the last measurement data and to reset the volume to zero.

4.1.3 IR-USB KEY OPTION: TRANSFER MEASUREMENT RESULTS TO THE KEY

The 'IR-USB KEY' option allows to transferring measurements results and parameters to the key. Then, data can be used on a PC.



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.

Transfer measurement results to the key:

- Place the key in abutment
- 1. Place the key on the UNI indicator such as shown below:

2. Press simultaneously RAZ and Select.



<u>WARNING</u>: if it's not made that way, it may change the product for the following unloading; so check the product before starting a new one.

3. Wait the end of transfer and display of message:



The file format is '.csv'.

4. Remove the key



Transfer files to a PC, see §6.



4.2 MENU VISUALISATION

The operator can access various menus and sub-menus by using: **BP3** select the menu, **BP2** validate the displayed menu or value, **BP4** return to the previous menu.



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

4.2.1 SUB-MENU METERING

This menu displays the information of the last measurement.





This menu displays the totalisers.



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4.2.3 SUB-MENU MEMORISATION

This menu displays the measurements results. The temperature, the converted volume and the density are only displayed if the temperature option is activated.



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4.3.1 SUB-MENU CALIBRATION

Check the measuring system accuracy during the calibration with a gauge.



4.3.2 SUB-MENU SEASON

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





4.3.3 SUB-MENU PARAMETERS

This menu displays the parameters set in METROLOGICAL mode.



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4.3.4 SUB-MENU MAINTENANCE

This menu displays the drain current (mA) of the gas detectors and the reference current set in METROLOGICAL mode, as well as the product temperature.





4.3.5 SUB-MENU TRANSFER - OPTION

This sub-menu is available with the 'IR-USB KEY' 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'. Transfer files to a PC, see §6.





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4.4 FAULTS LIST

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.

ALARM	FAULT
ProGrAM	Error on the checksum of the metrological data
rAM	Metrological configuration RAM fault
	Faults acknowledgeable in METROLOGICAL mode
MEtro_	Configuration loss
COEFF_	Coefficient fault (disparity between parameter values)
dAtE	Date loss
FLoV_	Flow setting fault (disparity between parameter values)
FrEQ_	Frequency fault (disparity between parameter values)
MEMoriS	Bad writing into the memory
	Faults acknowledgeable
dEF_MEM	Loss of backup data concerning the last measurement
SEnSor1	High gas detector fault (GDh)
SEnSor2	Low gas detector fault (GDl)
LoW_FLo	Flow rate less than the setting minimal flow rate
HiGH_FL	Flow rate greater than the setting maximal flowrate
LF_HiGH	Flow rate greater than 20m ³ /h when GDh is dry
GAS	GDh is wet but GDl is dry
doG	Watch dog fault
ovErFLo	Volume greater than 9 999 999 liters
MEtEr_	Discordance between the two metering channels
bobinE	Loss of pulse transmitter signal
dEF CoM	Communication fault on the IRDA link
totAL	Totaliser fault
diSPLAY	LCD display fault
FuLL	Saturation of secured memorisation: more than 99 measurements per day
bAttErY	Low battery
tEMPErA	Temperature less than -20°C or greater than 50°C



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5. METROLOGICAL MODE



The configuration parameters can only be modified after the processor configuration switch on the electronic card has been switched over. Only authorized personnel can modify these parameters. All other interventions must be carried out by authorised personnel since the metrological character of the FLEXICOMPT AUTONOME+ may be modified. Exit the METROLOGICAL mode thanks to the switch; the device is then reset.



IMPORTANT

Setup should be done under cover, metering off, with dry gas detectors (see § 5.3).



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$5.1\ MENUS$ reference, turbine, coefficient, vmft

A correction can be applied for low viscosity measurements. The correction coefficient can be applied on three products: Prod_2, Prod_3, and Prod_5.



5.2 MENUS FLOW RATES, VOLUMES





5.3 MENUS TEMPERATURE, GAS DETECTORS, THRESHOLDS, DATE, MPLS

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. First point: T<-20°C; second point: T>50°C.
- ⇒ Single temperature measuring point: The measure must be done in the range -20 to $+50^{\circ}$ C.





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6. TRANSFER DATA TO A PC – OPTION

The 'IR-USB KEY' option is used to transfer measurements results and parameters to a key. The data may be downloaded from the key to a PC through USB cable.

-----Read instructions up to the end of this section------

Transfer files from the key to a PC:



1. Connect the USB 2.0 cable to the key

2. Connect the USB 2.0 cable to the PC

A green led on the key lights on to indicate that it is detected by the PC.

3. Access the key directory (see PC documentation)

The measurements results files are named 'M0000123' where 123 is the FLEXICOMPT AUTONOME+ reference number.

The parameters files are named 'P0000123' where 123 is the FLEXICOMPT AUTONOME+ reference number.



Files should be renamed before being stored in the backup directory.



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FORM DOC 011 A

4	A	В		C	D		Е	F	G	Н	I I	L	К	L	M	N	0
1	Measuremen	nts sumr	nary c	of UNI n° 000	0002 ed	ited 0	3/23/2012 a	t 02:27									
2	Vm UNI total	78	7418	Ls.													
3	Vb UNI total	79	3840	L													
4	USB key batt	3.62		v	OK												
5																	
6	Day Number	Measur	emer	Date	Hour		Product	Measured V	Basic Volum	Temperatu	ure Weight (Kg)	Displayed I	De DEF_MEM	DOG	OVERFLO	METER	LOW_FLO
7																	
8	83		1	03/23/2012		00:07	PETROL	10	N/A	99.9	N/A						
9	82		5	03/22/2012		06:15	BUTANE	30	31	0.0	18	1					
10	82		4	03/22/2012		06:14	BUTANE	24	N/A	No	N/A						
11	82		3	03/22/2012		00:04	PETROL	20	N/A	No	N/A						
12	82		2	03/22/2012		00:03	DIESEL	21	21	19.4	17						
13	82		1	03/22/2012		00:02	DIESEL	7	, ,	18.5	5						
14	81		2	03/21/2012		23:59	UNLEADE	24	4	16.2	2	1					
15	81		1	03/21/2012		23:58	UNLE_LS	5	N/A	No	N/A						
16																	

File M0000123

4	A	8	С	D	E	F
1	UNI Parameters n°0000002 edited 03/23/2012 at 02:27					
2	Software version	438 v01.00.01				
3	Software date	04/22/2012				
4	USB key battery voltage	3.62	V			
5	Meter serial number	0				
6	K1 Coefficient (Low Flow)	4.00000	imp/L	Low Flow Q1	00.0	m3/h
7	K2 Coefficient (High Flow)	4.00000	imp/L	High Flow Q2	00.0	m3/h
8	Viscosity correction factor (0.1%)	0				
9	Rcsmin (%)	0.00				
10	Rcsmax (%)	50.00				
11	Product 1	GASOIL		Basic Density	830	Kg/m3
12	Product 2	UNLE_LS		Basic Density	730	Kg/m3
13	Product 3	UNLEADE		Basic Density	730	Kg/m3
14	Product 4	DIESEL		Basic Density	840	Kg/m3
15	Product 5	PETROL		Basic Density	740	Kg/m3
16	Product 6	JET		Basic Density	780	Kg/m3
17	Product 7	PROPANE		Basic Density	515	Kg/m3
18	Product 8	BUTANE		Basic Density	585	Kg/m3
19	Product 9	LPG		Basic Density	550	Kg/m3
20	Minimum flow rate	8	m3/h			
21	Maximum flow rate	80	m3/h			
22	Objective flow rate	24	m3/h			
23	Minimum Measured Quantity	200	L.			
24	Added volume	0	E.			
25	Delay	0	L			
26	Accuracy Class	0.5				
27	Displayed Volume	Vm				
28	Basic Temperature	15.0	°C			
29	PT100 slope	7.769698e-03				
30	PT100 Y intercept	89.432	Ohm			
31	Reference current DG1 Dry	16.0	mA			
32	Reference current DG2 Dry	16.0	mA			
33	LCD contrast (%)	38.00				
34	MPLS	No				
35	Min Ci temperature	15.0	°C			
36	Max Ci temperature	35.0	°C			

File P0000123



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FOLLOW THE INDICATION BELOW TO REMOVE THE KEY:



• Wait the message and check the green led is off. The key is then turned off.

🧼 Le maté	riel peut être retiré en	toute sécurité	
e périphériqu	e 'Périphérique de stockage	e de masse USB' peut	
naintenant ét	e enlevé du système en to	ute sécurité.	_
	1		
	· /·		
Martin C.			14.

WAIT UNTIL THE MESSAGE ALLOWING THE KEY REMOVAL

• Disconnect the USB cable from the PC.

NOTE: Depending on the version of the PC operating system, the removal of the key may require the closure of other files of the same type.

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