


**VERIFICATION MANUAL**

**MV 5012 EN A**  
**TURBOTRONIQUE with MICROCOMPT+**  
**(MTS-xx, MTP-xx or MEMP-xx)**

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## 1 FOREWORD:

Please refer to the TURBOTRONIQUE operating manual MU 7084 for current use of the calculator device.

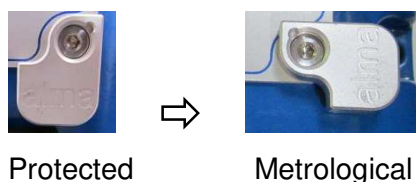
Verification operations must be performed in compliance with current regulations, it is particularly timely to bring:

- ⇒ **The initial verification report** of the relevant meter.
- ⇒ **A standard to control the accuracy of the measuring system.** It must be in line with national standards and the uncertainty in measurement must be less than 1/3 of the appropriate MPE. As far as possible, ALMA encourages the use of a calibration gauge of at least 1000 litres capacity and which is in line with a national standard.
- ⇒ **The temperature-correction table of the standard.**

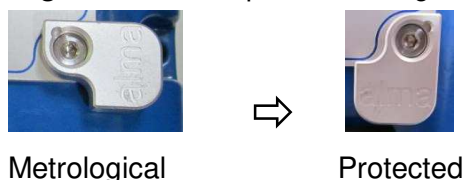
## 2 DEFINITIONS:

**MPE:** Maximum permissible error. It depends on the regulation of the country where the equipment has been put into use (MPE in France =  $\pm 0.5\%$ ).

**Switch the Microcompt+ to Metrological mode:** Remove the seal and turn the magnet to the right.



**Exit the Metrological mode:** Replace the magnet, the Microcompt+ reboots.



**Switch the Microcompt+ to Supervisor mode:** Use the magnetic key.



### 3 PRELIMINARY TESTS:

Take the operating manual MU 7084.

Print the parameters before beginning configuration.

#### 3.1 Check metrological parameters

METRO mode in MU	Parameter	Action	Comments
INDICATOR REFERENCE			
x.1	Reference	Check the serial number on the Microcompt+ identification plate.	
CONFIGURATION			
x.2.1	Distribution line	Check that the number of distribution ways is set up according to the truck configuration.	
x.2.2.1	Transmission	Set up according to the truck configuration.	
x.2.2.2.1	Overfill protection / Truck probe (embedded)	Set up according to the truck configuration.	
x.2.2.2.2	Overfill protection / Customer probe (external)	Set up according to the truck configuration (if the truck is equipped with a customer tank probe controlling system)	Check the type of the overfill protection probe technology (5 or 2 wires)
x.2.3.1	Flap	Activate according to the truck configuration. (if the truck controls manifold flaps)	
x.2.3.2	Return	Activate according to the truck configuration. (if the truck is equipped with a product return system)	
x.2.3.3	Probe	Set up according to the truck configuration.	Controls compartment probe during product movement.
x.2.5.1	Mode	Select « PUMPED »	
x.2.6	Unit and accuracy	Check the configuration matches the truck owner's requirements. Otherwise, correct it.	Choose m3/h or l/min
x.2.7	Conversion	Activate and set up according to the truck owner's requirements and to the truck configuration (for this option the temperature probe is mandatory).	Volumes temperature compensation.
EMA (PUMP MODE)			
x.3.1.1.1	LF coefficient (K1)	Meter coefficient	See meter inscriptions and/or meter test certificate. . May be adjusted after test. Cf. § 5.2
x.3.1.1.2	Low flowrate/K1 (Q1)	The value must be at zero.	May be adjusted after test. Cf. § 5.2
x.3.1.1.3	HF coefficient (K2)	It must be the same value than K1	May be adjusted after test. Cf. § 5.1
x.3.1.1.4	High flowrate/K2 (Q2)	The value must be at zero.	May be adjusted after test. Cf. § 5.1 et 5.2
x.3.2	Correction (thousandth)	Correction (thousandth % ) applied to certain products (particularly gasoline	See meter inscriptions and/or meter test certificate.



x.3.3.1	Minimum flowrate	Make sure the value is consistent with the measuring device.	See meter inscriptions and/or meter test certificate.
x.3.3.2	Maximum flowrate	Make sure the value is consistent with the measuring device.	See meter inscriptions and/or meter test certificate.
x.3.4	Minimum quantity	At least 200 L.	For lower values, see meter certificate and characteristics, and measuring system certificate
x.3.5	Manifold volume	Enter a value consistent with the manifold size.	Volume between manifold flaps and delivery valve. May be adjusted after test. Cf. § 5.4
x.3.6	Temperature	Make sure that the temperature probe is calibrated. Otherwise calibration must be done at -20°C and +50°C.	Use a Pt100 temperature probe simulator. Cf. FM8510
EMBEDDED COMPUTING			
x.4.1	Embedded computing	Activate or not the embedded computing according to the truck configuration.	Association by serial link
x.4.1.1	EC (printer)	Indicate if the embedded computing has its own printer or not.	
DATE AND TIME			
x.5	Date and time	Set the current date and time.	

### 3.2 Check supervisor parameters

SUPER mode in MU	Parameter	Action	Comments
CALIBRATION / GAUGE			
y.1	Calibration / Gauge	Nothing to configure.	This menu is used to adjust the parameters during the test.
PRODUCTS SETTINGS (for each product)			
y.2.1	Name	Enter the product name.	
y.7.2	Product type	Set up the product characteristics.	(dye, additive, 10PPM)
y.7.3	Unit price	Set up according to the use of the truck.	
y.2.4	Price in	Set up according to the use of the truck.	
y.2.5	Default unit price	Set up according to the use of the truck.	
y.2.6	VAT rate	Set up according to the use of the truck.	
y.2.7	Additive settings	Set the values in that cases: The product must be additivated upstream or downstream of the measuring device and if the truck is equipped for it.	
y.2.8	Correction	Activate according to the product.	If required, the correction that will be applied is the one set for the parameter 3.2 of the metrological mode.
VEHICLE			
y.4	Vehicle	Enter the vehicle identification.	EX : License plate

SETTINGS			
y.5.1.1	End low flow volume	Enter the volume according to the truck configuration.	May be adjusted after test. Cf. § 4.2
y.5.1.2	Complete purge	Enter the volume according to the truck configuration.	May be adjusted after test. Cf. § 5.4.1
y.5.1.3	Short purge	Enter the volume according to the truck configuration.	May be adjusted after test. Cf. § 5.4.3
y.5.2.1	LF-HF flowrate	Don't change the default value.	
y.5.2.2	Objective flowrate	Don't change the default value.	
y.5.3.1	Time before guaranty	Don't change the default value.	
y.5.3.2	Blowing time	Don't change the default value.	
y.5.3.3	Pump at zero flow	Don't change the default value.	
y.5.4	Backup value	Don't change the default value.	
TIME ADJUSTEMENT			
y.6	Time adjustment	Adjust the time if necessary.	
PRINTER SETTINGS			
y.7.1	Ticket	If a ticket lot is downloaded in the calculator, choose the customer ticket.	
y.7.2	Order	Enter the order for the cheque, according to the use of the truck.	
y.7.3	Forced ticket	Activate according to the use of the truck.	
y.7.4	Summary	Choose 'NORMAL'.	
LANGUAGE			
y.9	Language	Choose the language according to the use of the truck.	

Check parameters list after printing.

#### 4 **FUNCTIONING TEST (CONDITIONING):**

Before starting the measuring tests, the measuring system and the standard must be put in operating conditions.

The conditioning enables to check that pump hydraulic pressure is between 3 and 3.5 bar when nozzle is closed and between 7 and 8 bar at full flow.

**If pressure is not inside those limits, adjust mechanical by-pass.**

When a gauge is used, the conditioning operation consists in filling the gauge and then emptying it completely before using it.

##### 4.1 **Test**

Plug the standard to the tank. Start several consecutive preset operations by choosing the pumped distribution mode; the sum of preset volumes must correspond to the standard (or the gauge) volume. In this way, the predetermination will be adjusted over the tests.

If alarms appear during delivery, refer to the list of alarms in the MU2084-operating manual to solve the problem, then control the alarm does not appear anymore during the next predetermination.

## 4.2 Adjustment of the end low-flow volume, if necessary

At the end of the test, the end low-flow volume may be adjusted (*Cf. Supervisor parameters table*). If the flowrate is too important at the end of predetermination, the end low-flow volume must be increased.

Otherwise, if the delivery is too long to finish, the end low-flow volume must be reduced.

## 5 CONTROL AND AJUSTMENT OF THE METERING PARAMETERS:

### 5.1 High-flow pumped test

#### 5.1.1 Test

From User mode:

- ⇒ Choose the "DISCHARGE" menu,
- ⇒ Select PUMPED MODE COUNTED (optional),
- ⇒ Choose the compartment which volume is greater than the standard's one.
- ⇒ Select the product
- ⇒ Select HOSE 1 (optional).
- ⇒ Choose the preset delivery mode (Or free delivery, check that the initial and final conditions stay identical... nozzle closed...).
- ⇒ Enter a preset volume equal to the standard's one
- ⇒ Start delivery.

When the preset volume is reached, (Or in free delivery, at nozzle closing, press button to get an END DELIVERY) the Microcompt+ displays "END DELIVERY". Validate twice

#### 5.1.2 Calculation of the error

- ⇒ Switch the Microcompt+ to Supervisor mode with magnetic key.
- ⇒ Enter the menu "CALIBRATION/GAUGE" and select the menu "ENTER GAUGE VOLUME".
- ⇒ The Microcompt+ displays "ENTER VOLUME (REF)". Enter the temperature-compensated volume of the gauge or the standard.
- ⇒ Move on to the next menu, the Microcompt+ displays the error in % (write it down).
- ⇒ Move on to the next menu, the Microcompt+ displays the new coefficient (write it down).



Warning : This coefficient will be optimized in order to bring the error to the nearest 0. It must be taken into account only when the EMT are centered over zero.

Otherwise, do not take it into account.


- ⇒ Move on to the next menu, the Microcompt+ displays the average flowrate of the test (write it down). Validate the menu to return to "CALIBRATION/GAUGE".
- ⇒ Exit the Supervisor mode by removing the magnetic key.

#### 5.1.3 Adjustment of the new pumped high-flow coefficient (K2), if necessary

If the error is greater than the regulatory tolerance, the metrological pumped high-flow coefficient (K2) of the measuring device has to be adjusted. Then use the calibration menu of the SUPERVISOR mode to determine the new coefficient. Please note that the coefficient calculated by the system will be close to zero error.

Here is the formula to calculate the new coefficient K':

$$K' = K * (1 + E/100) / (1 + E'/100)$$

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With  $E'$  = objective error in %  
 $E$  = test error in %  
 $K$  = coefficient before test.

- ⇒ Switch the Microcompt+ to Metrological mode. It displays "REFERENCE".
- ⇒ Select the menu "EMA (PUMP MODE)" and then "METER COEFFICIENT"
- ⇒ Choose "HF COEFFICIENT (K2)" (Cf. 3.1.1.3 Metrological parameters table).
- ⇒ Enter the new coefficient and validate.
- ⇒ Choose "LF COEFFICIENT (K1)" (Cf. 3.1.1.1 Metrological parameters table).
- ⇒ Enter the same coefficient than K2 and validate.
- ⇒ Exit the Metrological mode.

#### 5.1.4 Control test

After the adjustment of the measuring device coefficient, do a control test by following the stages §5.1.1 and 5.1.2.

### 5.2 Low-flow pumped test

The low-flow to be respected during this test must not overpass 1,5 times the minimum flowrate of the measuring system. To achieve this, flowrate will be limited by action on the nozzle.

#### 5.2.1 Test

From User mode

- ⇒ Choose the "DISCHARGE" menu,
- ⇒ Select PUMPED MODE COUNTED (optional),
- ⇒ Choose a compartment which volume is greater than the preset's one.
- ⇒ Select the product,
- ⇒ Select HOSE 1 (optional).
- ⇒ Choose the preset delivery mode. (Or free delivery, check that the initial and final conditions stay identical... nozzle closed...)
- ⇒ Enter a preset volume smaller than the one contained in compartment.
- ⇒ When the Microcompt+ displays "START DELIVERY HF", press once blue pushbutton to choose "START DELIVERY LF". The delivery starts.
- ⇒ Limit the flowrate between 1 and 1.5 times the minimum flowrate of the measuring system by acting quickly on the nozzle.
- ⇒ When the preset volume is reached, (Or in free delivery, at nozzle closing, press button to get an END DELIVERY) the Microcompt+ displays "END DELIVERY".
- ⇒ Validate twice.

#### 5.2.2 Calculation of the error

- ⇒ Switch the Microcompt+ to Supervisor mode.
- ⇒ Choose the menu "CALIBRATION/GAUGE"
- ⇒ Select the menu "ENTER GAUGE VOLUME".
- ⇒ The Microcompt+ displays "ENTER VOLUME (REF)".
- ⇒ Enter the temperature-compensated volume of the standard.
- ⇒ Move on to the next menu, the Microcompt+ displays the error in % (write it down).
- ⇒ Move on to the next menu, the Microcompt+ displays the new coefficient (write it down).





Warning : This coefficient will be optimized in order to bring the error to the nearest 0. It must be taken into account only when the EMT are centered over zero.

Otherwise, do not take it into account.

- ⇒ Move on to the next menu, the Microcompt+ displays the average flowrate of the test (write it down). Validate the menu to return to "CALIBRATION/GAUGE".
- Exit the Supervisor mode by removing the magnetic key.

### 5.2.3 Adjustment of the new pumped low-flow coefficient (K1), if necessary

If the error is greater than the regulatory tolerance, the metrological pumped low-flow coefficient (K1) of the measuring device has to be adjusted. Then use the calibration menu of the SUPERVISOR mode to determine the new coefficient. Please note that the coefficient calculated by the system will be close to zero error.

- ⇒ Switch the Microcompt+ to Metrological mode. It displays "REFERENCE".
- ⇒ Select the menu "EMA (PUMP MODE)" and then "METER COEFFICIENT".
- ⇒ Choose "LF COEFFICIENT (K1)" (Cf. 3.1.1.1 Metrological parameters table).
- ⇒ Enter the new coefficient and validate.
- ⇒ Choose the menu "LOW FLOWRATE/K1 (Q1)" (Cf. 3.1.1.2 Metrological parameters table).
- ⇒ Enter the flowrate written during the test in low flowrate.
- ⇒ Choose the menu "HIGH FLOWRATE/K2 (Q2)" (Cf. 3.1.1.4 Metrological parameters table).
- ⇒ Enter the flowrate written during the test in high flowrate §5.1.2.
- ⇒ Exit the Metrological mode.

### 5.2.4 Control test

After the adjustment of the measuring device coefficient, do a low-flow control test by following the stages §5.2.1 and 5.2.2 followed by a high flow control test by following the stages §5.1.1 and 5.1.2.

## 5.3 Intermediate flow control test and calculation of the error

If the manufacturer did not perform an accuracy test at intermediate flowrate before installation, this intermediate flow rate test must be performed on site by repeating the same stages performed for low or high flows, then proceed to calculation of the error.

## 5.4 Pumped test with complete draining

### 5.4.1 Test




The test consists to do a delivery with a preset volume equal to gauge volume, from a compartment with far less liquid than preset.

After the flow stop, due to complete draining of the compartment, switch supply to another full compartment. The flow restarts, then stops at the end of preset.

This test to check separator good functioning, and back pressure produced by anti-return valve and other components.

From User mode,

- ⇒ choose the "DISCHARGE" menu,
- ⇒ Select PUMPED MODE COUNTED (optional),
- ⇒ Choose compartment which liquid volume is a far lower than the standard's (or the gauge's) one.

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- ⇒ Select the product,
- ⇒ Select HOSE 1 (optional).
- ⇒ Choose the preset delivery mode (Or free delivery, check that the initial and final conditions stay identical... nozzle closed...).
- ⇒ Enter a preset volume equal to gauge volume. Start delivery
- ⇒ After the flow stop, due to complete draining of the compartment, switch supply to another full compartment. The flow restarts.
- ⇒ When the preset volume is reached, (Or in free delivery, at nozzle closing, press button to get an END DELIVERY) the Microcompt+ displays "END DELIVERY".
- ⇒ Validate twice.

#### 5.4.2 Calculation of the error

- ⇒ Switch the Microcompt+ to Supervisor mode.
- ⇒ Choose the menu "CALIBRATION/GAUGE"
- ⇒ Select the menu "ENTER GAUGE VOLUME".
- ⇒ The Microcompt+ displays "ENTER VOLUME (REF)". Enter the temperature-compensated volume of the standard.
- ⇒ Move on to the next menu, the Microcompt+ displays the error in % (write it down).
- ⇒ Move on to the next menu, the Microcompt+ displays the new coefficient (write it down).
- ⇒ Move on to the next menu, the Microcompt+ displays the average flowrate of the test (write it down). Validate the menu to return to "CALIBRATION/GAUGE".
- ⇒ Exit the Supervisor mode by removing the magnetic key.

Calculate the additional error due to the complete draining, by subtracting the error of the last high flow test from the error determined above.

If the additional error is higher than MPE, check the gas separator, check valves, and gas piping

### 5.5 Pumped test with purge and adjustment of the volumes of complete and short purge, if necessary



To perform these tests, two qualities of product are necessary with two different colours.

#### 5.5.1 Test with complete purge volume

The goal of this test is to determine the colourless product smallest volume, sufficient to push all dyed product downstream transfer point.

The complete purge test consists to replace a dyed product by a colourless product.

First, make a preset delivery of dyed product to make sure that the pumped hydraulic part is filled with this product. The preset volume must be greater than the manifold volume and greater than the minimum quantity.

From User mode,

- ⇒ Choose the "DISCHARGE" menu.
- ⇒ Choose a compartment filled with dyed product.
- ⇒ Validate the proposed product (the dyed one)
- ⇒ Choose the "PRESET+PURGE" delivery mode
- ⇒ Enter a preset volume
- ⇒ Choose a colourless product that will push the dyed product
- ⇒ Select the compartment filled with the colourless product.

- ⇒ Start delivery
- ⇒ When the manifold purge is completed and the colourless compartment flap is open, look at the indicator display at which volume the product colour changes, seen at the nozzle. (write it down)
- ⇒ The Microcompt+ displays "DELIVERY FINISHED". Validate.

If the volume of colourless product through the nozzle is too important, the complete purge volume must be reduced.

If the colourless product did not flow through the nozzle, the complete purge volume must be increased.

### 5.5.2 Adjustment of the complete purge volume, if necessary

- ⇒ Switch the Microcompt+ to Supervisor mode.
- ⇒ Select the menu "SETTINGS".
- ⇒ Choose "VOLUMES SETTINGS".
- ⇒ Choose "COMPLETE PURGE"
- ⇒ Enter the complete purge volume.
- ⇒ Exit the Supervisor mode.

### 5.5.3 Test with short purge volume

The goal of this test is to determine the dyed product largest volume, able to push the maximum colourless product quantity, without the dyed product crosses transfer point.

The short purge test consists to replace a colourless product by a dyed product.

After the complete purge, the pipe is full of colourless product. Otherwise perform a a delivery of colourless product

From User mode,

- ⇒ Choose the "DISCHARGE" menu.
- ⇒ Choose a compartment filled with a colourless product.
- ⇒ Validate the proposed product (colourless product)
- ⇒ Choose the "PRESET+PURGE" delivery mode
- ⇒ Enter the preset volume.
- ⇒ Choose a dyed product that will push the colourless product. Select the compartment filled with the dyed product.
- ⇒ Start delivery
- ⇒ When the manifold purge is completed and the dyed compartment flap is open, look at the nozzle: the product colour must change, look at the volume display when colour changes (write it down).
- ⇒ The Microcompt+ displays "DISCHARGE FINISHED". Validate.

If you saw dyed product through the nozzle, the short purge volume must be reduced.

### 5.5.4 Adjustment of the short purge volume, if necessary

- ⇒ Switch the Microcompt+ to Supervisor mode.
- ⇒ Select the menu "SETTINGS".
- ⇒ Choose "VOLUMES SETTINGS".
- ⇒ Choose "SHORT PURGE"
- ⇒ Enter the short purge volume.
- ⇒ Exit the Supervisor mode.

**5.5.5 Control test with complete purge**

Make a control test following the sequence 5.5.1

**5.5.6 Control test with short purge**

Make a control test following the sequence 5.5.3

## ANNEX

## CALIBRATION FLOWCHART OF ALMA TURBOTRONIQUE MODEL MEASURING SYSTEM

