User Manual

FM-520 Series Flow Computer

Manual valid for Firmware v3r5 onwards
Last Revision 09/09/2020

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For some chapters we will refer to some videos on youtube.com, do not hesitate to suggest us about which videos we could include or make your own videos with our teams to add them to our channel.

https://www.youtube.com/channel/UCt8jjVNNOgOzXd9hQYh5JiA

CHAPTER 1-A
FLUID DISPATCH / RECEPTION CONTROL WITH A SINGLE BUTTON

Although this flow computer has a large number of screens, most of those who operate the equipment will only use the following:

Figure 1.1 Partial accumulated value or ACM screen and resetting it

To identify this screen, you must observe, on the left margin, two legends: **ACM** and **RATE**.

To start a new dispatch **press the left side button for 1 second**. The equipment will automatically go to the screen outlined in Figure 1.2. You are now in a position to control a new download.

If you are already on this screen and the ACM volume values are not zero, pressing the button will return them to zero and you will be ready to start a new download.

Figure 1.2 Partial accumulated value or ACM screen and resetting it

ACM represents the partial accumulated volume value. Before pressing the button represents the volume value of the last download. It is totally analogous to what we see in a gas station pump, the volume will advance from 0 to the desired final value; After finishing the download, you should press the side button before starting a new operation to start again from 0.

RATE represents the flow rate of the fluid. It indicates how "fast" the fluid moves, liters per minute or cubic meters per hour are two typical units but many others are possible to select.

Note that ACM is a value that accumulates as the fluid passes through the flowmeter from the zeroing operation, therefore when the fluid stops it freezes at a value other than zero. if there is movement, it has a value different from zero, but it will always be zero when there is no fluid moving.

At least half a dozen documents make up the manuals for this instrument. If you are interested, you can download them at www.flowmeet.com

CHAPTER 1-B
HISTORICAL TOTALIZED VOLUME (TTL) OF YOUR FLOWMETER

If you have read the previous chapter you should already know that the ACM volume is intended to control discharges. The operator takes this volume to 0 at the time of a new operation. There is another volume called synthetically TTL. This volume represents **the total historical volume of the equipment**. The operator cannot set it to 0, so this value represents the value of all the fluid that has passed through the flow meter since the equipment was started.

The screens of our flowmeters can be scrolled by pressing the buttons ↑ y ↓ , you will find the TTL on the first screen.

Pressing the button ↑ as many times as necessary you can reach the screen in Figure 1.3. To identify this screen, you must observe, on the left margin, two legends: **TTL** and **RATE**, as shown in Figure 1.3.

Figure 1.3 Cumulative Volume or TTL Screen

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CHAPTER 2
DISPLAYS

The user can navigate through the following screens

Power up screen. It is displayed every time the instrument is turned on or when the instrument is programmed, it fulfills the security function of verifying that all the segments are working properly. Press ↵ to advance or wait 5 seconds.

Version screen. Indicates the software version that the flow computer is running, this screen is implemented from version 1.4 onwards Press ↵ to advance or wait 5 seconds**.**

Historical volume (TTL) and flow rate (RATE) display.

Pressing Esc for 5 seconds enters the Configuration Menu.

Display of accumulated volume (ACM) and flow rate (RATE).

Pressing ↵ 5 seconds ACM = 0.

Accumulated display (ACM) and instantaneous temperature.
If the "° C" symbol flashes, it means that the internal temperature of the equipment is being displayed, otherwise the external one.

Pressing ↵ 5 seconds enter the ACM history menu. Each value represents the volume up to the moment when a reset occurred (see Manual "FM-520 ACM historico.pdf" to have a complete notion of the visualization of these values).

Accumulated volume (ACM) display corrected for temperature and average load temperature. This volume is normalized with respect to 15 ° C. If the corrected volume is greater or less than the accumulated uncorrected volume, the arrows are displayed on the screen. Pressing for 5 seconds enters the ACM history screen corrected by temperature (see Manual "FM-520 ACM history.pdf" to have a complete notion of the visualization of these values, similar to the **ACM screen and the instantaneous temperature**). Each value represents the volume up to the time a reset occurred. If the "° C" symbol flashes, it means that the internal temperature of the equipment is being displayed, otherwise the external one. This temperature represents the average temperature at which the load occurred.

BATCH screen. This screen is designed to automate batch filling or dispensing of a programmed amount of fluid. Go to the manual "FM-520 BATCH.pdf" to obtain a reference of its use.

Screen that displays the date and time. By pressing Esc 5 seconds you can modify the date and time. Pressing the arrows modifies the blinking item.

Pressing ↵ modifies the item to be modified.

Pressing exits Esc the date programming mode.

Screen that displays the coefficient of expansion and the instantaneous temperature. (This screen is available up to version 3-15-1. From 3-16-1 onwards, it is found in the Configuration Screens. See Manual "FM-520 Configuration Screens.pdf"). By pressing Esc 5 seconds you can modify the date and time. Pressing the arrows modifies the flashing digit. Pressing ↵ modifies the digit to be modified. Pressing Esc exits the expansion coefficient programming mode.

This screen is displayed on equipment that has the volume temperature correction mode activated.

This screen is displayed on computers that have the BATCH fill mode activated.

CHAPTER 3
CALIBRATION FACTOR SETTING

IMPORTANT: DO NOT MODIFY THE VALUES OF THE K AND K_OUT PARAMETERS UNLESS INDICATED TO DO SO. THEY ARE VALUES THAT CORRESPOND TO THE CALIBRATION OF THE EQUIPMENT AND EACH FLOWMETER HAS ITS OWN CONFIGURATION. ANY WRONG MODIFICATION IN THESE VALUES WILL CAUSE AN ERRONOUS CALCULATION OF THE VOLUME AND FLOW RATE OF THE FLOWMETER.

1- Press ↑ until you get to the TTL and RATE screen that can be seen in Figure 3.1.

Figure 3.1 Cumulative Volume or TTL Screen

2- Hold down Esc for 3 seconds to enter Configuration Mode.

Figure 3.2

3- Once you have entered the Configuration Mode, the screen shown in Figure 3.2 will appear

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Figure 3.3

4-   Enter the Password of the equipment (in case of not knowing it, request it from the manufacturer). As you enter the password, it will be reflected on the screen as shown in Figure 3.3.

Figure 3.4

5-   After entering the password, the first configuration screen that will appear will be the one for setting the calibration factor (K factor). shown in Figure 3.4. Pressing the key ↵ will move one digit to the left and then with ↓ and ↑ will respectively increase or decrease the digits one by one.

6- Once the modification of the calibration factor is finished, press Esc repeatedly until the equipment restarts.

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CHAPTER 4-A

TICKET PRINTING IN THE EASIEST WAY

IMPORTANT: *Remember to supply the equipment with a continuous 12V source to be able to print tickets.*

Our flowmeters allow you to print a ticket in a very simple way, you just have to press the right side button, as shown in Figure 4.1, and the printing will start after a few seconds.

Figure 4.1 One-button receipt printing

Consider the following important points:

1. The flow values, date, etc., cannot be manipulated, what the ticket prints is what the flow meter has measured.
2. This printing method is designed to facilitate printing as much as possible. If you need to enter particular data for each ticket, for example, you dispatch to 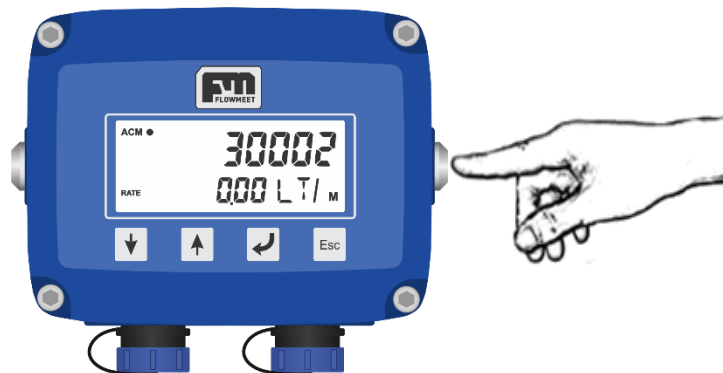different clients and the client's name must be printed. You must read the TCIKET CONFIGURATION AND PRINTING chapter. USING ANDROID.
3. The printer remains off until the moment of use, turn on the printer when it is in the vicinity of the Flowmeter, up to 3 meters, after turning on the printer press the button to print, if before repeated attempts to print the ticket are not successful turn the printer off and on again
4. The printer has an internal rechargeable battery, once charged it has no less than 4 months of autonomy, charge it only with the accessories that we provide, if you have the "cigarette lighter" charger you must be sure that the power supply is 12VDC.

WARNING: Recharging the battery using 24V will damage the printer

```
            EMPRESA S.A.
CUIT Nro.: 12-35678901-23
Calle Independencia 93 - Ensenad
a - CP 1925

Rito:123


Lat.: -34.86540927
Long.: -57.90496035
Direccion: Independencia 93



TIKET NRO.: 4

Temp*: 26.4 C

12:01:07 24/01/2017

ACM:  9 Lt

ACM @15g:  9 Lt



Operador:julian



Chofer:



Supervisor:
```

Figure 4.2 Typical receipt of a dispatch

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CHAPTER 4-B
CONFIGURATION AND PRINTING OF TICKET USING ANDROID

IMPORTANT: *Remember to supply the equipment with a continuous 12V source to be able to print tickets.*

hl=es_419

On our YouTube channel you will find tutorial videos for the connection, configuration and printing of tickets for greater ease. https://www.youtube.com/playlist?list=PLcwafmd6o8PVJyMKcjcc0tBBjdhvBPRgD

In the event that you need to make modifications to the ticket parameters in each download, our Flowmeet Companion application will allow you to do them in a very intuitive way.

This application is available for free on the Google Play Store. You just have to search for it by its name "Flowmeet Companion", install it and it is ready to use. https://play.google.com/store/apps/details?id=com.flowmeet.flowmeet_companion&

CHAPTER 5
VIEWING, DOWNLOADING AND SENDING THE HISTORY BY MAIL

IMPORTANT: *Remember to supply the equipment with a continuous 12V source to be able to print tickets.*

The FM-520 flow computer has a history of up to 5000 records. These records can be viewed, downloaded in .csv format and even sent by email in a very easy and intuitive way through our Android application, Flowmeet Companion.

https://www.youtube.com/channel/UCt8jjVNNOgOzXd9hQYh5JiA?view_as=subscriber

This application is available for free on the Google Play Store. You just have to search for it by its name "Flowmeet Companion" and install it and it is ready to use.

On our YouTube channel you will find a video tutorial for viewing, downloading and emailing the equipment history

https://www.youtube.com/watch?v=0xbSx8VCKoE&t=1s

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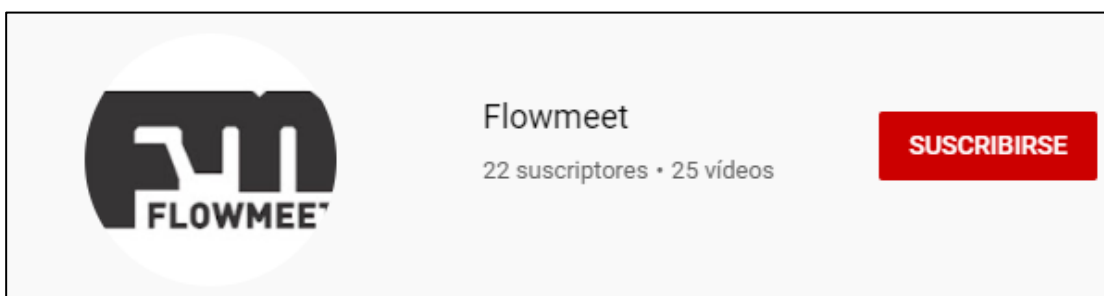
CHAPTER 6
COMUNICATION RS-232 (Optional)

The Equipment-PC communications link extends its functionality on a large scale, since it allows from complete downloads of all the events of the equipment from its origin to its complete configuration.
CAUTION: The equipment in order to communicate with the computer must be connected externally to 12V, otherwise communication cannot be established.

Software
To establish the communication of the equipment with the computer, you can use any program of the HyperTerminal type. In our case, we recommend TERMITE which is a free download program. By clicking on the link below you can access the download of the latest version of the program.
http://www.compuphase.com/software_termite.htm.

How to establish communication?
1-   Power the equipment at 12V
2-   Connect the flow meter to the computer
3-   Open Termite
4-   Go to SETTINGS
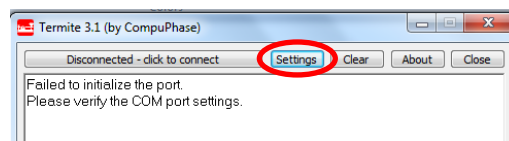
5- Once in SETTINGS, pressing on PORT will open a window with all the equipment available to connect. If you do not know what your computer is, observe which COM port disappears and appears when you disconnect and reconnect.
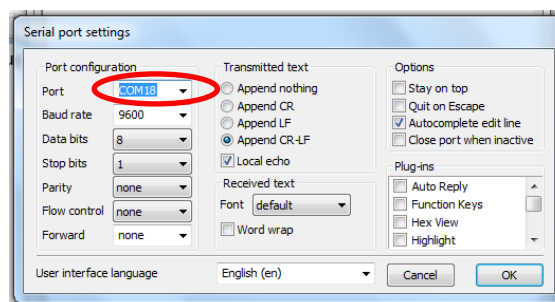

5- Once the corresponding COM port has been selected, configure the BAUDRATE and other communication characteristics as indicated below:

            CONFIG PORT RS-232
            BAUD RATE: 9600
            DATA BITS: 8
            STOP BITS: 1
            PARITY: NONE
            FLOW CONTROL: NONE
            FORWARD: NONE

FINISH EVERY COMMAND WITH LF OR CR+LF

5-   Press OK to exit

6- Automatically connects and establishes communication as indicated in the Figure. You are now in a position to write the commands to communicate
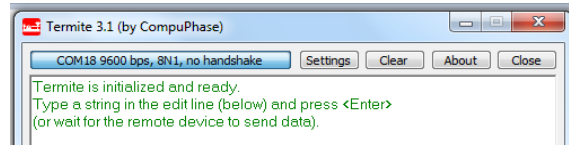
Commands

The flowmeters of the FM-520 line have the option of incorporating a module for data recording. Information on flow, volume, date, time, etc. Stored in solid state memory, this information can be downloaded to a PC for further analysis on a spreadsheet or other tool.

To communicate with the flowmeter there are several commands, which are available below, allowing communication through a computer-equipment interface with the use of the hyperterminal type program, or through an application called "FLOWMEET Companion" available cell phone in Google applications through communication with Bluetooth protocol (Spanish only).

Commands list

Command	Answer	Description
FM+?	OK	Verify connection
FM+ALIVE	< Resp >	Shows firmware and hardware version
FM+BUILD	< Resp >	Returns reprogramming time from midnight 1/1/1970
FM+TTL	< Resp >	Returns historical cumulative volume
FM+RATE	< Resp >	Returns instantaneous flow
FM+ACM	< Resp >	Returns partial cumulative volume
FM+RST.ACM	0	Resets partial cumulative volume
FM+TEMP	< Resp >	Returns sensed temperature
FM+TEMP_PROM	< Resp >	Equipment averaged charging temperature
FM+SEC=<N>	< Resp >	Returns the minutes of the clock where N is the desired value. If no value is assigned, it returns the current data.
FM+MIN=<N>	< Resp >	Same, but in minutes
FM+HOUR=<N>	< Resp >	Same, but in hours
FM+DAY=<N>	< Resp >	Same, but in days
FM+MON=<N>	< Resp >	Same, but in months
FM+YEAR=<N>	< Resp >	Same, but in years
FM+TIME	< Resp >	Returns date and time
FM+KTTL=<N>	< Resp >	Returns KTTL factor where N is desired number
FM+BACH=<N>	< Resp >	Returns max volume for batch, where N is desired number
FM+UNIT.TTL	< Resp >	TTL volume unit
FM+UNIT.ACM	< Resp >	ACM volume unit
FM+UNIT.RATE	< Resp >	Flow unit
FM+INT=<N>		Time lapse for register data in minutes (0-255) where N is desired value
FM+LOG	< Resp >	Returns complete log file
FM+RESET	0	Reset flowmeter
FM+SAVE.RESET	0	Save the changes and reset the flowmeter
FM+LAB<N>=<M>	< Resp >	Shows label X value from ticket where N is label number and M is the label.

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