

# **MC-BOX**

## **MANAGEMENT SYSTEM SOFTWARE**



**CONSUMER  
PUMPS**

***USE MANUAL***

**ENGLISH**



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## 1 WHAT IS MC-BOX?

MC is an electronic system, integrated in MC-BOX refuelling stations, for controlling diesel fuel dispensers.

The system provides:

- For the system manager: complete control over all functions, during system configuration and data collection/processing.
- For users: user-friendly dispensing operations.

This manual refers to the following versions of MC BOX:

- MC BOX 230V
- MC BOX 110V
- MC BOX 24V
- MC BOX 12V

## 2 FUNCTIONS OVERVIEW

### 2.1 ACCESS CONTROL

MC limits access to only to authorized users.

MC identifies authorized users in two alternative ways:

- a 4-digit PIN CODE.
- an ELECTRONIC KEY.

### 2.2 USERS

There are two kinds of users, with access privileges:

- MANAGER. Only ONE manager is allowed for every MC system.  
The manager is assigned a MASTER PIN CODE and/or a MASTER KEY.
- USERS. Up to 80 or 120, depending on the model of MC-BOX.  
Each user is assigned an individual PIN CODE and/or USER KEY.

### WARNING

***All MC systems are factory-programmed with a MASTER PIN CODE = 1234. The system manager can change the MASTER PIN CODE. If the manager loses the MASTER PIN CODE, he will not be allowed to access the functions reserved for the manager. In this case the manager should contact our CUSTOMER SERVICE and request the "SUPER MASTER CODE," which will make it possible to retrieve the lost MASTER PIN CODE.***

***SUPER MASTER CODES are different for each MC system and cannot be changed; they should therefore remain strictly confidential.***

### 2.3 CONFIGURATING MC-BOX

Only the MANAGER can access configuration functions, through which MC-BOX can be customized and adapted to meet specific requirements.

The main configuration operations are:

- Assigning a name to the station.
- Requesting optional inputs (vehicle plate number and/or odometer reading).
- Determining time out at start or at end of dispensing.
- Using a remote printer.
- Deciding what unit of measurement to use for dispensing.
- Connecting the system to a PC for data collection/processing.
- Changing the MASTER CODE.

## 2.4 MANAGING MC-BOX

Only the MANAGER can access management functions, through which he can control all operations performed with the MC-BOX station.

The main management functions include:

- Creating/deleting users.
- Processing system data (memory / date / time).
- Calibrating the on-board flow meter.
- Transferring data from MC-BOX to a PC by the MASTER KEY.

OPTIONAL management functions include:

- Printing different kinds of reports on a remote printer.
- Printing a user list on a remote printer.
- Printing system configuration details on a remote printer.

## 2.5 DISPENSING

Dispensing functions are accessible only by USERS, who can be requested to:

- enter the vehicle's plate number or any identifying number (REG. NUMBER);
- enter the vehicle's odometer reading (ODOMETER);
- pre-select the desired amount of fuel (PRESET).

## 2.6 PROCESSING DATA ON PC (OPTIONAL)

Data regarding the dispensing operations, collected and stored in MC's non-volatile memory, can be transferred to a PC for further processing and permanent storage. To process the data the PC must have installed the SELF MC-BOX MANAGEMENT, provided separately as an optional feature for MC-BOX.

There are two ways to transfer data from MC-BOX to a PC:

- Through an RS 485 cable connection. In this case you should install an RS 232/485 CONVERTER on the RS 232 serial port of the PC. The converter is supplied separately.
- Through the MASTER KEY. In this case you should install a KEY READER on the RS 232 serial port of the PC. The key reader is supplied separately.

### 3 HOW MC-BOX WORKS

#### 3.1 OPERATING MODES

MC enters the various OPERATING MODES automatically, depending on what events take place.

- **SYSTEM Mode**

In this operating mode MC performs all the functions related to access control and system management. MC automatically enters SYSTEM mode any time a user presses a button (except buttons used in LEVEL mode), or applies an electronic key or finishes dispensing.

When it is in SYSTEM mode, MC requests and accepts INPUT through the keypad and provides OUTPUT through displays or a printer.

- **DISPENSING Mode**

This is the operating mode in which fuel is dispensed.

The system exits dispensing mode when a user presses STOP, when a preset quantity of fuel has been dispensed or when a certain period of time has elapsed without dispensing.

- **MANUAL Mode**

In this mode a user can dispense fuel **BYPASSING MC FUNCTIONS**.

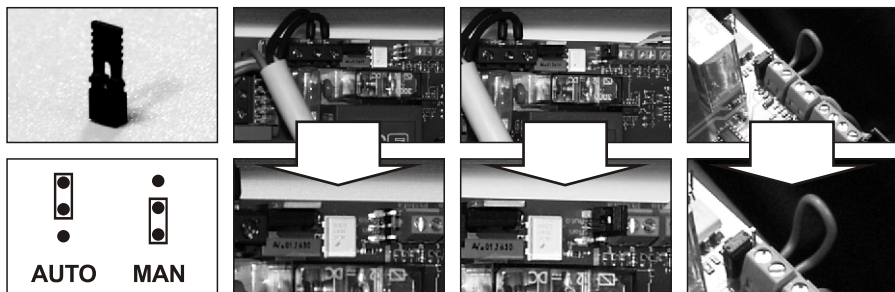
This is a special operating mode - it should be used only under exceptional circumstances, such as when management necessities require fuel to be dispensed without the operation being recorded and/or when you want to simplify setup or maintenance operations that require the pump to be started and stopped repeatedly.

#### **WARNING**

*When it is in MANUAL mode, MC does not record any dispensing operations.*

To enter MANUAL mode, proceed as follows:

- Unscrew and remove the cover panel from the MC Box to access the circuit boards.
- Move the jumper from the position in which you find it (by default it bridges the two upper contacts in AUTO mode) to the lower position, i.e. the jumper should bridge the two lower contacts.



In MANUAL mode:

- The LCDs will continue to show what was being displayed when switching from AUTO to MAN.
- No PIN CODE or KEY is necessary to start the pump; the pump starts as soon as the nozzle is lifted and stops when it is put back in its place.
- MC-BOX does not show the amount of fuel dispensed in any way.

### 3.2 DISPLAYS

Two backlit displays provide different information, depending on which OPERATING MODE MC is currently in.

**NUMERIC DISPLAY**  
(1 line containing 4 numeric characters)

- In LEVEL mode  
shows current time
- In SYSTEM mode  
shows current time
- In DISPENSING mode  
shows quantity dispensed

**ALPHANUMERIC DISPLAY**  
(2 lines containing 16 alphanumeric characters)

- In LEVEL mode  
shows prompt message
- In SYSTEM mode  
shows prompt message and/or data entered
- In DISPENSING mode  
shows unit of measurement and user data



### 3.3 KEYPAD

Input is provided through a membrane keypad equipped with:

- 10 alphanumeric buttons
- The following "special" buttons:



STOP

stops the dispenser pump



NUMBER

used in combination with other buttons for special functions

**CANCEL**

CANCEL

cancels data or returns to previous stage

**ENTER**

ENTER

confirms selection or data entered



FS / FG

shifts through menu functions



FD / FS

selects options proposed (flashing)

### 3.4 ELECTRONIC KEYS AND KEY READER

MC controls access to the system through two kinds of ELECTRONIC KEYS.

The MASTER KEY is assigned to the system manager and can also be used for transferring data to the PC - it is supplied with a RED key holder.



Every user is assigned a USER KEY by the plant manager than can be used only for refuelling at the pump. There are two kinds of USER KEYS:

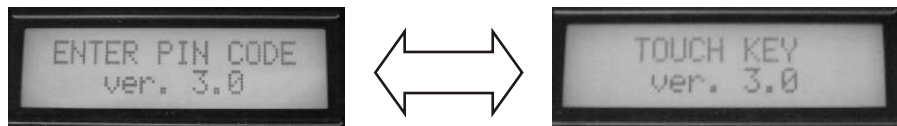
- a version with a GREEN KEY HOLDER having a four-digit code (KEY CODE) on the key-grip which is needed to identify the key at the time of user configuration;
- a version with a YELLOW KEY HOLDER without the four-digit code on the key-grip. This version has an internal identification code that is automatically recognized when the key is used.



ELECTRONIC KEYS are used by pressing them to the KEY READER located on the MC's front panel.



The stations to be used with USER KEYS with YELLOW key holder indicate the software release of the station in the second line of the alphanumeric display (ex. **ver. 3.0**).



This message is displayed only when the station is waiting for pin code entry or key touch. It is never displayed in the menus or during dispensing.



## 4 USING MC-BOX

### 4.1 GENERAL INFORMATION

To use MC and carry put the appropriate FUNCTIONS, operators must know the SOFTWARE governing the system.

#### WARNING

*The system MANAGER should have an IN-DEPTH understanding of the software, since he is likely to use every function at one time or other; the MANAGER should therefore read and understand every part of the present manual.*

*USERS only need to know what is necessary for dispensing.*

#### 4.1.1 SOFTWARE FLOW CHARTS

All the FUNCTIONS supported by the FM SOFTWARE are described in detail below and illustrated through FLOWCHARTS that show the information displayed on the LCDs in the different stages.

The indications displayed on the LCDs (more often on the alphanumeric display only) are connected by arrows drawn with a continuous line, next to which the functions of the respective BUTTON are shown.

When a button is pressed the display passes from one indication to the one immediately following it, connected to the first one by an arrow.

In certain occasions passing from one step to the following does not depend on pressing a button but occurs automatically at the end of activities lasting an unspecified period (e.g.: printing a report); in this case the display will show a dotted line and the image of a clock.

#### USING THE BUTTONS



**SHORT PRESS**  
(Press button briefly and release immediately)



**PRESSING TWO BUTTONS IN COMBINATION**  
(Press first button and hold down while briefly pressing second button, then release)



**APPLYING A KEY**  
(Press key to key reader)

LIQUID CRYSTAL DISPLAY (GENERAL)



MAIN INDICATIONS ON LCD

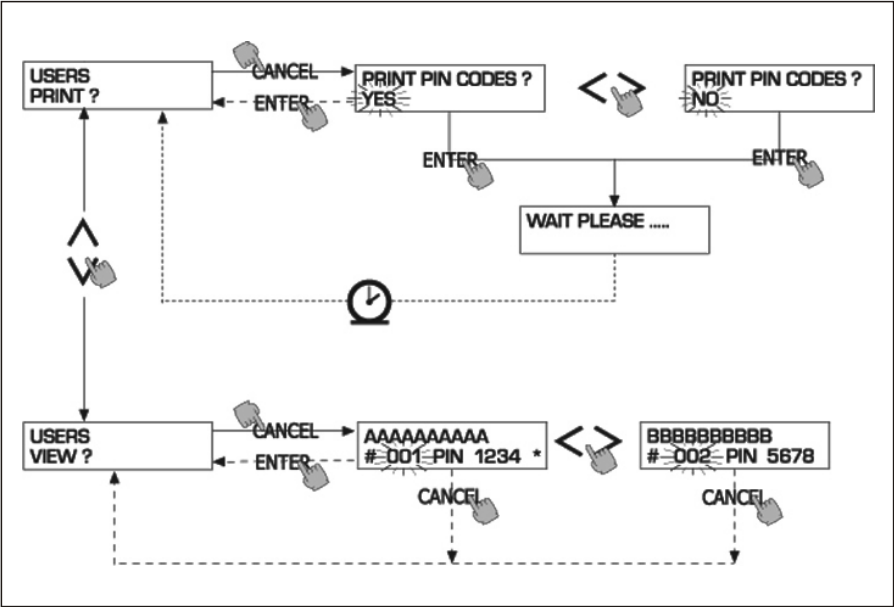


FLASHING MESSAGES



ALTERNATE FLASHING MESSAGES

FLOW CHART



**WARNING****CANC BUTTON**

*For simplicity, in some FLOW CHARTS the CANC button is not shown, although it can be used at almost any stage.*

*Pressing the CANC button has one of the following effects:*

- return to previous screen, or
- cancel numerical data entered.

**TIME OUT**

*During any function, if no action is taken (pressing a button, applying a key, dispensing fuel) in a fixed period of time (TIME OUT), the system will automatically exit the function. This ensures that MC does not remain in an input-expecting mode and prevents access by unauthorized users.*

*The TIME OUT function is not shown in the FLOW CHARTS.*

**4.1.2 SOFTWARE OVERVIEW**

All the functions provided by MC-BOX SOFTWARE are grouped in SECTIONS. Each SECTION contains functions that are consistent with each other. SECTIONS can be automatically accessed, freely accessed or access-protected by a PIN CODE.

The SOFTWARE OVERVIEW describes the available sections and gives a brief description of each function contained.

The SECTIONS are:

**BOOT**

MC performs a self-diagnosis on the LCDs and displays the MODEL and SERIAL NUMBER.

- Enter: - automatically, at start-up.
- Exit: - automatically, when completed.

**SYSTEM MANAGEMENT**

Management operations (reports, enabling users, calibrating, transferring data to a PC).

- Enter: - from ACCESS CONTROL, after entering a key or a SYSTEM code number.
- Exit: - when function completed or at time out.

**SYSTEM CONFIGURATION**

Customizing MC for specific plant requirements.

- Enter: - from SYSTEM in SYSTEM MANAGEMENT menu.
- Exit: - when function completed or at time out.

**DISPENSING**

Fuel dispensing operations.

- Enter: - from ACCESS CONTROL, after entering a key or a USER code number.
- Exit: - when function completed or at time out.

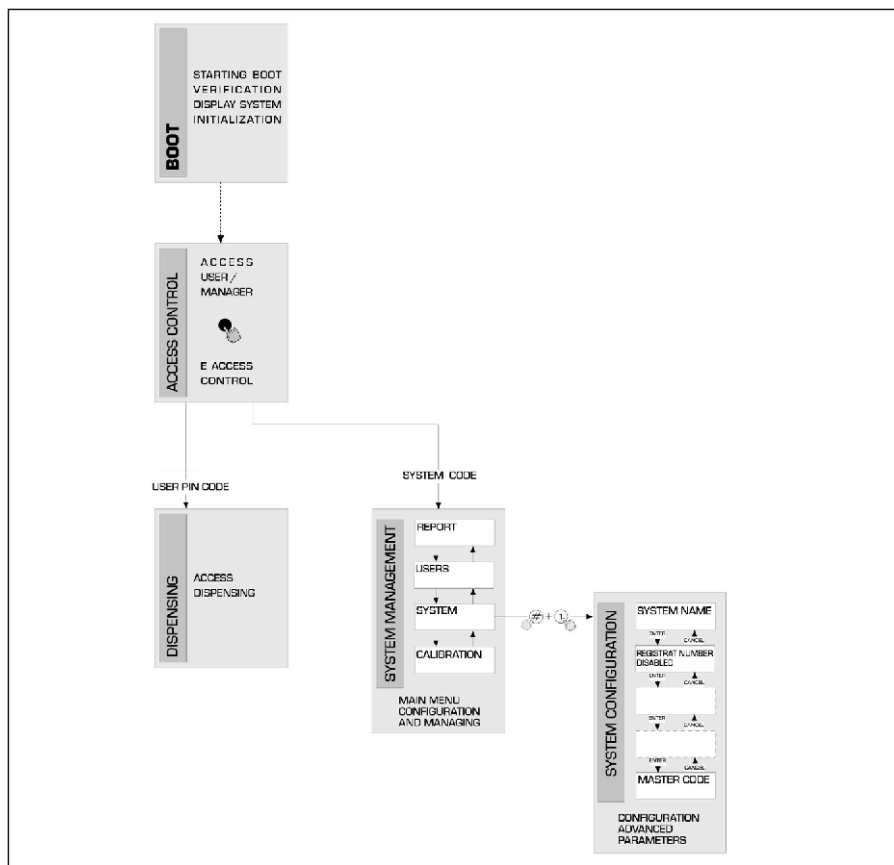
Some carry out their functions without user input (BOOT, ACCESS CONTROL).

Others require an input to perform a function (SYSTEM CONFIGURATION, DISPENSING). Input must be made in sequence, and MC prompts the user to enter the requested information.

After providing the requested input the section will automatically be exited.

Other sections (SYSTEM MANAGEMENT) are more complex and appear in form of MENU. The user (in this case only the MANAGER) accesses the menu and chooses the desired function, which can itself be organized as a lower-level MENU (SUBMENU).

Sections are described in detail below.



## 4.2 BOOT

The BOOT section is fundamentally a TEST section, in which MC automatically carries out a number of checks.

The BOOT section is performed only in one of the following situations:

- When MC is powered up (by a master switch that the installer should place between the power supply and MC-BOX).
- When, without cutting and giving power, the AUTO/MAN jumper is switched from MAN to AUTO (see Sect. 3.1).

In the BOOT section the operator can:

- make sure the displays are working properly (they light up completely for a few seconds)
- check the MODEL
- check the SERIAL NUMBER.

### WARNING

**The SERIAL NUMBER shown during BOOT is the S/N of the CPU mounted on MC. The S/N is required to access the data collected by MC in case you lose the MASTER KEY and the MASTER PIN CODE. If this happens, you should note down the station's S/N and contact CUSTOMER SERVICE.**

### 4.3 TANK LEVEL ALARM

MC-BOX is designed to be connected to an optional external level alarm equipped with a normally-open dry contact. The contact closes when an alarm signal arrives.

The connection must be made directly to MC's junction box through the tank cap, which should be replaced by a PG7-type core hitch.

The way MC reacts when reaching alarm level depends on its configuration.

- **CONFIGURATION 1**  
LEVEL INPUT = NO / LEVEL OUTPUT = ALARM or LEVEL OUTPUT = PUMP CUTOUT

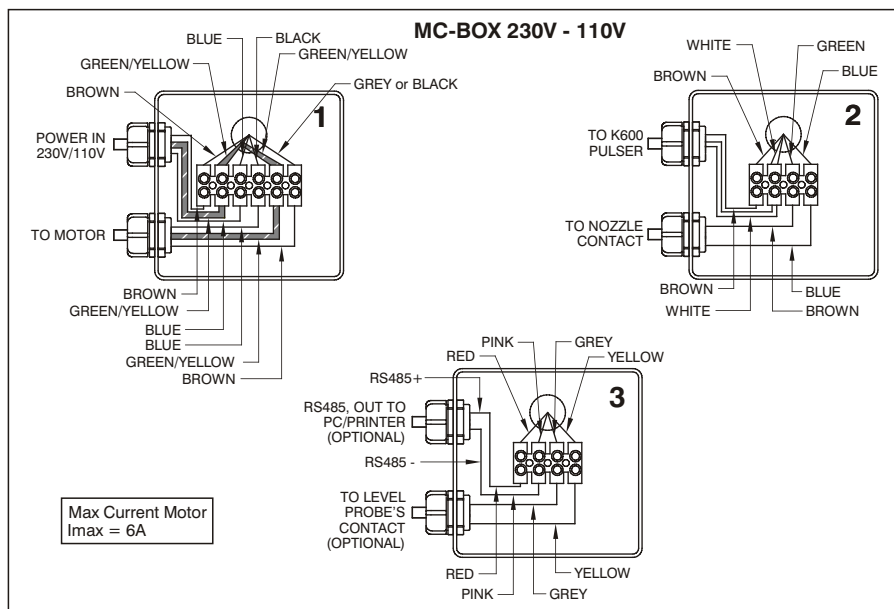
MC does not react to inputs from the level sensor and takes no specific action.

- **CONFIGURATION 2**  
LEVEL INPUT = YES / LEVEL OUTPUT = ALARM

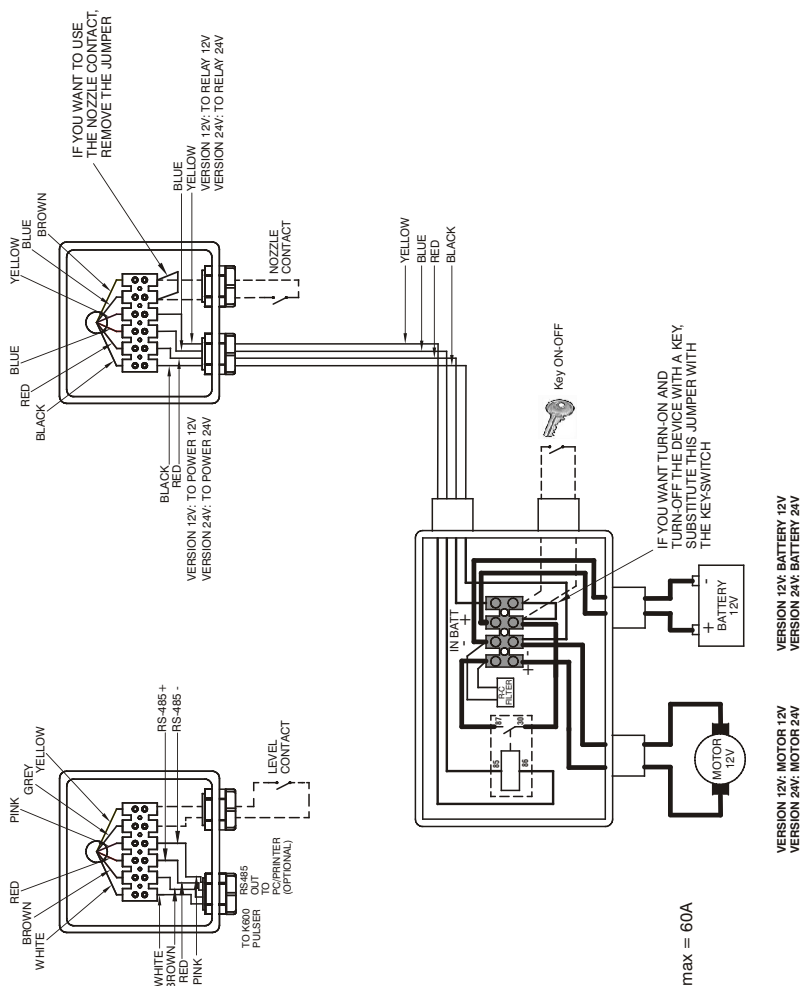
MC prints a "WARNING LOW LEVEL" message on the remote printer, if enabled, after the current dispensing is finished.  
Dispensing remains possible.  
No message appears on the LCD.

- **CONFIGURATION 3**  
LEVEL INPUT = YES / LEVEL OUTPUT = BLOCK

MC disables any further dispensing.  
The LCD shows "DISPENSING IMPOSSIBLE / MINIMUM LEVEL".



# **ELECTRICAL DIAGRAM VERSION MC BOX 12V** **ELECTRICAL DIAGRAM VERSION MC BOX 24V**



## 4.4 ACCESS CONTROL

The system enters ACCESS CONTROL when start-up booting has been completed or when one of the following events take place:

Pressing a NUMERIC button, as when entering a PIN CODE. MC checks whether the PIN CODE is enabled and whether it belongs to a USER or the MANAGER.

If the system fails to recognize the code number, an "UNKNOWN CODE" alert message is displayed.

If the number is recognized, the system does as follows, depending on the type of code number:

- if USER PIN CODE  
the system enters DISPENSING mode
- if MASTER PIN CODE  
the system activates the REPORT function in the SYSTEM MANAGEMENT menu
- Introducing a KEY in the KEY READER.  
MC checks whether the KEY is enabled and whether it is a USER KEY (green) or MASTER key (red).

If the system fails to recognize the key, an "UNKNOWN USER KEY" message is displayed.

If the key is recognized, the system does as follows, depending on the type of key:

- if USER KEY  
the system enters DISPENSING mode
- if MASTER KEY  
the system activates the DATA TRANSFER function in the MASTER MANAGEMENT menu

### WARNING

*Since the MASTER KEY is chiefly used for transferring data from MC-BOX to a PC (if the optional software is installed), when the system recognizes the MASTER KEY it automatically opens the DATA TRANSFER menu.*

*Once in this menu, the user can access any other function available in the menu.*

*Therefore, the MANAGER PIN CODE and the MASTER KEY are two ALTERNATIVE ways of accessing SYSTEM MANAGEMENT, both reserved exclusively for the plant MANAGER.*

## 4.5 SYSTEM CONFIGURATION

In SYSTEM CONFIGURATION the system can be customized and adapted to the specific requirements of the fuelling station.

Only the MANAGER (or the installer) can access SYSTEM CONFIGURATION, using either the MASTER PIN CODE or the MASTER KEY.

To access the CONFIGURATION section:

- enter SYSTEM MANAGEMENT
- shift through the menu until you reach SYSTEM
- press the "#" and "1" buttons in combination.

### 4.5.1 SETUP CONFIGURATION

The system must be configured at first installation. Before configuring the system, the installer and the manager should decide which among all available options are more suitable for the fuelling plant.

Configuration requires a number of OPERATIONS (selections to make or data to enter) that must be performed in sequence.

For each operation the system proposes a DEFAULT value that can be edited or accepted by pressing ENTER (which leads to the next operation).

Each operation is described below in full detail.

The title of the sections is the same as the indications shown on the LCD in the respective operation.

#### UNIT NAME

(Name of unit)

The name assigned to the station by the system manager. It can be left blank.

DEFAULT: none

Options: an ALPHANUMERICAL string of max 16 characters

#### REGISTRATION NUMBER

(Vehicle plate number)

Determines whether the user is required to enter a name (or number) identifying the vehicle.

If this option is enabled, the user must enter the required information before being allowed to refuel (the system accepts any value).

DEFAULT: DISABLED

Options: DISABLED (name/number not required)  
ENABLED (name/number required)

#### ODOMETER

(Odometer reading)

Determines whether the user is required to enter the odometer reading of the vehicle.

If this option is enabled, the user must enter the required information before being allowed to refuel (the system accepts any value).

DEFAULT: DISABLED

Options: DISABLED (information not required)  
ENABLED (information required)

#### START TIME OUT

(Period before starting dispensing)

Determines the maximum period within which the user must start dispensing fuel from the moment the system enables the pump. If the fixed period elapses before dispensing begins, MC disables the pump and the user is required to identify himself again (using a code number or a key).

DEFAULT: 60 seconds

Range: 001 ÷ 999 seconds

#### FILLING TIME OUT

(Time allowed for interruptions to dispensing)

Determines how long a dispensing operation can be interrupted.

Once started, dispensing can be temporarily interrupted by the user or by the automatic nozzle. If the suspension (the pump remains on but the meter is still) lasts longer than the fixed period of time, the pump is disabled and stopped.

To resume dispensing the user is required to identify himself again (using a code or a key).

When the nozzle is put back in its place, even if the fixed period of time has not elapsed, dispensing is considered completed (and the pump disabled).

DEFAULT: 120 seconds

Range: 001 ÷ 999 seconds

#### REMOTE PRINTER

(Remote printer)

Determines whether MC-BOX is to be connected, by an (optional) RS 485 serial line, to a remote printer (e.g. installed inside an office, that can be at a distance of several hundred metres) to automatically print one-line reports for each dispensing (logging) or reports requested by the manager.



**WARNING**

*The printer must be equipped, alternatively, with:*

- RS 485 serial port
- RS 232 serial port + RS 232/485 converter (supplied on request)
- Centronics parallel port + RS 232/485 converter + RS 232/Centronics converter (supplied on request)

**DEFAULT:** NO

**Options:** YES (printer connected)  
NO (printer not connected))

**REMOTE SERIAL PRINTER SETTINGS (optional):**

**Protocol:** 8 - N - 1

**BAUD RATE:** 2400

**Word Length:** 8 bit

**Parity:** None

**Bit Stop:** 1

If YES (printer connected) is selected, the following options will be proposed:

**REMOTE PRINTER / TYPE** (Type of remote printer)

Determines whether the remote printer should be a:

- 80-column printer (standard office printer)
- 40-column printer (roll-paper printer for tickets)

**DEFAULT:** 80 COLUMNS

**Options:** 80 COLUMNS (80 column printer)  
40 COLUMNS (40 column printer)

**REMOTE PRINTER / PRINT OUT** (Type of printouts on remote printer)

Determines what kind of printouts should be produced by the remote printer:

- tickets (reproduction of a hypothetical receipt printed by the remote printer)
- automatic one-line reports for each dispensing ("logging").

**DEFAULT:** LOGGING

**Options:** LOGGING  
TICKET

**REMOTE PRINTER / AUTO CR-LF** (Automatic line jumping)

This function customizes the commands sent by MC-BOX to the printer to meet printer settings, which may require special "line feed" instructions in order to work properly.

**WARNING**

*For the first printouts you should leave the default option on; if the printer does not print the report lines correctly, enter configuration mode and change the option.*

**DEFAULT:** NO

**Options:** NO (line feed disabled)  
YES (line feed enabled)

**REMOTE PRINTER / LINE DELAY** (Printing delay)

If the printer's buffer is not large enough to handle the printing spool, use this function to change the delay by which the data is sent to the printer, so to facilitate printing without losing data.

**WARNING**

*For the first printouts you should leave the default option on; if the printer fails to receive all the data sent to it, enter configuration mode and change the option.*

**DEFAULT:** 100 x 10 ms

**Range:** 100-999 x 10 ms

**PC CONNECTED**

(Connected to PC - only with optional software)

Determines whether MC-BOX is to be connected, by an RS 485 serial line, to a PC running the (optional) MC-BOX MANAGEMENT software for collecting and processing the data on dispensing operations (see manual no. M00105).

**MEASUREMENT UNIT**

(Unit of measurement)

Determines the unit of measurement used by the system.

DEFAULT:

LITRES

Options:

LITRES

US GALLONS)

**DECIMAL DIGIT**

(Number of decimals)

Determines how many decimals should be shown when displaying the amount of fuel dispensed. If 2 decimals are selected, whenever more than 99.99 units of fuel are dispensed the system will automatically revert to displaying a single decimal.

DEFAULT:

1

Options:

1-2

**LOW LEVEL INPUT = YES / NO**

This function defines the control of the optional level contact (see sect. 4.3).

With "YES", the input level is controlled; with "NO", the input level is not controlled.

**LOW LEVEL INPUT = ALARM / PUMP CUT OUT**

This option is visible only if the Low Level Input is set to "YES" (see also sect. 4.3).

This selection defines the reply action of the electronics when the level alarm contact closes. If alarm is chosen, a printout on any remote printer is possible. If "PUMP CUT OUT" is set, MC turns off the pump and fuel dispensing is no longer enabled.

**KEY READER**

(Electronic key reader)

Enables/disables the electronic key reader located on MC's front panel.

DEFAULT:

YES

Options:

YES (Reader enabled)

NO (Reader disabled)

**MASTER CODE**

(Manager's code)

Changes the MASTER CODE, which is factory-programmed as "1234". When you open the function the system displays the current code:

- press "ENTER" to confirm and go to the next step
- press any numeric button to enter a new code.

**WARNING**

*The new code must be a 4-digit number. Enter the new code and press ENTER; MC will display both the PREVIOUS code (OLD PIN) and the NEW code (NEW PIN):*

- press "ENTER" to confirm the new master code
- press "CANCEL" to cancel the changes and confirm the PREVIOUS code.

**MASTER KEY**

(Replacing manager's key)

This function enables a new MASTER KEY in replacement of the previous one.

When MC displays this message, you can:

- exit SYSTEM CONFIGURATION by pressing "CANCEL"; the existing MASTER KEY remains enabled;
- apply a new key to the key reader; the key will be enabled as the new MASTER KEY in replacement of the old one.

**WARNING**

*Only one key at a time can be enabled as the MASTER KEY on any given MC-BOX station. A same key, however, can be enabled as the MASTER KEY on different MC-BOX stations.*

## 4.5.2 CHANGING CONFIGURATION

If at any time you want to change a option chosen during the initial configuration, proceed as follows:

- enter CONFIGURATION mode;
- press "ENTER" to confirm all the options you DO NOT want to change, until you reach the option you want to edit;
- go through all remaining functions by pressing "ENTER", until you reach the last one (NEW MASTER KEY);
- exit CONFIGURATION mode (unless you want to change the MASTER KEY) by pressing "CANCEL".

## 4.6 SYSTEM MANAGEMENT

The SYSTEM MANAGEMENT section is used by the Manager to handle day-to-day MC operations.

The section is organized in menus and submenus to facilitate access to the various functions. The main menu contains six functions, described below.

### 4.6.1 REPORT

Makes three different kinds of printouts on an (optional) remote printer, as described in the following FLOW CHART.

#### 4.6.1.1 REPORT / TRANSACTION

Prints all the dispensing operations (TRANSACTIONS) contained in MC's memory.

#### WARNING

*There are two ways to transfer data from MC-BOX's memory to a PC running the optional data-processing software, i.e. through a serial connection or through the MASTER KEY. Only transactions that have not yet been transferred can be printed, because when the data is transferred to a PC it is automatically cancelled from the station's memory.*

Data printouts can be:

- complete, i.e. all transactions stored in the memory (select ALL DATE + ALL USERS);
- limited to a period of time between two specified dates (select PERIOD);
- limited to a single day (select PERIOD and enter the date twice);
- limited to a single user (select SINGLE USER) identified by his USER NUMBER (a number from 1 to 50 progressively assigned to each user).

The above limitations can be all applied simultaneously, for example when you want to print all the transactions made by a single user during a specific period of time.

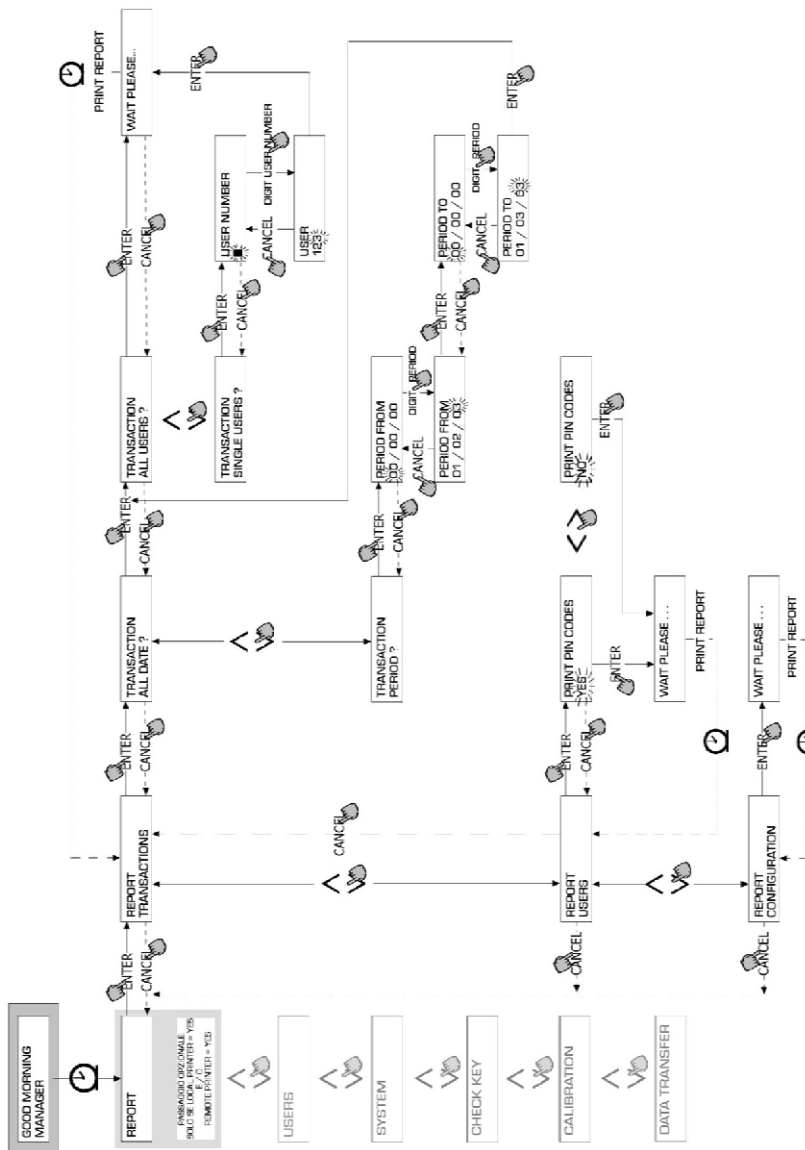
```

SELF SERVICE    08:40:56 28-03-03
FM

TRANSACTION LIST

DATE : 28/03/03
TIME USER  QUANTITY ODOMETER REC NUM
              (LITER)
08:24 001    6.26
08:37 005    4.09
08:37 001    4.16
08:38 001    3.11
08:38 002    5.97
08:38 004    2.92
08:39 005    1.06
08:39 003    3.06
08:39 002    1.06
  
```

## SYSTEM MANAGEMENT / REPORTS



### 4.6.1.2 REPORT / USERS

Prints a list of all enabled users.

There are two kinds of lists:

PRINT CODE > YES

Prints a list of users, including a column showing every user's PIN CODE.

PRINT CODE > NO

Prints a list of users without showing the PIN CODES.

#### WARNING

*Printouts containing user PIN CODES should remain confidential, to avoid revealing users' secret code numbers.*

*For each user, the printout shows:*

- Progressive number assigned to user (USER NUMBER)
- Name of user (USER NAME)
- User's secret code number (PIN CODE)
- Electronic key assigned to user (USER KEY)

If a user is assigned an electronic key only, the USER KEY column will contain an asterisk (\*) and the PIN CODE column will show "0000".

If a user is assigned a PIN CODE only, it will be a 4-digit number different from "0000" and no asterisk will appear in the USER KEY column.

SELF	SERVICE	08:40:46	28-03-03
	FM		
	USERS	LIST	
NUMBER	NAME		KEY
001	MARIO		*
002	JOHN		
003	PAOLO		
004	ROSSI		
005	SMITH		*
006	HENRY		

PRINT CODE - YES

SELF	SERVICE	08:40:46	28-03-03
	FM		
	USERS	LIST	
NUMBER	NAME		CODE KEY
001	MARIO	0001	*
002	JOHN	0002	
003	PAOLO	0003	
004	ROSSI	0004	
005	SMITH	0005	*
006	HENRY	0006	

PRINT CODE - NO

### 4.6.1.3 REPORT / CONFIGURATION

Prints a list of all selections made in system configuration, as described below:

SELF	SERVICE	08:40:23	28-03-03
	FM		
	UNIT CONFIGURATION		
REG. NUMBER	DISABLED		
ODOMETER	DISABLED		
START TIME OUT	050 sec		
FILLING TIME OUT	120 sec		
INTERNAL PRINTER	YES		
TICKET RECEIPT	AUTO		
REMOTE PRINTER	YES		
TYPE	40 COLUMNS		
PRINT OUT	TICKET REC		
AUTO CR-LF	NO		
LINE DELAY	10 *10 mSec		
PRINT REPORT ON	BOTH PRINTERS		
PC CONNECTION	NO		
DISPENSING UNIT	LITERS		
DECIMAL DIGIT	2		
LOW LEVEL INPUT	ALARM		
KEY READER	YES		
OC10 PRESENT	YES		

For details on the single functions please see Sect. 4.6.1.

#### 4.6.1.4 REPORT / TOTALS

Prints the GENERAL TOTAL, Period Totals (TOTAL FROM XX/XX/XX) and User Totals.

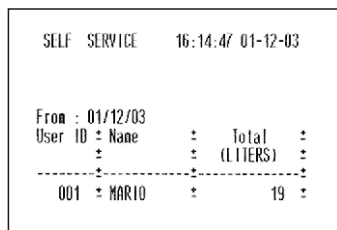
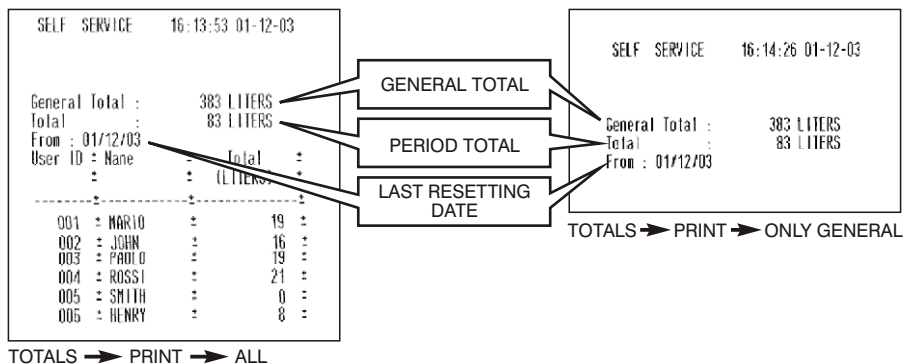
**General Total (cannot be reset). Total amount of fuel dispensed from first installation of MC-BOX system. This value cannot be changed by the manager in any way.**

**Period Total (can be reset by manager). Total amount dispensed since last resetting. This value is the sum of all Users Totals.**

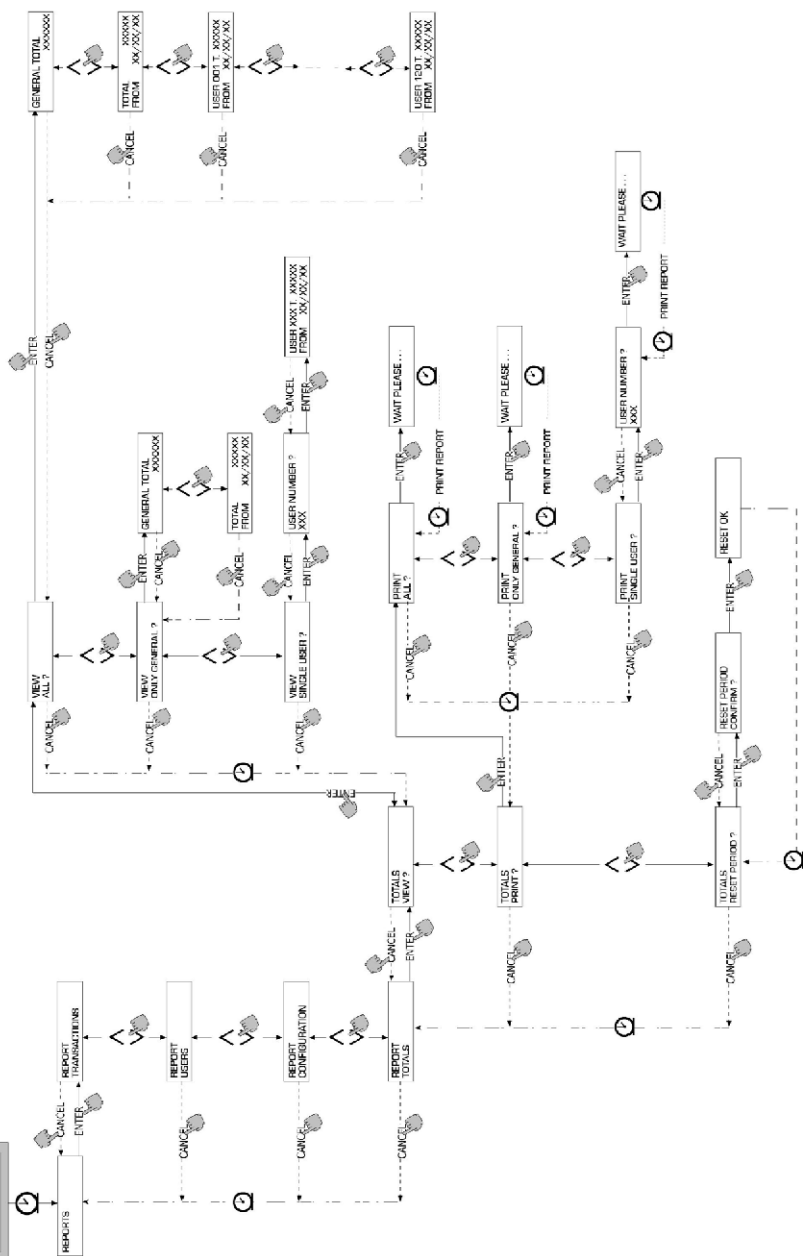
**User Total (can be reset by manager). Total amount dispensed to a specific user since last resetting of Period Total. Single User Totals cannot be reset. All User Totals are simultaneously reset every time the Period Total is reset.**

Totals can be displayed, printed and reset. This is done by the following submenus:

- \* TOTALS VIEW? Displays the different totals on the LCD (General Total, Period Total, User Total);
- \* TOTALS PRINT? Prints the different totals (General Total, Period Total, User Total);
- \* TOTALS RESET PERIOD? Resets the Period Total and consequently all User Totals.



GOOD MORNING  
MANAGER



## 4.6.2 USERS

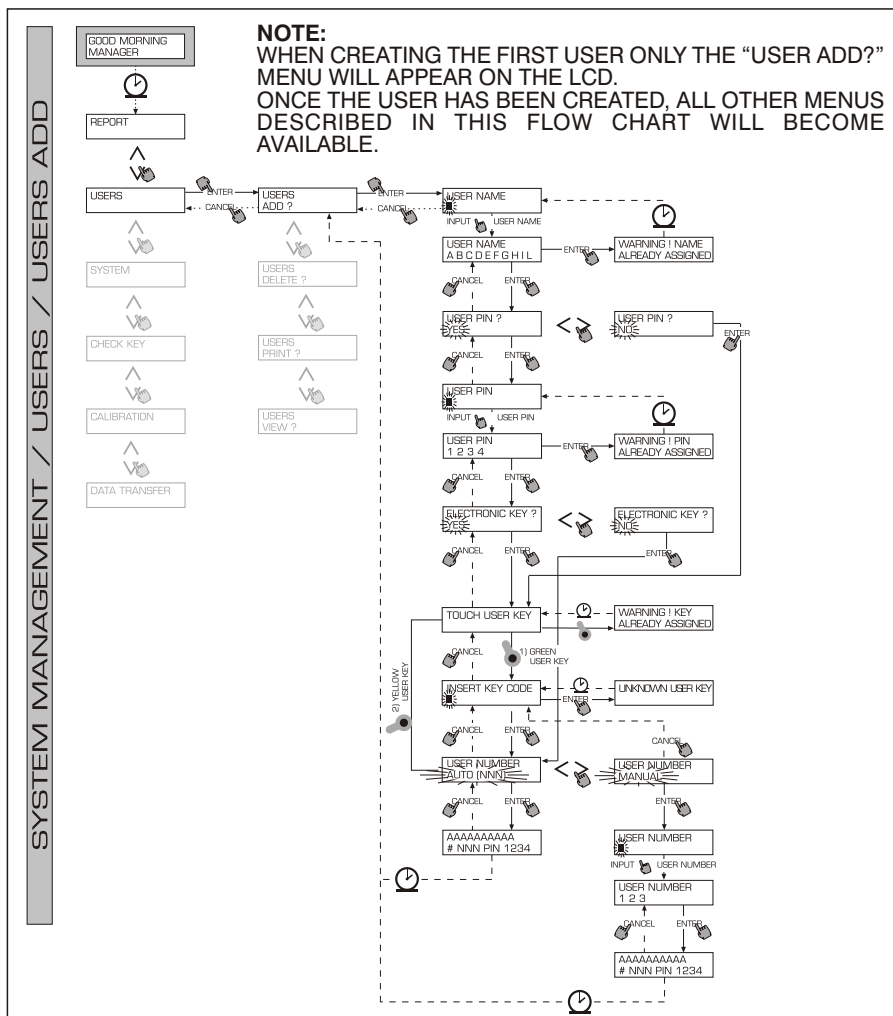
This function is for managing all users enabled on MC-BOX, through four separate functions contained in a submenu.

### WARNING

*If no user is enabled, the only function available is the creation of new users (USER/ADD Sect. 4.6.2.1).*

### 4.6.2.1 USERS / ADD

Creates (adds) and enables a new user, as described in the flow chart below:





To create a new user follow the steps listed below, in sequence.

### USER NAME

Name of user; this is an alphanumeric field containing from 1 to 10 characters.

**This field must be filled.**

### USER PIN

Secret individual code number assigned to each user.

The options are USER PIN > YES / NO.

If the option USER PIN > NO is selected, the user is not assigned a secret code but only an electronic key, and the system request the key to be applied to the reader (see below).

If the option USER PIN > YES is selected, the user's secret individual code (a numeric field containing from 1 to 4 characters) must be entered.

### WARNING

*At this stage of assigning a user PIN you always have to enter 4 digits. For example, if you want to assign the number "4" as a user's PIN number, you must enter "0004". When refuelling, however, the user only needs to enter "4". If the user enters a USER PIN assigned to another user, MC will not accept it and will ask for another code.*

### ELECTRONIC KEY

The options are ELECTRONIC KEY > YES / NO.

If the option ELECTRONIC KEY > YES is selected, the system will ask you to press the key to the key reader, displaying the message TOUCH USER KEY, in order to assign that specific key to the user. The system will exit this stage only when a key is pressed to the reader and pass to the entry stage of the 4-figure code applied on the key.

If the key has already been assigned to a different user enabled on the same station, the system will not accept the key and display the message "WARNING KEY ALREADY ASSIGNED".

### WARNING

*Only USER KEYS can be assigned to users.  
The system will not assign a MASTER KEY to a user.*

### KEY CODE

The KEY CODE is the 4-figure code applied on the handle of the USER key enabling the User Key to be identified by the station. This code is used only during the user's configuration; the final user does not need it in daily use.

If the key code is lost or damaged, the user key cannot be configured again but its daily use is possible if previously configured.

### WARNING

*The key code is required only on models which are provided with Green User Keys.  
No code is required on models which are provided with Yellow User Keys.*

### USER NUMBER

A number from 1 to 50 progressively assigned to every user.

### WARNING

*Unlike PIN CODES, USER NUMBERS can be revealed, because they are simply numbers that are associated to users to make it easier for the manager to process user data (printouts and transactions).*

The options are USER NUMBER > AUTO (NNN) / MANUAL.

If the option USER NUMBER > AUTO (NNN) is selected, the user is automatically assigned the number (NNNN) displayed, which is the lowest available number, i.e. not assigned to any other user.

If the option USER NUMBER > MANUAL is selected, the manager can assign any available USER NUMBER that has not yet been assigned. If a USER NUMBER is entered that has been assigned to another user, MC-BOX will not accept it and ask for a new number.

In both cases (automatic or manual selection), when the selection is confirmed by pressing "ENTER", the system displays all user data for a few seconds and then returns to the USER / ADD menu.

### WARNING

**The system does not allow partial changes to user data. If data entered and confirmed when creating and enabling a user is found to be incorrect, you must:**

- delete the user (see Sect. 4.7.2.2)
- create a new user with correct data.

#### 4.6.2.2 USERS / DELETE

Deletes enabled users, as described in the flow chart below.

To select the user that you want to delete, enter his USER NUMBER.

The system will display all the information regarding the user and ask you to confirm deleting the user.

### WARNING

**DELETE is non-reversible: once a user is deleted he cannot be restored other than by creating a new user.**

**Deleting a user means that:**

- the PIN CODE or USER KEY assigned to the user will no longer be accepted to authorize dispensing;
- the USER NUMBER assigned to the deleted user can be assigned to a new user;
- the USER KEY assigned to the deleted user can be assigned to a new user.

#### 4.6.2.3 USERS / PRINT

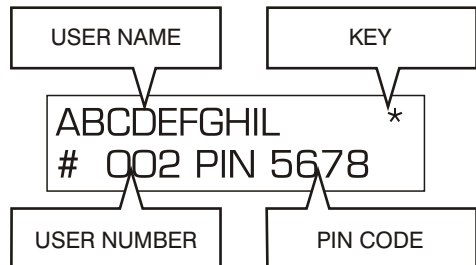
Prints a list of enabled users. Details and printouts regarding this function are the same as those described in Sect. 4.7.1.2.

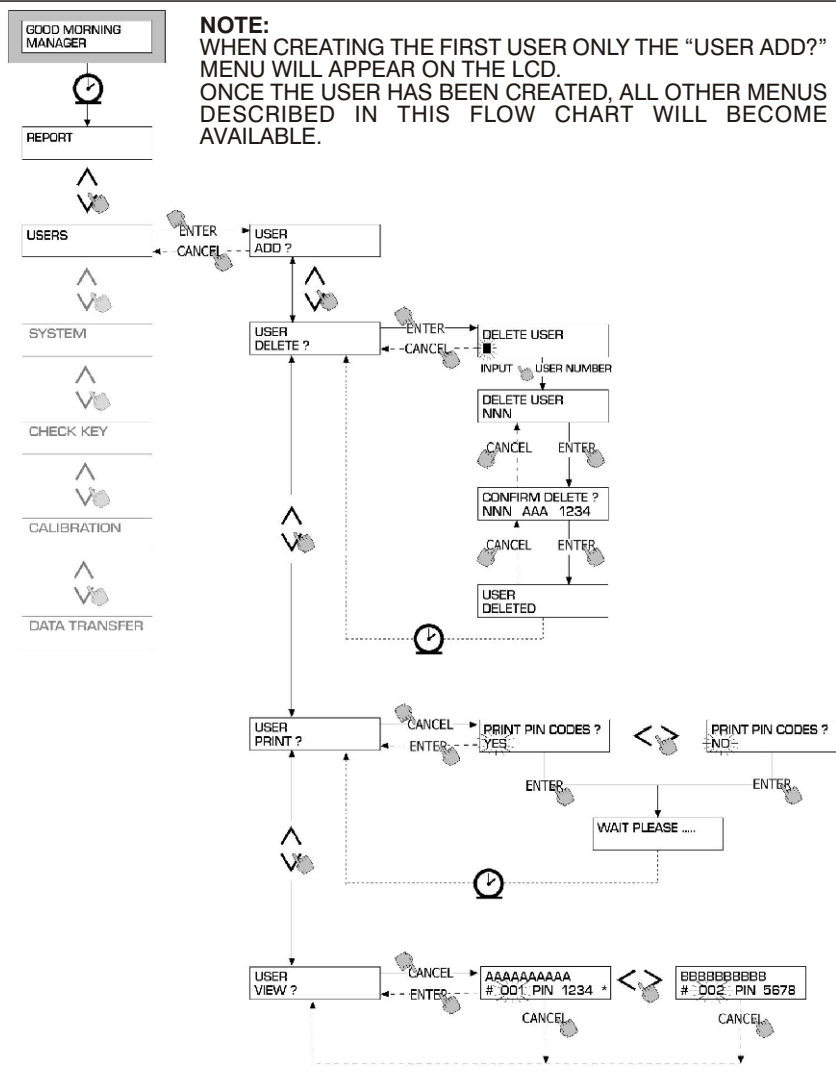
#### 4.6.2.4 USERS / VIEW

Displays all enabled users.

The following information is displayed for each user:

- USER NUMBER
- USER NAME
- PIN CODE
- KEY (if assigned)





Lets you enter **SYSTEM CONFIGURATION** (typically used at first installation) described in Sect. 4.6, and also a submenu containing the following four functions.

#### 4.6.3.1 SYSTEM / SERIAL NUMBER

Displays the SERIAL NUMBER of MC's circuit board.

##### **WARNING**

*This SERIAL NUMBER identifies the circuit board only and is NOT RELATED to the S/N of the station, which appears on the NAMEPLATE affixed to the station.*

There are two other ways to display the station's S/N for which neither the MASTER CODE nor the MASTER KEY are necessary:

- Use the master switch to turn power off and on again; during the BOOT phase the system will briefly display the S/N.
- In the LEVEL CONTROL section:
  - Press STOP to enter "ACCESS CONTROL"
  - Press "#" and "9" in combination; the system will display the station's S/N.

#### 4.6.3.2 SYSTEM / MEMORY

Opens a submenu that controls the station's memory, as follows.

##### **SYSTEM / MEMORY / VIEW**

Shows how much memory is available, by displaying how many of all 255 memory locations are currently used.

Occupied memory locations are made free when:

- The data stored in MC's memory is transferred to the MASTER KEY and then to a PC running the (optional) data processing software. This operation can be done whenever the Manager considers it necessary.
- The data stored in MC's memory is transferred to a PC through an RS connection. This occurs automatically in a few seconds, provided the MC-BOX MANAGEMENT software running on the PC has been launched.

##### **WARNING**

*Printing transaction details is not considered "data transfer" and therefore does not free occupied memory locations.*

If neither of the above data transfer operations is performed, the memory can fill up completely (message displayed: USED MEMORY 255/255); when this happens MC will allow no more transactions and the LCD will display a "FULL MEMORY" message.

In this case the Manager must clear the memory in one of the following ways:

- by transferring the data to the MASTER KEY;
- by connecting the station to a PC through an RS 485 line;
- by clearing memory locations through a "MEMORY RESET".

##### **SYSTEM / MEMORY / RESET**

Clears all occupied memory locations, allowing the system to record new transactions. The function can be performed regardless of whether the memory is occupied totally or in part.

##### **WARNING**

*After a "MEMORY RESET" it will no longer be possible to print nor transfer the cancelled data.*

*The "MEMORY RESET" function should therefore be considered an extreme measure, and all existing transactions should be printed before permanently cancelling the data.*

### 4.6.3.3 SYSTEM / DATA / TIME

Sets the current date and time, which are required when recording transactions.

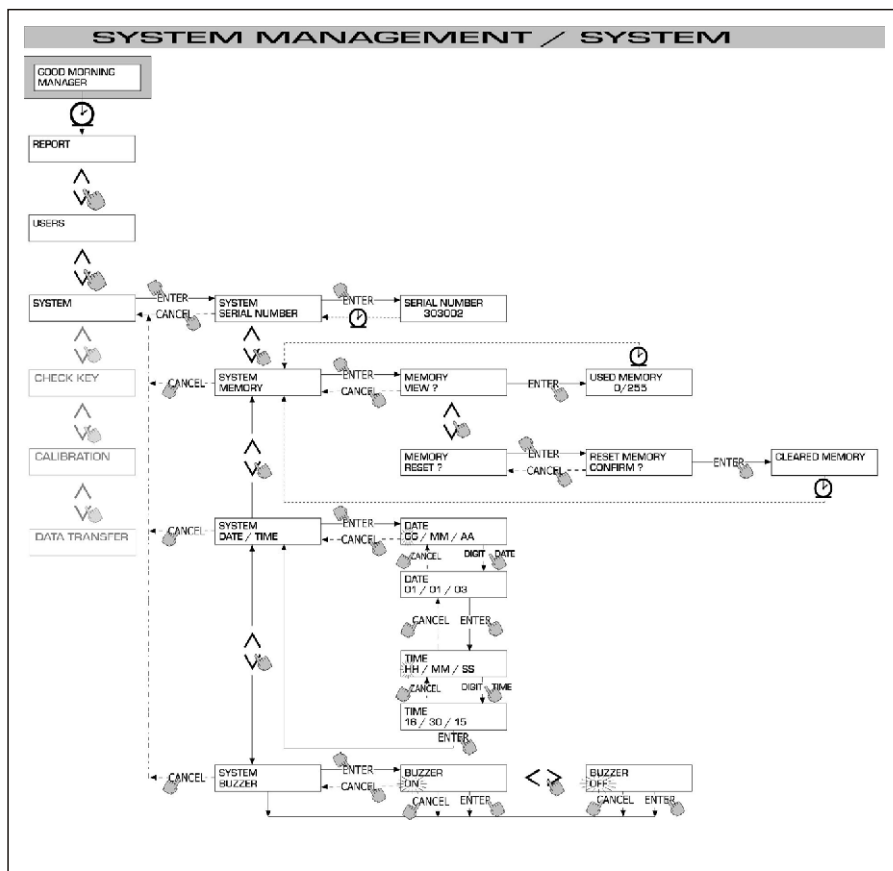
#### WARNING

*The system contains a perpetual calendar that changes year automatically, including leap years.*

*The calendar DOES NOT pass automatically from solar time to daylight-saving time.*

### 4.6.3.4 SYSTEM / BUZZER

Associates a sound (BUZZ) to each pressing of a button.



#### 4.6.4 CHECK KEY

Allows the Manager (only) to check if a key is enabled on any specific MC station and to identify the user it is assigned to.  
When MC displays the message "TOUCH KEY", apply the key to the reader to have the system identify the key.

Identification can have one of four outcomes:

If the key is a "MASTER KEY", the LCD will read:

- "UNKNOWN MASTER KEY" if the key is NOT enabled on that specific station.
- "MASTER KEY", if the key is the master key enabled on that station.

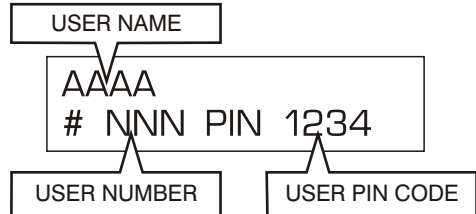
#### WARNING

**A station can have only one "MASTER KEY", i.e. no two keys can be enabled as MASTER KEYS on the same station at the same time.**

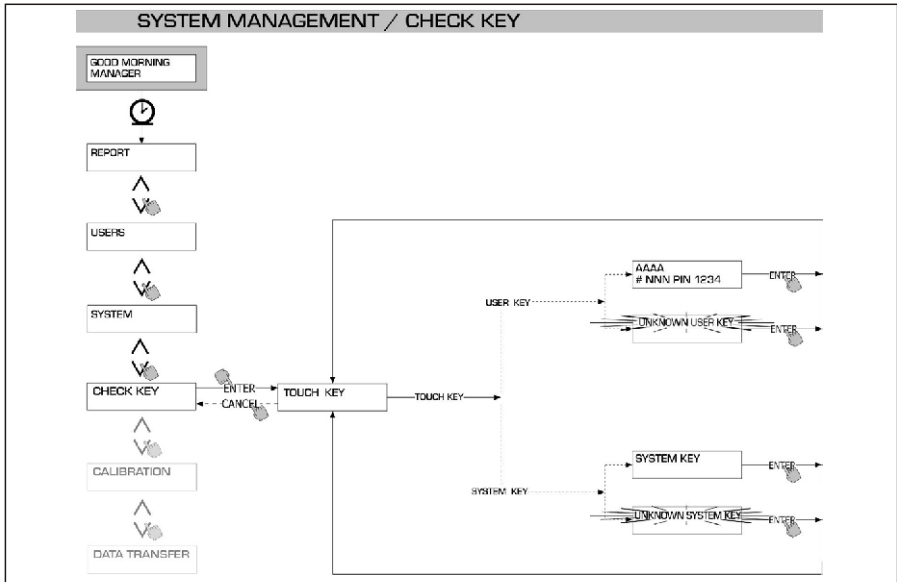
**However, a key can be enabled as the "MASTER KEY" on more than one station.**

If the key is a "USER KEY", the LCD will read:

- "UNKNOWN USER KEY" if the key is NOT enabled on that specific station, i.e. is not assigned to any user.
- User's data, as follows:



if the key is enabled on that station.



### 4.6.5 CALIBRATION

Opens a submenu where you can check or edit CALIBRATION settings and the K600 FLOW METER/PULSER settings.

#### 4.6.5.1 CALIBRATION VIEW

Displays the CALIBRATION FACTOR in use.

All K600 flow meters/pulsers are factory-calibrated for use with DIESEL FUEL, and will display "K FAC 1.0000" as the calibration factor.

Calibration changes the K FAC from 1.0000 to another value.

#### **WARNING**

*Calibration is performed to optimize flow meter accuracy.*

*After calibration, the K FAC will be different from 1.0000 by no more than 5% (higher or lower), i.e. it should remain between 0.9500 and 1.0500.*

*If the difference is larger than 5%, calibration may have been done improperly.*

#### 4.6.5.2 CALIBRATION MODIFY

Opens a submenu providing two alternative means of calibrating the flow meter.

#### **CALIBRATION / DIRECT**

DIRECT calibration changes the calibration factor (K FACTOR) directly.

This is useful when you want to change the calibration factor by a known amount to compensate errors observed in one or more refuellings.

#### **WARNING**

*Any correction to the K FACT must always be based on the current value.*

*For example, if the current calibration factor is 1.0120 (which is itself the result of a previous calibration, since the factory-set value is 1.0000), and the following conditions are observed:*

- *Flow meter readings are "on average" 1.5% higher than the "true" reading. The new K FACT should be calculated to compensate the mean error observed, as follows:  
(new) K FACT =  $1.0120 * (1 - (1.5/100)) = 0.9968$*
- *Flow meter readings are "on average" 0.8% lower than the "true" reading. The new K FACT should be calculated to compensate the mean error observed, as follows:  
(new) K FACT =  $1.0120 * (1 + (0.8/100)) = 1.0200$*

**CALIBRATION / BY DISPENSING**

CALIBRATION BY DISPENSING calibrates the flow meter by dispensing fuel into a GRADUATED CONTAINER of known capacity.

This is the quickest and easiest way of calibrating the flow meter and requires no calculations.

Calibration by dispensing can be suspended and restarted at will, and is considered complete when the fuel level can be seen in the container's graduated section. Press "ENTER" to confirm the end of the calibration dispensing.

**WARNING**

*To calibrate the flow meter properly you should use an accurately graduated container with a capacity of no less than 20 litres. In particular, you should:*

- *Remove all air from the pump, hoses, tubes and flow meter by pumping until the flow is full and regular.*
- *Stop the flow by switching off the nozzle but not the pump.*
- *Do not reduce flow when nearing the container's graduated section.*

*The correct procedure is to start and stop dispensing at a constant rate until reaching the desired limit, if possible with no interruptions.*

If the quantity displayed by MC-BOX is different from the quantity observed in the graduated container (the "TRUE READING"), the quantity displayed by MC-BOX will have to be changed to the TRUE READING.

Press "ENTER" to confirm the correction; the system will recalculate the calibration factor and display the new value for a few seconds.

The new calibration factor will remain effective until a new changed.

**WARNING**

*A single dispensing is enough to calibrate the flow meter properly.*

*After calibrating the flow meter, always check the results to make sure the instrument's accuracy has is within acceptable limits.*

*To do so, make a normal dispensing applying a User Code and not the Master Code.*





#### 4.6.6 DATA TRANSFER

Enables the transfer of dispensing data from the station's memory to the memory in the manager's electronic key (MASTER KEY).

The data can then be transferred from the key to the mass storage system of a PC equipped with a KEY READER and running the SELF SERVICE MANAGEMENT software.

##### **WARNING**

***For information on installing the software and transferring data to PC, please consult manual no. M0090, provided with the (optional) MC-BOX software.***

When you press a key against the key reader, the system identifies the key and displays one of the following messages:

##### **UNKNOWN MASTER KEY**

This means that the key has been identified either as a USER KEY or as a MASTER KEY that is not enabled on that station.

##### **KEEP IN PLACE / WAIT**

This message means all of the following:

- the key has been identified as the station's MASTER KEY;
- the station contains stored data that has not yet been transferred;
- the key is "EMPTY", i.e. it has already been used to transfer data to PC.

##### **WARNING**

***The MASTER KEY is "EMPTY" when no data on DISPENSING OPERATIONS is present in its memory. The MASTER KEY is considered "FULL" (message: FULL SYSTEM KEY) when it is storing AT LEAST ONE dispensing operation.***

***When you download ANY NUMBER (from 1 to 255) of transactions from a station to a key, the key passes from EMPTY to FULL and it will not be possible to add any more data to the key's memory.***

***To use the key again to transfer data from the station to the PC you must:***

- ***transfer to PC all the data stored on the key; this will "EMPTY" the key;***
- ***transfer new data from the station to the key;***
- ***empty the key again by transferring the data to the PC.***

***A key can be enabled as a MASTER KEY for more than one station. For the reasons explained above, however, it can be used to transfer to a PC only the data of ONE STATION AT A TIME.***

After transferring the station's data to a key, the system will briefly display a message saying whether transfer was successful ("OK") or not ("FAILED").

If data transfer was completed successfully ("OK"), the key is considered "FULL" (FULL MEMORY KEY), otherwise it is still "EMPTY" and you should transfer the data from the station to the key again.

##### **WARNING**

***Depending on the number of transactions stored, transferring data from a station to a key can last from less than one second to a few seconds.***

***During data transfer the key should be held firmly against the reader in the correct position until the system confirms that transfer has been completed; moving the key during a data transfer may cause the transfer to fail.***

**FULL MASTER KEY**

This message means that the key is "FULL" and should therefore be downloaded on a PC. The following two situations may occur:

- 1) The station's memory is NOT FULL, meaning that there are less than 255 transactions stored.  
In this case, even if the memory cannot be emptied, it still remains possible to carry out other transactions, up to a maximum of 255.
- 2) The station's memory is FULL, meaning the station is storing 255 transactions that have NOT YET BEEN TRANSFERRED.  
In this case no further transaction is possible until the station's memory has been cleared.  
The system displays the message "CONFIRM M. KEY / OVERWRITE?".  
Pressing ENTER will authorize the system to overwrite 255 new transactions on the data stored on the key and not yet transferred to PC.

**WARNING**

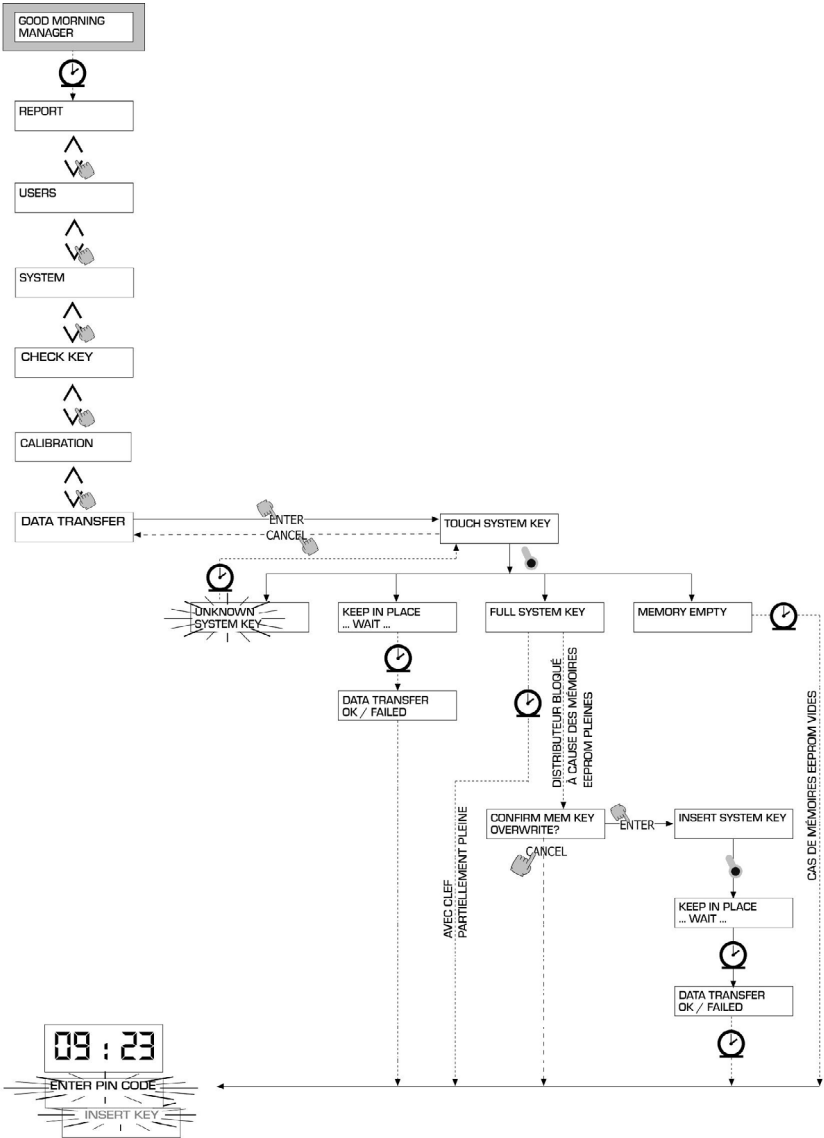
*Overwritten data is permanently lost, but the station will be available for new transactions.*

**MEMORY EMPTY**

The message means that the station contains no data, i.e. the memory is empty.

SYSTEM MANAGEMENT / DATA TRANSFER

ACCESS CONTROL



## 4.7 DISPENSING

DISPENSING enables fuel dispensing.

### 4.7.1 ALERT MESSAGES

When a USER enters a USER PIN CODE or applies a USER KEY to the station's reader, the system processes the input through its ACCESS CONTROL section and displays one of the following messages:

#### FULL MEMORY

The station's memory is full and no dispensing is possible.

#### WARNING

*To make dispensing possible again the user must apply to the plant manager. The manager can proceed in three ways:*

- *make a data transfer using the MASTER KEY as described in Sect. 4.6.6;*
- *if the station is connected to an RS 485 line, launch the "MC-BOX MANAGEMENT" software and wait for the system to automatically download the data from the station's memory;*
- *if neither of the above options are possible, perform a MEMORY RESET (see Sect. 4.6.3.2).*

#### DISPENSING IMPOSSIBLE / MINIMUM LEVEL

The level in the tank is below the allowed minimum limit, disabling any further dispensing.

This occurs only if the level sensor is connected to an external level gauge.

#### WRONG CODE

The station does not recognize the USER PIN CODE that has been entered and does not enable dispensing.

The message disappears after a few seconds and the user can enter the code again.

#### UNKNOWN USER KEY

The station does not recognize the USER KEY that has been applied to the reader and does not enable dispensing.

#### WARNING

*The system displays this message when the key has been properly detected but its number is not among those enabled on that station.*

#### GOOD MORNING "USER"

This message appears when the user applies a USER KEY to the key reader or enters a USER PIN CODE that the system recognizes as enabled on that station.

The system identifies the user and displays the associated USER NAME.

### 4.7.2 OPTIONAL INPUTS

Depending on the SYSTEM CONFIGURATION, the user may be requested to enter the following data before dispensing can start:

#### REGISTRATION NUMBER

The PLATE number or other number identifying the vehicle.

The system accepts up to 10 alphanumeric characters.

The user must enter at least one alphanumeric character before proceeding.

#### ODOMETER

The odometer reading of the vehicle.

The system accepts up to 6 numeric characters.

The user must enter at least one numeric character before proceeding.

### 4.7.3 DISPENSING

After it has identified the user and processed any additional information, the system will enable dispensing.

The NUMERIC LCD goes from displaying the current time to displaying the dispensed quantity, showing "000.0" or "00.00", depending on how many decimals the system is configured to display.

The ALPHANUMERIC LCD displays the USER NUMBER while alternatively flashing:

- the UNIT (LITRES or GALLONS)
- the word "DISPENSING".

#### WARNING

***The flashing message "DISPENSING" means that dispensing has been enabled and that the pump is ready to start as soon as the nozzle is lifted.***

***The user must start dispensing within a certain time (see START TIME OUT, under CONFIGURATION) from when the word "DISPENSING" begins to flash on the LCD.***

***If this period elapses before the user starts dispensing, the pump will be disabled and the displays will revert to showing the time and requesting a PIN or KEY.***

Dispensing can be stopped and started at will.

However, if the interruption lasts longer than a fixed period of time (see FILLING TIME OUT, under CONFIGURATION), the pump will be disabled.

When dispensing is finished, the pump stops as soon as the nozzle is put back in its place.

#### WARNING

***If necessary the pump can be stopped by pressing the "STOP" button, even if the nozzle is not in its place.***

If the station is connected to a remote printer and the connection is active, after each dispensing the printer will print a dispensing report, regardless of whether the "TICKET RECEIPT" function under configuration is set on "AUTO" or "ON REQUEST".

#### WARNING

***If the system has returned to "LEVEL CONTROL", you must press "STOP" to return to "ACCESS CONTROL" before you can manually request a printed ticket.***

#### 4.7.4 PRESET DISPENSING

Before starting to dispense fuel, but after the system has enabled the pump and started to flash the message "DISPENSING", the user can enter a PRESET quantity on the numeric keypad.

##### **WARNING**

*If the decimal point is used, the amount of fuel that can be selected is 1 to 999.9 L/Gal. If the decimal point is not used, the amount of fuel that can be selected is 1 to 9999 L/Gal.*

The pump will be temporarily disabled until the user confirms the quantity by pressing "ENTER".

The ALPHANUMERIC display will show the preset value during the whole dispensing operation.

##### **WARNING**

*Dispensing stops automatically when the preset quantity is reached.*

*It will not be possible to continue dispensing in a manual mode, because when the preset quantity is reached the system disables the pump and prints the ticke (if the ticket receipt function is on AUTO or if requested by the user).*



*Authorized reseller's stamp*



**M0187 EN - Rev.0**