Badger Meter Europa GmbH

MDS 2000 Oil management system

USER MANUAL

Version MDS-05/01-e

Contents

1.   Important safety instructions

1. Before installing or using this product, please read the instruction manual thoroughly.
2. Unpacking: Please check that the product is complete and free from any damage (check with the further packing list).
3. Only qualified individual should install and/or repair this product.
4. Unplug the MDS 2000 from the electrical outlet before you clean it. Use a clamp cloth for cleaning and do not use liquid or aerosol cleaners.
5. Do not place the MDS 2000 on an unstable surface that may allow the unit to fall.
6. Never place the MDS 2000 near or over a radiator or heat register.
7. Use the type of power source indicated on the label (AC power). If you are not sure of the type of power available, consult your supplier or local electric company.
8. The MDS 2000 must be equipped with a plug having a third (grounding) pin, which fits only into a grounding-type outlet. This is a safety feature. The MDS 2000 should not be used without a properly grounded outlet. Failure to properly ground the MDS 2000 may cause damage to the unit or the data stored.
9. Do not put the MDS 2000 where the cord will be walked on.
10. An extension cord is not recommended for use with the MDS 2000. If you use an extension cord, make sure that the total of the ampere ratings on the products plugged into the extension cord does not exceed the extension cord's ampere rating. Also, make sure that the total of all products plugged into the wall outlet does not exceed 15 amperes.
11. Unplug the MDS 2000 from the wall outlet and have it repaired by a qualified service person under the following conditions:
    a) When the power cord or plug is damaged or frayed.
    b) If liquid has been spilled into it.
    c) If it has been exposed to rain or water.
    d) If it does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions since improper adjustment of other controls may result in damage and loss of data.
    e) If it has been dropped or damaged.
    f) If it exhibits a distinct change in performance, indicating a need for service.

Warning
Failure to adhere to these safety instructions may result in serious bodily injury.

2. Introduction

2.1 Description

The MDS 2000 is a modular fluid management/security system for service workshops. It provides the shop supervisor with a host of services required for precise management of an inventory of products such as oil, antifreeze, lube, water and gasoline. The MDS 2000 maintains the inventory by controlling access to hoses, precise metering of the products, and accurate accounting. A printed transaction ticket is made upon completion of all transactions and an inventory report showing all product levels is available to the supervisor. The MDS 2000 will keep up to 1900 transactions in its protected memory. A transaction historic report keeps track of all the transactions, classified by user, product or hose for a convivial research.

The modularity of the MDS 2000 makes it adaptable to your existing workshop and upgradable to your future, it is comprised of 1 to 8 I/O modules, 1 to 64 data entry keypads, 1 to 16 optional remote displays and 1 optional PC interface card. The function of the different system components is:

The I/O module is the operating intelligence. Each I/O module supports up to 8 counter inputs and controls up to 8 solenoid drivers – this means that the MDS 2000 can operate up to 64 hose reels all simultaneously. One I/O module can dialog with 1 to 8 data entry keypads. Each I/O module also supports one additional input for controlling a waste oil high level switch and one additional input for activating or deactivating the main air supply.

The data entry keypad will perform the important function of the system access to the oil monitoring and dispensing procedures for the garage mechanic. Configuration of the system is also done from the keypad (for installations without PC). The keypads are all alphanumerical and equipped with a serial port or to provide connection to a serial printer. An optional optical pen is available for bar code reading.

The remote display is assisting the mechanic. With large 56 mm digits, it assists the mechanic to visualize the quantity currently dispensed.

The PC interface card is available as an option and offers extended remote transaction memory, host computer interfacing and the possibility to control up to 24 I/O units – which means 192 outlets. A complete management software package is supplied with the PC interface card. The software is working under Windows and does not require a dedicated PC.

To initiate a transaction, the technician enters a personal identification number (PIN) via the data entry keypad. Any keypad can dialog with any I/O module. The technician also must enter a job number, a hose number, and optionally, and odometer reading, a license plate, and the preset amount. The technician then begins dispensing the product. The amount of product dispensed thus far is displayed on the remote display. When the preset amount is reached, the valve is turned off, terminating the transaction. When a transaction ends, a transaction ticket is printed on the printer, and the appropriate inventory is reduced by the amount dispensed. Should the site be equipped with the optional interface card, the transaction is sent to the PC. Transactions will also end whenever dispensing stops for a certain time period.

The transaction ticket contains all data relevant to the transaction including the job number, the product name, the amount dispensed, the mechanic's name, the hose used, the type of transaction, the time and date, the remaining inventory of the dispensed product and optionally, the odometer reading and license plate.

The MDS 2000 controls up to 64 hoses and can maintain an inventory of up to 8 tanks. The system can be configured for use with pulsers that are single channel or quadrature (w&m approved) and with variable ratio settings. Access to functions such as configuration and report printing are restricted to different security levels; a supervisor code must be entered before these functions can be used. The supervisor can select the language that will be used throughout the system.

2.2   Memory protected

The MDS 2000 unit is provided with sufficient battery backed RAM to store up to 1900 completed transactions to guard against data loss in the event of a power failure.

2.3.   Reports

Transaction ticket:	Audit trail of all completed jobs
Stock level:	Stock level of each product tank with minimum stock level
Product delivery:	Details of all deliveries entered into the system, date and quantity – and stock corrections
Transaction reports:	Product report – usage and totals
	Hose report – usage and totals
	User report – usage and totals
	All transactions – usages and totals
	(Data retrieved from system memory)
Alarm ticket:	If a high level warning switch is fitted to the waste oil collection tank, a ticket is printed immediately as a warning
Tank low level warning:	When the minimum tank level is reached, a warning ticket is printed
Job report:	Report review by job number for different grades against the same job no and from one date to another (PC level only)
License plate report:	Historic report by license plate no (PC level only)
Configuration:	To keep track of the system configuration for reconfiguration and after sales services

Note: All the above reports are available to be printed except where shown as PC level only. When a PC is incorporated all reports can be viewed on screen before printing.

2.4   Technical data

Network specifications

The MDS 2000 operates with a only TWO WIRES + shield CAN Bus network communication.

System specifications

Keypads on a system	64 maximum
I/O modules on a system	8 maximum
Solenoid valves on a system	64 maximum
Meters with single channel pulse transmitters	64 maximum
Fluids on a system	8 maximum
Number of operators	99 maximum
Transaction log	1900 maximum
Simultaneous dispenses	64 maximum
Printers per system	64 maximum

Power supply

The MDS 2000 operates on a 24 V DC voltage.
A power supply unit is included in the system – Voltage input 90 – 120 Volts AC, 50/60 Hz, single phase or 210 – 240 Volts AC, 50/60 Hz, single phase.

3.   Software menu

3.1   User menu

The user menu is accessible through all the keypads. Only the personal PIN code gives access to this menu.

```
+--------------------------------+
|         Enter Pin No.          |
|             ****               |
|                                |
+--------------------------------+
```

```
+--------------------------------+
|         Good morning           |
|         (User's name)          |
+--------------------------------+
```

```
+--------------------------------+
|         Enter Job No.          |
|                                |
|      _ _ _ _ _ _ _ _ _ _ _     |
+--------------------------------+
```

Please introduce the number of the job, ENTER

```
┌─────────────────────────────┐
│         Enter Reg No.       │
│     _ _ _ _ _ _ _ _ _ _     │
│                             │
└─────────────────────────────┘
```

(Optional)
Introduce the vehicle plate number (Alphanumerical), ENTER

```
┌─────────────────────────────┐
│         Enter Reg No.       │
│     _ _ _ _ _ _ _ _ _ _     │
│                             │
└─────────────────────────────┘
```

(Optional)
Introduce the vehicle mileage, ENTER

```
┌─────────────────────┐
│     Enter Hose      │
│        _ 0          │
└─────────────────────┘
```

Introduce the hose's number which corresponds to your request, ENTER

```
┌─────────────────────┐
│      Product        │
│   (Product's name)  │
└─────────────────────┘
```

The system confirms the product's name dispensed on the selected hose, ENTER

```
┌─────────────────────┐
│    Enter quantity   │
│        6.7          │
└─────────────────────┘
```

(Optional – Dispense mode: Pre-select or free dispense).
Introduce the desired quantity, ENTER

```
┌─────────────────────┐
│                     │
│   Dispense product  │
│                     │
└─────────────────────┘
```

3.2   Supervisor menu

The supervisor menu is accessible through all the keypads by entering the Supervisor PIN Nr.

Every 45 seconds without use of the keypad, the display shows you the date & time and reset the network.

```
┌─────────────────────────┐
│     Enter Pin No.       │
│         9999            │
└─────────────────────────┘
```

```
┌─────────────────────────┐
│     Good Morning        │
│       Supervisor        │
└─────────────────────────┘
```

```
┌─────────────────────────┐
│    Supervisor Menu      │
│      Start / Stop       │
└─────────────────────────┘
```

The MDS 2000 is equipped with an "emergency" procedure. From any keypad, press four times the "." key; This will automatically prevent any oil dispensing. If a solenoid valve (normally closed) is installed on the main air supply and connected on the I/O unit (connectors IN8+ (IN8-), this valve will be shut off by the system. The selection Start / Stop permits to restart the installation for the supervisor, ENTER

```
┌─────────────────────────┐
│      System State       │
│         Active          │
└─────────────────────────┘
```

ENTER

```
┌─────────────────────────┐
│    Supervisor Menu      │
│   Transaction Report    │
└─────────────────────────┘
```

Upon request, the supervisor can print the transaction's reports. These reports will give him precise historic of fluids dispensed and totals. All the reports are printed on the Report Printer as configured in the System Configuration Menu.

Transactions report are available:

By user	Report by user	(Enter the user's number)
By hose	Report by hose	(Enter the hose's number)
By product	Report by product	(Enter the product's number)
All transactions	Report all	
Exit		

```
┌─────────────────────────────┐
│      Supervisor Menu        │
│      Delivery Rep.          │
└─────────────────────────────┘
```

MDS 2000 prints a hard copy of all your stock modifications. We recommend you to print this report after each product delivery entered in the system.

```
┌─────────────────────────────┐
│      Supervisor Menu        │
│      Stock Level Rep.       │
└─────────────────────────────┘
```

Print the stock and the minimum levels for all the configured tanks.

```
┌─────────────────────────────┐
│      Supervisor Menu        │
│      Product Deliver        │
└─────────────────────────────┘
```

Enter here your new oil deliveries. The new stock will be calculated automatically.
Suggestion: Print a delivery report after entering deliveries.
Use Up / Down key to select the desired tank, ENTER

```
┌─────────────────────────────┐
│      Supervisor Menu        │
│      New Stock Level        │
└─────────────────────────────┘
```

If you want to modify the stock level:

```
┌─────────────────────────────┐
│      New Stock Level        │
│      Tank 1 = 200           │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐
│      New Stock Level        │
│      300 lts                │
└─────────────────────────────┘
```

> New Stock Level
> 300 lts

> Supervisor Menu
> Set Date / Time

ENTER

> Date 18-04-97
> Time 15:09

In a multi I/O system, this parameter must be the same on each I/O.
Every 45 seconds without use of the keypad, the display shows your the date & time and reset the network.

> Supervisor Menu
> Set super PIN

This prompt is used to change the Supervisor PIN Nr. Only numerical PIN is accepted by the system. If the supervisor PIN Nr. has been forgotten, it will be necessary to reset the system and reconfigure.

ENTER

> Supervisor PIN
> 9999

ENTER

> Supervisor Menu
> Set super PIN

ENTER

> Confirm PIN
> * * * *

```
┌─────────────────────────────┐
│        Confirm PIN          │
│         Confirmed           │
└─────────────────────────────┘
```

ENTER

```
┌─────────────────────────────┐
│      Supervisor Menu        │
│      Clear transacts.       │
└─────────────────────────────┘
```

We advise you to clear regularly the transactions when you use the system without PC: the transactions' numbers is limited to 1900. Moreover, when you print the report, you will have the printing of all transactions since the last "Clear transactions".
Answering "Yes" will automatically clear all transactions in the memory of the system. To avoid clearing transactions by mistake, the system is proposing a "No" answer. Using the down arrow key will bring the "Yes" answer on the screen.

ENTER

```
┌─────────────────────────────┐
│       Clear Transacts.      │
│             No              │
└─────────────────────────────┘
```

Down
ENTER

```
┌─────────────────────────────┐
│        Are you sure?        │
│             No              │
└─────────────────────────────┘
```

Down
ENTER

Suggestion: Print your transactions report before clearing transactions.

```
┌─────────────────────────────┐
│      Supervisor Menu        │
│       Add New User          │
└─────────────────────────────┘
```

Up to 99 users can be stored in the system. Any 4 digits PIN numbers can be attributed to each operator. It is recommended to the supervisor to keep a list of the different PIN numbers for the day it is necessary to remove one of them from access to the system (see diagnostic in Configure system). Two users with the same PIN Nr. can't coexist; it will be refused by the system-

ENTER

```
New User PIN
****
```

ENTER

```
New User Name
(User name)
```

ENTER

```
New User Name
User added
```

```
Supervisor Menu
Remove User
```

ENTER

```
Enter Ex-PIN
****
```

ENTER

```
Enter Ex-PIN
User deleted
```

The user will be deleted from the system.

```
Supervisor Menu
Customer Config.
```

ENTER

```
Costumer Cfg. PIN
****
```

Access to the customer security level

```
Supervisor Menu
Exit
```

ENTER
Return to User Screen.

3.3   Customer configure menu

The Customer Configure Menu is accessible through all the keypads. At the initialisation of the system or when modifications are done on this menu, the datas are automatically updated at the other keypads through the network. It is not necessary to configure all the keypads separately.

```
Customer Menu
Products
```

All the fluids controlled by the system can be identified in alphanumerical characters. In certain installations, the same product can be pumped from different tanks (maximum 8 tanks). The MDS 2000 allows you to manage these tanks separately to control their respective stock level.
Assign the tank from which the product will be pumped.

```
Enter
Tank N° 1
```

Introduce the tank number.
ENTER

```
Product 1
Motor Oil
```

Use Up/Down key to select the product number.
ENTER
Enter the product's identification by using the alphanumeric keypad.
ENTER
The system goes back to the prompt "Products"

```
Customer Menu
Hose
```

All your dispensing points (hoses) must be linked to the tank it is dispensing from.
ENTER

```
Enter Hose
01
```

Introduce the hose number
ENTER

```
Enter Tank
01
```

Introduce the tank number
ENTER
The system will confirm the name of the product configurated for verification.

```
+----------------------------+
|       Select Product       |
|         Motor Oil          |
+----------------------------+
```

ENTER
Enter Hose "00" to exit

```
+----------------------------+
|       Customer Menu        |
|         Warn Level         |
+----------------------------+
```

A minimum stock level must be set for each tank. All fluids
dispenses will automatically be deducted from the respective tank
stock. When the stock level in the tank reaches the minimum level,
a warning reordering message will automatically be printed on the
report printer.
ENTER
Use Up/Down arrow key to select the tank.

```
+----------------------------+
|         Warn Level         |
|      Tank 1 = _ _ _ _       |
+----------------------------+
```

ENTER

```
+----------------------------+
|         Warn Level         |
|         _ _ _ _ 0          |
+----------------------------+
```

Introduce the minimum stock level
ENTER

```
+----------------------------+
|         Warn Level         |
|            400             |
+----------------------------+
```

```
+----------------------------+
|       Customer Menu        |
|         Stop Level         |
+----------------------------+
```

In addition to the "minimum level", the MDS offers now the possibility to set up "stop levels" for each tank, preventing dispenses of the selected product when the level in the tank is under the stop level limit.

This will prevent air to enter in the oil line and prevent any risk of impurities entering the line as well.

ENTER

```
┌─────────────────────────────┐
│          Stop Level         │
│     Tank 1 = _ _ _ _ 0      │
│                             │
└─────────────────────────────┘
```

Choose the tank you want to configure
ENTER

```
┌─────────────────────────────┐
│        New Stop Level       │
│         _ _ _ _ 0           │
│                             │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐
│        Customer Menu        │
│        Dispense Mode        │
│                             │
└─────────────────────────────┘
```

The MDS 2000 offers the possibility for the operator to dispense oil in pre-select or in free dispense mode. In pre-select mode, the system will not authorize any dispense without a pre-selected quantity of fluid.

In free dispense, the system will authorize dispenses without pre-selection of any quantity.

The system will close the transaction when the inactive time-out has been reached.

ENTER

Use Up/Down key to select the mode.

```
┌─────────────────────────────┐
│        Dispense Mode        │
│  Pre-Select – Free Dispense │
│                             │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐
│        Customer Menu        │
│        Odometer & Reg.      │
│                             │
└─────────────────────────────┘
```

MDS 2000 is offering the possibility to memorize the odometer and the license plate of the vehicles maintained in the garage. These information will appear on the transaction ticket;
ENTER

```
Odometer & Reg.
     Yes
```

Use Up/Down keys to select
The keypad will always ask the operator to introduce the odometer and registration plate of the vehicle corresponding to the job nr.

```
Odometer & Reg.
      No
```

The function will not be activated.

```
Customer Menu
Initial Timeout
```

The initial timeout is the time between the validation of the transaction datas on the keypad and the opening of the solenoid valve corresponding to the selected hose. Enter the maximum number of seconds necessary before starting the operation.

In a multi I/O system without PC, this parameter must be programmed and be the same and on each I/O.
ENTER

```
Initial Timeout
      06
```

```
Customer Menu
Inactive Timeout
```

The inactive timeout is the period between the last pulse received by the system and the closing of the solenoid. The MDS 2000 will close the transaction if the time between 2 pulses reach the inactive time configurated in the system. It is visualised that the operator has started to fill the carter with oil and that he has stopped the dispense before the preset quantity has been reached or because he is working on a free dispense mode. When choosing this duration, bear in mind that this should be long enough to authorise your worker to verify the level on the vehicle stick gauge.

```
Inactive Timeout
      12
```

In a multi I/O system without PC, this parameter must be programmed and be the same and on each I/O.

```
Customer Menu
Set Language
```

ENTER
Use Up/Down key to select the language
MDS 2000 is a multi-language system. The default language is English. To access another language, you will need an area code provided by the factory.
(UK4164 for English)

```
Customer Menu
Set Customer PIN
```

This prompt is used to change the Customer PIN number. Only numerical PIN is accepted by the system. If the Customer PIN Nr. has been forgotten, it will be necessary to reset the system and reconfigure
ENTER

```
Customer Cfg PIN
     ****
```

ENTER

```
          Confirm PIN
          ****
```

```
          Confirm PIN
          Confirmed
```

```
          System Menu
          Diagnostics
```

As a support for the installer and after sales services, MDS 2000 is provided with an integrated diagnostic enclosing:
- The configuration for the installation parameters
- The names of the products
- The number of the users, their names and their PIN codes
- The hoses, tanks, products' names, displays and correction factors

We advise you to print this diagnostic after each installation

```
          Customer Menu
          Configure System
```

ENTER

```
          System Cfg. PIN
          ****
```

Access to the system configuration installer level.

```
          Customer Menu
          Exit
```

ENTER
Return to the supervisor menu prompt. If you want to come back at the PIN, press ENTER again.

3.4   <u>System menu</u>

The System Configuration Menu is accessible through all the keypads. The modified datas are automatically updated at the other keypads through the network. It is not necessary to configure all the keypads separately. Only Tickets (A & B) printers must be configurated on each keypad.

```
┌─────────────────────────┐
│      System Menu        │
│       Test Mode         │
└─────────────────────────┘
```
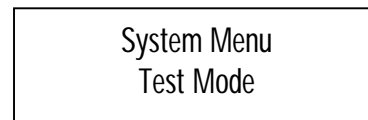
ENTER

Use Up/Down key to select the test.

- Test A: Test of open/close each solenoid output all the solenoids one by one, you can hear that the solenoids are correctly connected
- Test B: Factory use only.
- Test C: Test to confirm the address of each large character remote display.

Display address 0:   Random figures
Display address 1:   Figures 000.1
Display address 2:   Figures 000.2
etc...

- FLT FLT FLT FLT or OK OK OK OK:
  This test is only valid for quadrature pulsers.
  You have the possibility to test a maximum of 4 quadrature pulsers connected on the I/O unit.
  The position of the message indicates where the position of the pulser is.
  An OK message indicates that the quadrature pulser is well connected.
  A FLT (Faulty) message indicates that the quadrature pulser is not well connected.
  If you connect single pulsers, a FLT message will appear.

- None

```
┌─────────────────────────────┐
│        System Menu          │
│      Display Allocation      │
└─────────────────────────────┘
```

The MDS 2000 offers the use of remote displays for an easy visualisation of the oil dispensed by the worker. This screen allows you to program in the system on which display the worker wants to visualize his dispenses. One display can be used for multi hose reels. Every display is delivered with micro switches on the electronic board. See "Change of the displays' addresses".
ENTER

```
┌─────────────────────────────┐
│        Select Hose          │
│            01               │
└─────────────────────────────┘
```

ENTER

```
┌─────────────────────────────┐
│       Select Display        │
│            00               │
└─────────────────────────────┘
```

ENTER
Hose Nr. 1 will be visualised on display Nr. 00.

```
┌─────────────────────────────┐
│        System Menu          │
│       Set Encoder Type       │
└─────────────────────────────┘
```

MDS 2000 allows the use of single channel and dual channels pulse transmitters. By default, all the systems are programmed to be used with single channel pulse transmitters.
ENTER

```
┌─────────────────────────────┐
│       Set Encoder Type       │
│          Quadrature          │
└─────────────────────────────┘
```

Quadrature corresponds to dual channel pulse transmitter.
Use Up/Down keys to select.

> Set Encoder Type
> Single Channel

Single channel pulse transmitter.

In a multi I/O system without PC, this parameter must be programmed and be the same and on each I/O.
ENTER

> System Menu
> System Type

> System Type
> Non-Master

Use Up/Down keys to select.
Non-Master is used without PC.
Master is used with PC.
ENTER

> System Menu
> Set Report Adr.

A "Main" printer is necessary to print all the statistic, stock level reports and diagnostic. This printer must be 80 columns, Epson emulated with a serial port. The factory default setting is report address on keypad 0.
Enter

> Report Address
> I/O Control Unit

ENTER: The network considers that the main printer is connected on the I/O unit (ID=0). Use Up/Down keys to select

> Report Address
> Keypad x

ENTER: The network considers that there is no main printer on the keypad Nr. 0.
Use Up/Down key to select until you have the good address
ENTER

```
System Menu
Set Ticket A Adr.
```

To fulfil all the needs of the garage supervisor, MDS 2000 offers the flexibility to print the transaction tickets on different printers. All the printers must be connected through the serial port and be Epson emulated. This instruction must be done on EACH keypad. The factory default setting is Ticket A address on Keypad 0.
ENTER

```
Ticket A Address
I/O Control Unit
```

ENTER: The network considers that the printer is the connected on the I/O unit (ID=0).
Use Up/Down keys to select

```
Ticket A Address
None
```

ENTER: The network considers that there is no ticket printer on the system.
Use Up/Down keys to select the address

```
System Menu
Set Ticket B Adr.
```

To fulfil all the needs of the garage supervisor, MDS 2000 offers also the flexibility to print a copy of the transaction tickets. All the printers must be connected through the serial port and be Epson emulated. This printer can be the main printer. This instruction must be done on EACH keypad. The factory default setting is ticket B address on keypad 0.

```
                              Ticket B Address
                              I/O Control Unit
```

ENTER: The network considers that the ticket printer is connected
on the I/O unit (ID=0).
Use Up/Down keys to select

```
                              Ticket B Address
                                  None
```

ENTER: The network considers that there is no ticket printer on
the system.
Use Up/Down keys to select

```
                              Ticket B Address
                                 Keypad x
```

ENTER: The network considers that the ticket printer is connected
on the keypad Nr. x.
Use Up/Down keys to select the address
ENTER

```
                                System Menu
                               Set Ticket PIN
```

The installer PIN code can be modified. Only numerical PIN is
accepted by the system. If the installer PIN Nr. has been
forgotten, it will be necessary to reset the system and re-
configure.
ENTER

```
                               System Cfg PIN
                                   ****
```

MDS 2000 operates all the hose reels simultaneously or one hose
reel at a time.
When the system is configured in simultaneous mode, you will be
able to dispense on all the different hoses at the same time.

When the system is configured in non-simultaneous mode, you have the possibility to dispense only on one hose for a same product.
It's important to analyse the disposition of the remote displays to avoid to have many hoses working simultaneously and affected to a same display.
The factory default setting is simultaneous.

```
System Menu
Set Simult. Mode
```

ENTER

```
Set Simul. Mode
Non-Simultaneous
```

Use Up/Down keys to select

```
Set Simultaneous Mode
Simultaneous
```

In a multi I/O system without PC, this parameter must be programmed and be the same and on each I/O.
ENTER

```
System Menu
Pulses per Litre
```

MDS 2000 is designed to register pulses from 1 to 255 per liter.
Refer to the type of pulse transmitter.

```
Pulses per Litre
100
```

In a multi I/O system without PC, this parameter must be programmed and be the same and on each I/O.
ENTER

```
┌─────────────────────────┐
│      System Menu        │
│      Max. Dispense      │
└─────────────────────────┘
```

ENTER

```
┌─────────────────────────┐
│      Select Hose        │
│           0             │
└─────────────────────────┘
```

```
┌─────────────────────────┐
│      Max. Dispense      │
│         _ 100           │
└─────────────────────────┘
```

ENTER the maximum quantity that will be allowed to be dispensing on the selected hose.
Then press ENTER and do the same for the other hoses.

```
┌─────────────────────────┐
│      System Menu        │
│      Decimal Place      │
└─────────────────────────┘
```

```
┌─────────────────────────┐
│      Decimal Place      │
│           1             │
└─────────────────────────┘
```

From here you can choose the place of the decimal. You only have 1 or 2 (use the Up/Down arrow key).
)!You also have to change physically the jumper into the display!).
ENTER

```
┌─────────────────────────┐
│      System Menu        │
│     Hose Calibration    │
└─────────────────────────┘
```

This prompt is offering the possibility to correct the delay of the solenoid valve shut-off. When an operator presets a quantity of fluid to be dispensed, the system will automatically close the solenoid valve when the preset quantity has been reached. The MDS 2000 counts the pulses coming from the pulse transmitter. assuming that the pulse transmitter type is 100 pulses per liter, the calibration procedure will be as follows:

Preset quantity: 4 litres = 400 pulses
Quantity dispensed: 4,1 lt. = 410 pulses
Difference: 0,1 lt. = 10 pulses

10 will be the calibration factor to introduce in the system

ENTER

```
Select Hose
01
```

ENTER

```
Pulse count
10
```

ENTER

```
System Menu
Change I/O ID
```

By default all the I/O units have the same address (ID) Nr. 0 corresponding to solenoid drivers (hose reels) 10 to 8. For the installation with multi I/O units (more than 8 hose reels), each I/O must have its own address to be identified by the network. Power up each I/O successively and change their address. For example ID Nr. 1 for solenoid drivers (hose reels) 9 to 16.

ENTER

```
Change ID I/O
From 0 to 1
```

ENTER
The network dialogs now with this I/O unit 1 for hoses 9 to 16.

```
System Menu
Exit
```

ENTER
Return to customer configure menu at the exit prompt. To return
to the user screen, press twice ENTER.

4.   Troubleshooting guide

4.1   Explanations for the transaction end codes printed on each transaction ticket

0   Means that the transaction has been stopped after the inactive timeout:
    - It's normal in free dispense mode
    - The preset quantity has not been totally dispensed
1   In preselect mode, the preset quantity has been totally dispensed: Completed
2   Input error in the pulses sequence: For quadrature pulseres only
3   Count error: Missing pulse in quadrature pulsers only
4   It means that the power has been shut down during the transaction: Power down
5   The transaction has been stopped by the emergency procedure ("..."): System inactive
6   IOP error: Microprocessor error
7   Unauthorised transaction: For approved systems only, quantity dispensed between 0,5 Lt and 100 Lt.

4.2   Procedure to change the battery

-   Test of the RAM "MAX690" next to the battery:
-   With power 24 VDC: Pin 3 (-) Pin 7 (+) = 5 VDC
-   Without power 24 VDC: Pin 4 (-) Pin 8 (+) = 3 VDC   (2 VDC min)
-   Print a diagnostic and your reports by security.
-   Under tension, remove the battery and replace it by a new one.
-   Battery's references: Lithium Manganese Battery
                             3 VDC – 180 mAH – Type CR2032
                             Dimensions: L: 2.3mm Diam: 20.0mm
                             Lifetime: +/- 2 years

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