

# Operators Manual

## MC12

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### 1 DECLARATION OF CONFORMITY

We Flexicon A/S  
Frejasvej 2-6  
DK-4100 Ringsted

declare on our sole responsibility that the product:

#### MC12 Master Controller

<b>Flexicon®</b> <small>Denmark</small>	
Model:	MC12
Serial No:	yymm xxxx
Supply:	230V / 50/60 Hz / 50W
Year:	2006
<b>CE</b>	Made in Denmark

to which this declaration relates is in conformity with the following standard(s):

DS/EN ISO 12100	Safety of machinery - Basic concepts, general principles of design
DS/EN 60204	Safety of machinery – Electrical equipment of machines

according to the provisions in the Directives:

98/37/EC	On the approximation of the laws of the Member States relating to machinery.
73/23/EEC	On the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits
2004/108/EC	On the approximation of the laws of the Member States relating to electromagnetic compatibility

Ringsted, August 2006

Mads Ulric Jensen  
Signature.



## 2 GENERAL INFORMATION

### 2.1 Unpacking and inspection

After checking that all ordered items have been received, please check that they were not damaged during transport. In case of any defects or shortcomings, please contact Flexicon A/S or your supplier immediately.

In case of future need of spare parts for this machine, please, when ordering, indicate the serial number stamped on the label on the bottom of the machine.

ALWAYS REMEMBER that this machine must be earthed via its main cable.

### 2.2 Use

MC12 is the main computer of the Flexicon Multi Filling System (FMFS). MC12 can not perform filling by itself, but is developed for controlling one of Flexicons pumps for example PD12 or PD22 series.

### 2.3 Connections

It is important that MC12 is placed on a stable bedplate and that liquids are not splashed onto it.

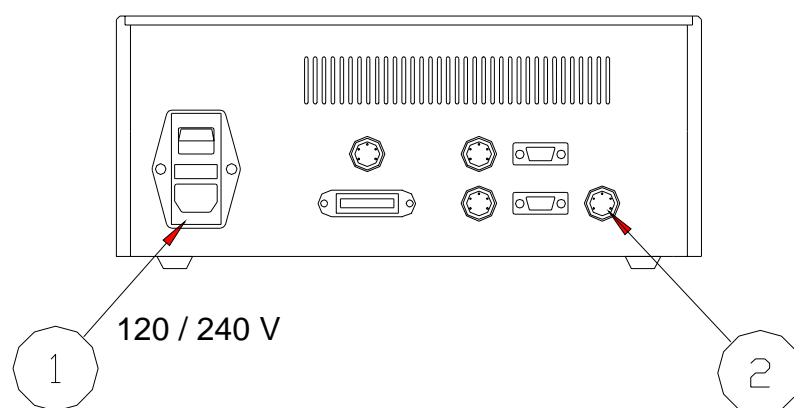


Fig. 2.1

The main cable supplied is connected to the main socket (1). The plug is connected to an earthed switch.

The communication cable (type 3) comes fitted with two 4-pin DIN plugs. One is connected to the “net” socket (2) of MC12, and the other plug is connected to the “net 1” socket of the required pump.

The terminator supplied (4-pin blind Din plugs) is connected to the “net 2” socket of the filling station.

MC12 is now ready to be switched on and to control the connected filling station. Should it be required to connect more than one filling station to the same MC12 or to connect other equipment to it, the operators manual supplied for the filling station should be consulted.

### 3 CONTROL

#### 3.1 Display

The display of MC12 consists of 4 lines each of 40 characters. The display is lit from the back.

The blinking cursor of the display shows where a character will occur, if a key is activated.

ENTER FUNCTION No. :		P1
F 1: 100.00 ml.	F 2: 8.0 TUBE	
F 3: 200 rpm	F 4: 10 ACC	
F 5: 0 REV.	F 6: 1 fills	

**Fig. 3.1**

The top line is the typing line and also the line, where MC12 prompts the operator.

The second last character on the top line (P) indicates the operation principle of MC12: Parallel (P).

The ultimate character of the top line (1) indicates the pump connected.

The three lines below are status lines which always shows the current operating parameters. These status lines can be scrolled by pressing the Up or Down Arrow of the keyboard.

When operating MC12, it is VERY important to watch the top line constantly, as any current question or instruction will be written here.

### 3.2 Keypad

The MC12 comes with a membrane-type keypad. The keypad is sealed and flat and can be cleaned with alcohol and other detergents.

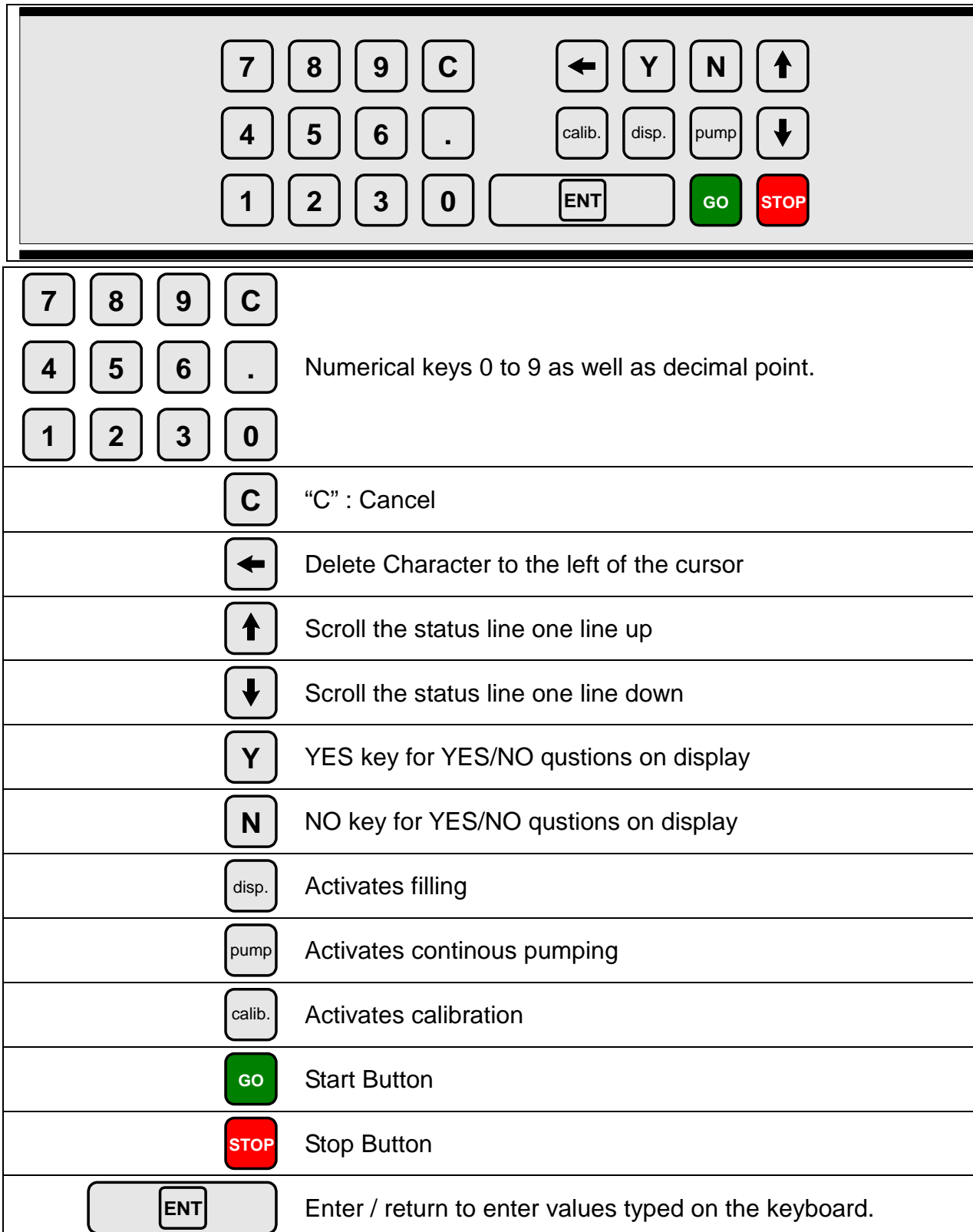


Fig. 3.2

### 4 PROGRAMMING

#### 4.1 Starting the MC12

In the following, the sign <> will mean that the indicated key must be activated. For instance, <ENT> means that ENTER must be pressed.

When the MC12 is connected, the main switch on the left side of the control box can be turned on.

The display will show the following:

```
STANDBY
```

Fig. 4.1

Press the <GO> key, and the display will show the following:

```
* MC12 V1.XX (C) Flexicon 90-XX *  
PRESS GO TO CONTINUE.  
  
DRIVE No.: 1
```

Fig. 4.2

Verify that all connected drives are displayed with their respective numbers.

Then press <GO> once more, and the display will show the following:

```
ENTER FUNCTION NO. : 11  
F 1: 100.00 ml.      F 2: 8.0 TUBE  
F 3: 200 rpm        F 4: 10 ACC  
F 5: 0 REV.         F 6: 1 FILLS
```

Fig. 4.3

The values shown in the status lines will be the above or the latest values used.

#### 4.2 Password Protection

MC12 is password protected. To be able to perform the following programming procedures it is necessary to log on as a supervisor (see function 59).

Always remember to change the password level back to user level after programming.



Remember that merely switching MC12 off/on will NOT change any selected password level! The MC12 is now ready to be programmed.

If the MC12 is a FMB210 or FP50 version the password level can also be changed by entering the supervisor password on the control panel touch screen.

### **4.3 Parameters**

In the following a parameter will be a single value like for example volume, velocity, number of fillings etc.

### **4.4 Programs**

In the following a program will be a complete set of parameters which together form a program according to which MC12 and the connected pump will operate.

### **4.5 General information on the programming of MC12**

MC12 is equipped with a battery in the memory and will therefore always remember the programmed parameters, even if the main switch is turned off.

The programming is made via functions, i.e. every operating parameter has its own function number.

The programming is made by entering the function number followed by "ENT". This will make the required function appear in the prompt line of the display and show the current value or information of the function.

This value will automatically be overwritten when entering the new value. After being entered, the new value will be displayed in the prompt line. The new value is entered into the computer by pressing "ENT".

The new value will be displayed in the status lines at once.

Example:

If a volume of 8.5 ml is required, the following should be entered:

<1>+<ENT>+<8>+<. >+<5>+<ENT>

MC12 knows automatically which filler is connected. Consequently, values which are not valid for this pump will not be accepted. If a faulty value is entered, it will not be entered, and a "beep" sound will be heard.

### 4.6 List of functions

1. Volume	31. Save program
2. Tube diameter	32. Load program
3. Velocity	33. Delete program
4. Acceleration/deceleration	34. Print programs
5. Reversing (back suction)	35. Free memory capacity
6. Batch size (Disabled in FMB version)	40. Mode
7. Delay (Disabled in FMB version)	41. Select filler
8. Completed fills	42. Set date
9. Specific gravity	43. Set time
10. Output rate	44. Display time and date
11. Accumulated volume	45. Display filler version
12. Maximum flow rate	46. Select language
16. Pumping direction (GD30I)	47. Printer set-up
17. Timer 1 (Disabled in FMB version)	49. Balance set-up
18. Timer 2	51. Filling needle set-up
19. Timer 3	53. Drive deactivation !!
20. Operator number	58. Set passwords
21. Batch number	59. Change access level
22. Start Log	60. Ext. Input mode (Disabled in FMB version)
23. Stop Log	70. Output format
24. Print Log	71. Flow rate format
25. Delete Log	72. Volume format
26. Log status	73. Display Mc12 version
29. Print parameters	80. Reset memory
	86. Complete memory reset

**!! Before activating function 53, ALWAYS first press STOP on the FMB touch Screen. If not the FMB has to be switched OFF and ON before it can be restarted.**

### 4.7 Description of functions

The individual functions will be described in the following:

#### 1. Volume

Value: Choice of ml and grams as unit.

The required volume from 0.01 to 9999.9 ml, or grams.

To change the volume unit please refer to function 72

#### 2. Tube diameter

Value: The inside diameter of the tube in mm.

Enter the tube diameter used. The MC12 will only accept original Flexicon tube diameters.

The diameters are specified in the manual for the drive and can be read on the tube gauge supplied with the drive.

#### 3. Velocity

Value: Revolutions per minute.

Enter the required velocity.

The different drives have different ranges, and the range is stated in the drive manual.

#### 4. Acceleration/deceleration

Value: An integral number.

The filling can start and stop more or less abruptly.

This function offers a choice of values between 1 and 200 dependent on the tube size and drive serie.

1 = slowest acceleration.

100/150/200 = fastest acceleration<sup>1</sup>.

#### 5. Reversing (back suction)

Value: An integral number.

When the filling stops, the filler can be asked to produce a small back suction to prevent dripping.

The back suction can be set to values between 0 and 10.

0 = no back suction.

10 = maximum back suction.

#### 6. Batch size (Disabled in FMB version)

Value: Number.

Enter the number of fillings you want the filler to perform when started by <GO>, foot switch or via electrical signal.

There is a choice between 1 and 65,000.

When the filler is operating in an automatic system, where the system itself starts the filler each time a bottle is in position,

THE VALUE IN THIS FUNCTION MUST - ON AN FMB - ALWAYS BE 1.

### 7. Delay (Disabled in FMB version)

Value: Seconds.

If more than one fill is selected in Function 6, enter the required delay between the fills. The value of the delay can range between 0.0 and 25.5 seconds, with intervals of 0.1 second.

### 8. Completed fillings

Value: Number.

Nothing can be entered in this function, since it only displays the number of fillings completed since the latest reset of the function.

To reset this function, press the <C> key.

### 9. Specific gravity

If the product has another spec. gravity than the usual 1.0 (Water), then it is entered here. The default value is 1.0000 g/ml. Changing specific gravity should be followed by a calibration .

### 10. Output rate

Value: Number of fillings per time unit.

Nothing can be entered in this function, as it only displays the current output rate.

To change the time unit, please refer to function 70.

### 11. Accumulated volume

Value: Litre

Nothing can be entered in this function, since it only displays the total volume used since the latest reset of the function.

To reset this function, press the <C> key.

### 12. Maximum flow

Value: Volume per time unit.

Nothing can be entered in this function, since it only displays the current maximum flow.

The read-out is based on the flow created when the rotor runs at the required velocity.

To change the units of measurement, please refer to function 71.

### 16. Pumping direction

Value: Clockwise or counter-clockwise.

This function works only in connection with the pump GD30I.

### 17. Timer 1 (Disabled in FMB version)

Value: Seconds.

A time interval can be set between a starting signal and the time the drive actually starts.

The interval is from 0.0 to 25.0 seconds.

### 18. Timer 2

Value: Seconds.

A time interval can be set where the status signal says that the filler is operating BEFORE it actually begins to operate.

The interval is from 0.0 to 25.0 seconds.

### 19. Timer 3

Value: Seconds.

A time interval can be set where the status signal says that the filler is operating AFTER it actually stopped.

The interval is from 0.0 to 25.5 seconds.

### 20. Operator number

An operator number that can be from 1 to 12 digits long can be entered.

### 21. Batch number

A batch number that can be from 1 to 12 digits long can be entered.

### 22. Start Log

By this function automatic logging of production data (Log) can be started.

### 23. Stop Log

By this function the automatic logging of production data (Log) is stopped.

### 24. Print Log

If a printer is connected, this function will start the printing of the log. It is possible to choose between printing the complete log immediately without deleting it and continuous printing with contemporary deletion of log-data.

### 25. Delete Log

Deletes the Log memory.

### 26. Log Status

This function displays the number of used and free bytes in the Log memory.

### 29. Print parameters

This function prints the current parameters via connected printer.

### 31. Save program

Saves a complete set of parameters as a program.

It is possible to save 87 set of parameters, i.e. one pump has 87 programs available, and in case of two pumps, each have 43 programs available.

### **32. Load program**

Loads a program already saved and overwrites the current parameters with the values of the program.

### **33. Delete program**

This function deletes the required program.

### **34. Print programs**

This function prints the individual parameters in all the programs stored in the memory.

### **35. Free memory capacity**

Displays the number of used and free programs in the memory.

### **40. Operating principle (mode)**

Value: An integral number.

If more than one pump is connected, MC12 can operate according to three different principles:

- 1 - individual
- 2 - parallel
- 3 - serial

Please consult the reference manual for further information.

### **41. Select filler (drive)**

If several pumps are connected, this function is used for selecting the number of the filler to be shown on the display and to be controlled via the keyboard.

### **42. Set date**

Please consult the reference manual.

### **43. Set time**

Please consult the reference manual.

### **44. Display time and date**

Will display time and date on display.

### **45. Display pump version**

This function displays the type and version of the pump.

### **46. Select language**

Value: An integral number.

This function offers a choice of four languages:

- 1 - Danish
- 2 - English
- 3 - German
- 4 - French

The language returns to the default after re-start or function 80 has been applied.

### 47. Printer set-up

Please consult the reference manual.

### 49. Balance set-up

This function provides the possibility to connect MC12 to an electronic balance. The balance which can be used are Mettler® and Sartorius®. Furthermore it is possible to choose between dynamic calibration and direct filling on balance.

Please consult the reference manual for further information.

### 51. Filling needle set-up

If the machine is required to operate with a pneumatic bottom-up or an electrical filling equipment, this is indicated by entering the number for the actual system as listed below in functions and then follow the instructions in the prompt line.

MC12 will then control the movement of the filling nozzle in step with the pump in question.

In case of parallel or serial operating principle, the pump to be followed must ALWAYS be 0.

0 - No moving of filling nozzles (Standard setting on FMB)

0- Pneumatic Dumping Nozzle

1 - Pneumatic bottom-up filling system

2 - Electrical Dumping Nozzle

3 - Electrical bottom-up

For further information please refer to the reference manual.

### 53. Activating/Deactivating drives

With this function it is possible to activate or deactivate the connected pumps.

N.B. Before activating function 53, ALWAYS first press STOP on the FMB touch Screen panel. If not the FMB has to be switched OFF and ON before it can be restarted.

### 58. Set Passwords

This function sets the passwords for the 3 different levels.

Level 1 – Unlimited access.

Level 2 – Basic functions

Level 3 – Restricted to <calib>, 41 (display tube size in serial mode) and 59. (Change access level) only.

### 59. Change access level

Key in the password for the required level, as set in function 58.

Displays the current password level.

**60. Operating mode for ext. connections** (Disabled in FMB version)

Mode 1 or 2.

This function is activated when using foot switch in order to start/stop filling.

1- Foot-switch used only as start (Standard setting on FMB)

2- First push starts    Second push stops    Third push starts    etc.

**70. Capacity format**

Changes the unit for F10. fills/min or fills/hour

**71. Flow rate format**

For further information please refer to the reference manual.

**72. Volume format**

Changes the unit for F1 and F11. ml or g

**73. Display MC12 version**

This function displays the type, version and date of the MC12 software.

**80. Reset memory**

This function resets the memory with the exception of the part used for saving programs.

MC12 goes into stand-by. When switched on again the built-in parameters are active.

**IF MC12 DOES NOT WORK OR DOES NOT OPERATE AS EXPECTED,  
ACTIVATE FUNCTION 80**

**86. Complete memory reset**

This function works in the same manner as Function 80 but includes also the part of the memory containing programs saved via Function 31. This function should only be used for extreme cases.

Function 86 is not shown in the status lines of the display. A **calibration** is necessary after using function 86.



## 5 .DAILY USE

### 5.1 *Used as a dispenser*

Switch on MC12 and press <GO> twice.

Program example with PD12 as a filler:

Volume: 8.5 ml.

Tube: 3.2.

Velocity: 400 rpm.

Acceleration: 35.

Small back suction.

100 fillings to be completed.

An interval of 1.1 seconds between the fillings.

specific gravity for instance, water

The above job shall be programmed as follows:

Volume:	<1>+<ENT>+<8>+<. >+<5>+<ENT>
Tube:	<2>+<ENT>+<3>+<. >+<2>+<ENT>
Velocity:	<3>+<ENT>+<4>+<0>+<0>+<ENT>
Acceleration:	<4>+<ENT>+<3>+<5>+<ENT>
Back suction:	<5>+<ENT>+<1>+<ENT>
Number of fillings:	<6>+<ENT>+<1>+<0>+<0>+<ENT>
Intervals:	<7>+<ENT>+<1>+<. >+<1>+<ENT>
Specific gravity	<9>+<ENT>+<1>+<. >+<0>+<ENT>

You have now programmed MC12 for the job, but want to reset the built-in counters. In function 8 the counter indicates "number of completed fillings" and in function 11 "total volume dispensed".

Number of fillings:	<8>+<ENT>+<C>+<ENT>
Total volume:	<11>+<ENT>+<C>+<ENT>

Then just inform MC12 that you want fillings by pressing <disp.>.

Every time <GO> or the foot switch is pressed, or every time an electric signal is given, the filler carry out 100 fillings of 8.5 ml at an interval of 1.1 seconds between each filling.

Press <GO>, verify that the filler starts and let it run.

Press Arrow Down twice, and on the status lines that F8: and F11: are counting each filling.

F10: gives a current indication of the number of fillings completed per minute.

## **5.2 Terminate dispensing**

When the filler has completed the number of fillings asked for in F6: it stops automatically. If <GO> is pressed again, the filler completes the programmed number of fillings once more.

If you want to stop the fillings, before the programmed number has been completed, press <STOP>, and the filler stops after completing the filling in progress. The filling series can be completed by pressing <GO>.

If you want to stop IMMEDIATELY, also in the middle of a filling, press <STOP> twice, and the filler stops immediately. The filling series can be completed by pressing <disp.>+<GO>, and the interrupted filling are counted in.

## **5.3 Continuous run.**

MC12 can also control a filler as a pump so the pump runs continuously.

The pumping is started by pressing <pump>+<GO>.

The filler starts with the entered acceleration and runs up to the required number of revolutions per minute.

The filler runs at this velocity until stopped by pressing <STOP>.

In function 12 the current uncalibrated flow can be read.

If an exact flow read-out is required, the system must be calibrated. This calibration shall be made as indicated in paragraph 5: CALIBRATION.

It is recommended to use a rather long filling for this calibration of the flow value.

## 6 CALIBRATION

As the surroundings may vary from time to time and as tubes and products have small tolerance deviations, it is necessary to calibrate the filler when it is started.

If the quantity has been entered as volume in ml, a measuring cylinder or a balance may be used as control and measuring unit. The balance will always be most accurate, especially when the quantities are small.

### 6.1 Calibration with measuring cylinder

(The parameters already entered may be used for a trial).

Prepare the measuring cylinder and make sure that the tubes are completely filled, up to and including the filling nozzle.

(It is recommended to let the filler complete a few fillings before the calibration is made. After these fillings, set F9, reset F8: and F11:).

Keep the measuring cylinder below the filling nozzle and press <calib.>+<GO>. The filler will complete ONE trial filling, and the display will now show the following:

CALIBRATION WEIGHT:	0.0000	l1
F 1: 8.50 ml	F 2: 3.2 TUBE	
F 3: 400 rpm	F 4: 35 ACC	
F 5: 1 REV.	F 6: 100 fills	

Fig. 6.1

It will be observed that the MC12 in the prompt line asks for the weight.

THE WEIGHT MUST BE ENTERED, e.g. 8.05: <8>+<. >+<0>+<5>+<ENT>.

The filling may begin by pressing <disp.>+<GO>.

### 6.2 Calibration with balances

(The parameters already entered may be used for a trial).

Reset the balance with the container (bottle) to be used for the trial filling and make sure that the tubes are completely filled, up to and including the filling nozzle.

(It is recommended to let the filler complete a few fillings before the calibration is made. After these fillings, set F9, reset F8: and F11:).

Keep the container below the filling nozzle and press <calib.>+<GO>. The filler will complete ONE trial filling, and the display will now show the following:

CALIBRATION WEIGHT:	0.0000	I1
F 1: 8.50 ml	F 2: 3.2 TUBE	
F 3: 400 rpm	F 4: 35 ACC	
F 5: 1 REV.	F 6: 100 fills	

Fig. 6.2

It will be observed that the MC12 in the prompt line asks for the weight, and the value shown on the balance must be entered, e.g. 8.25: <8>+<. >+<2>+<5>+<ENT>.

The filling may begin by pressing <disp.>+<GO>.

### 6.3 Calibration of grams with balance

A MC12 programmed to fill a quantity measured in grams, should be calibrated by means of a balance.

(The parameters already entered may be used for a trial, where the 8.5 ml equals 8.5 grams). i.e. Specific gravity is 1.0000 g/ml

Reset the balance with the container (bottle) to be used for the trial filling and make sure that the tubes are completely filled up to and including the filling nozzle.

(It is recommended to let the filler run a few fillings before the calibration is made. After these fillings, set F9, reset F8: and F11:).

Keep the container under the filling nozzle and press <calib.>+<GO>. The filler makes ONE trial filling, and the display now shows the following:

CALIBRATION WEIGHT:	0.0000	I1
F 1: 8.50 ml	F 2: 3.2 TUBE	
F 3: 400 rpm	F 4: 35 ACC	
F 5: 1 REV.	F 6: 100 fills	

Fig. 6.3

It can be observed that the MC12 in the prompt line asks for the weight, and the value shown on the balance must be entered, e.g. 8.25: <8>+<. >+<2>+<5>+<ENT>, If grams is selected as volume format in function 72, the calibration will now be completed.

The filling may begin by pressing <disp.>+<GO>.

#### **6.4 Recalibration**

During the production it may be necessary to recalibrate the volume dispensed by the filler, as for example the liquid level of the suction vessel will sink. This recalibration can be made without stopping the fillings.

IT IS IMPORTANT TO USE THE SAME MEASURING METHOD FOR THE RECALIBRATION AS USED FOR THE INITIAL CALIBRATION.

Draw off a filling sample and measure it.

Press <calib.>+<ENT>, and the display will show the following:

RECALIBRATION WEIGHT:	0.0000	l1
F 1: 8.50 ml	F 2: 3.2 TUBE	
F 3: 400 rpm	F 4: 35 ACC	
F 5: 1 REV.	F 6: 100 fills	

Fig. 6.4

Enter the measured value, e.g. 8.47: <8>+<. >+<4>+<7>+<ENT>, and MC12 will now automatically correct the filler from 8.47 to 8.5 as asked.

MC12 uses the specific gravity entered in F9.

### **6.5 Calibration in parallel mode**

When MC12 is working with several pumps in parallel mode the system is controlled from **Drive 0**.

When calibration or recalibration is needed, at first the MC12 will ask for the actual drive and when this information has been keyed in, the procedure will be the same as described above.

### **6.6 Calibration in serial mode**

When MC12 is working with several pumps in serial mode the system is controlled from **Drive 0**.

When calibration or recalibration is needed, the MC12 will consider all drives as being one single filler and the procedure will be the same as described above.

## **7 CLEANING AND MAINTENANCE**

### **7.1 Daily cleaning**

As MC12 is not in contact with the dispensed product, daily cleaning will not be necessary except for the normal routine cleaning of production equipment.

When cleaning, please note that the cabinet of MC12 is provided with open slots for the cooling of the built-in parts. Therefore, liquids must NOT be splashed onto MC12. It may only be cleaned with a damp piece of paper or cloth.

The cabinet is made of anodised aluminium and plastics, and normal detergents as spirit and isopropanol may be used.

### **7.2 Sterilisation**

If MC12 shall be placed in aseptic environments, the sterilisation may be made as described in paragraph 6.1, or you may sterilise MC12 by gasses observing the following precautions.

If you use gasses that might injure and corrode contacts and other metals, air slots and sockets MUST be covered with tape.

### **7.3 Maintenance**

As there are no movable parts in MC12, no other maintenance is required than normal cleaning of the equipment.

If service should be needed, please consult the reference manual.

Should any further service be needed, please contact Flexicon A/S or your supplier.

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