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# ***OPERATOR'S MANUAL***

## ***MC12 P***

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### Declaration of conformity:

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

declare on our sole responsibility that the product:

MC12P Master Controller

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

EN 292:.	Safety of Machinery: Basic Concepts & General Principles of design
EN 50081-1:	Generic Standard for Emission
EN 50082-1:	Generic Standard for Immunity

according to the provisions in the Directives:

98/37/EEC, 91/368/EEC and 93/44/EEC:.	Machine-directive
73/023:	Low Voltage-directive.
EMC 89/336/EEC	

**Flexicon**<sup>®</sup>  
denmark

Model:

S/N:

Supply:

Year:

**CE**      Made in Denmark

Ringsted, Denmark October 2003

Mads Ulric Jensen  
Signature.

## **1: GENERAL INFORMATION**

### **1.1 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.

### **1.2 Use**

MC12P is the main computer of the Flexicon Multi Filling System (FMFS). MC12P can not perform filling by itself, but is developed for controlling one of Flexicons pumps for example PD12 or PD22 series.

## 1.3 Connections

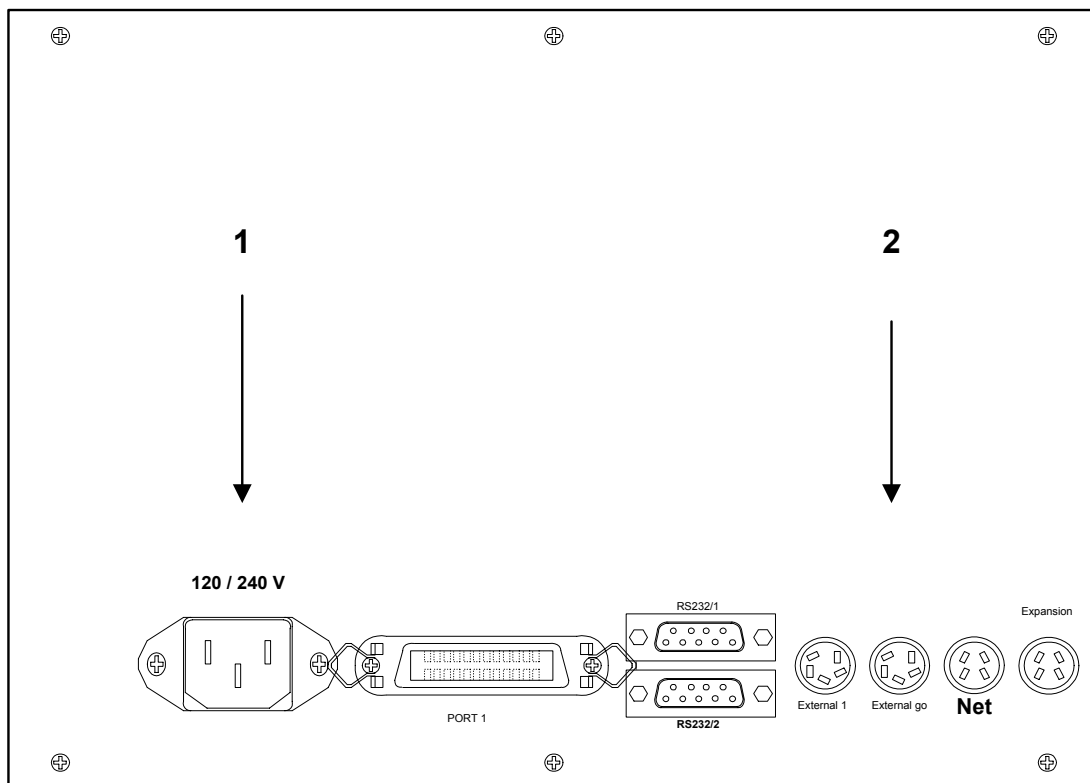


Fig.

1

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

Using MC12P with stand-alone drive.

The communication cable (type 3) comes fitted with two 4-pin DIN plugs. One is connected to the “net” socket (2) of MC12P, and the other plug is connected to the “net 1” socket of the required pump.

Using MC12P together with panel-mounted drive.

a communication cable is connected with a 4-pin DIN plug into the “Net” socket (2) of MC12P. The other end is mounted on pin 1 to pin 3 on the terminal on the panel-mounted drive, according to the guidelines in the manual for the drive.

MC12P is now ready to be switched on and to control the connected pump.

Should it be required to connect more than one pump to the same MC12P or to connect other equipment to it, the reference manual supplied should be consulted.

## 2: CONTROL

### 2.1 Display

The display of MC12P 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.2

The top line is the typing line and also the line, where MC12P prompts the operator.

The second last character on the top line (P) indicates the operation principle of MC12P: 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 MC12P, it is VERY important to watch the top line constantly, as any current question or instruction will be written here.

### 2.2 Keyboard

It is a foil-type keyboard with built-in click. The keyboard is quite tight and plane and can be cleaned with alcohol and other detergents.

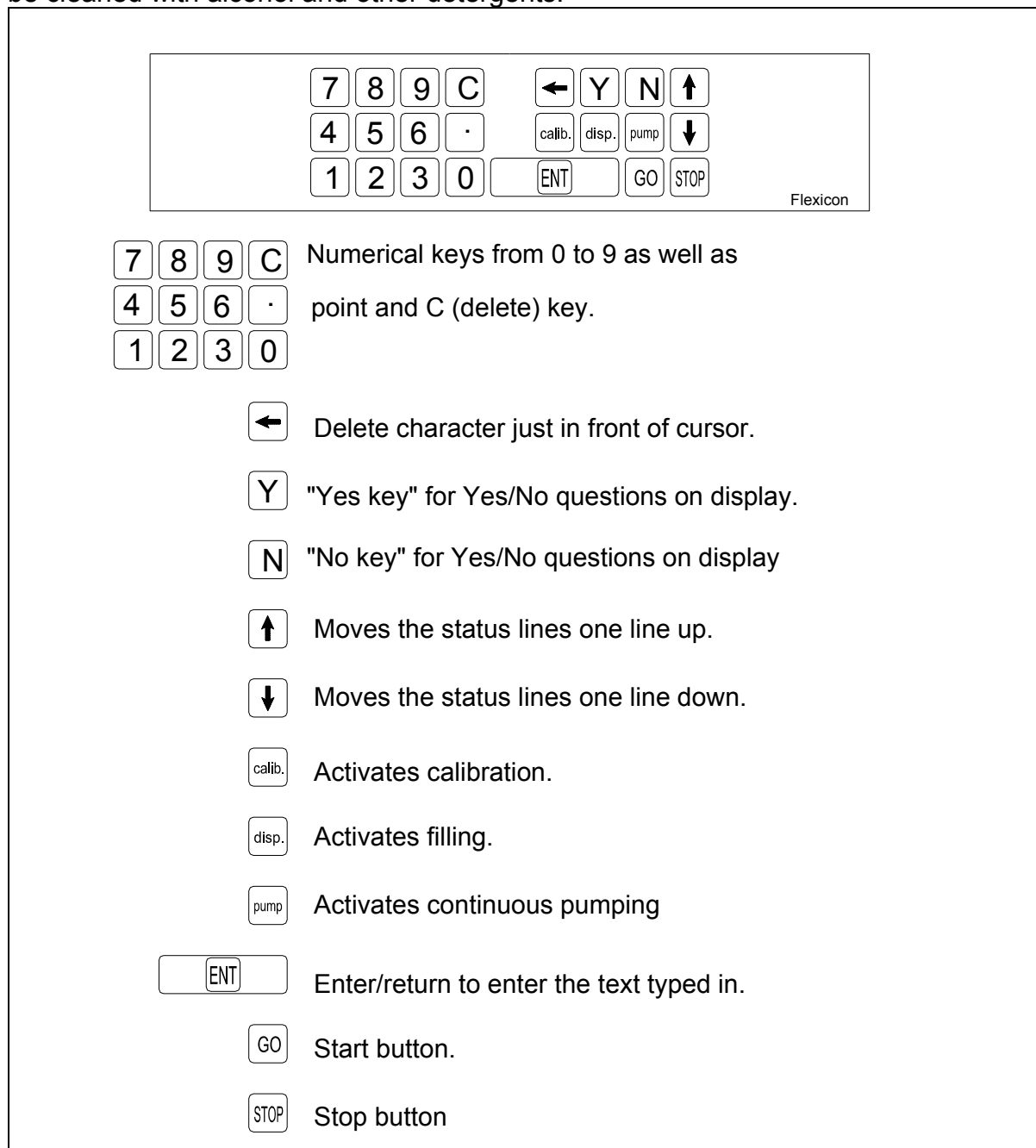


Fig.3

### 3: PROGRAMMING

#### 3.1 Starting MC12P

When MC12P is connected, FIRST switch on the pump or the pumps, and THEN switch on MC12P. When used in an FMB this is automatically taken care of.

The display will show the following:

```
STANDBY
```

Fig. 4

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

```
* MC12P V1.1X (C) Flexicon 90-02 *  
PRESS GO TO CONTINUE.  
  
DRIVE No.: 1
```

Fig. 5

Verify that all connected pumps (DRIVES) are displayed with their respective numbers in the bottom line.

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. 6

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

MC12P is now ready to be programmed.

### 3.2 Password

This version of the MC12P is password protected. To be able to perform the following programming procedures it is necessary to be logged on as a supervisor (level 1). This is done by selecting function 59, and enter the level 1 password. Always remember to change the password level back to level 3 after programming. Remember that merely switching MC12 off/on will NOT change any running parameters!

### 3.3 Parameters

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

### 3.4 Programs

In the following a program will be a complete set of parameters which together form a program according to which MC12P and the connected pump will operate.

### 3.5 General information on the programming of MC12P

MC12P 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>

MC12P 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.

**3.6 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	40. Mode
7. Delay	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	48. RS232 set-up
18. Timer 2	49. Balance set-up
19. Timer 3	51. Filling needle set-up
20. Operator number	53. Drive deactivation
21. Batch number	58. Set passwords
22. Start Log	59. Change access level
23. Stop Log	60. Ext. Input mode
24. Print Log	70. Output format
25. Delete Log	71. Flow rate format
26. Log status	72. Volume format
29. Print parameters	80. Reset memory
	86. Complete memory reset

### 3.7 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 in question. MC12P accepts only original Flexicon tube diameters.

The sizes are indicated in the filler manual and can be read on the template supplied with the filler.

#### 3. Speed

Value: Revolutions per minute.

Enter the required speed.

The different fillers have different ranges, and the range is stated in the filler 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 100.

1 = slowest acceleration.

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

#### 5. Reversing (back suction)

Value: An integral number.

When the filling stops, the filler can be asked to produce a minor suction to prevent afterdripping.

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

0 = no back suction.

10 = maximum back suction.

#### 6. Batch size

Value: Number.

DISABLED ON FMB's

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 ALWAYS BE 1.

---

<sup>i</sup> Depends on the filler version

**7. Delay**

Value: Seconds.

If more than one filling is chosen in function 6, the required delay time between each filling shall be entered in this function.

There is a choice between 0.1 - 25.0 seconds, with a graduation 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. or Kg.

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**

Value: Seconds.

A time interval can be set between a starting signal and when the filler 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 25.0 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**

In case of a connected printer, 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 82 set of parameters, i.e. one pump has 82 programs available, and in case of two pumps, each have 41 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 storage capacity**

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

#### **40. Operating principle**

Value: An integral number.

If more than one pump is connected, MC12P 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 filler 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.

#### **48. RS232 set-up**

Please consult the reference manual.

#### **49. Balance set-up**

This function provides the possibility to connect MC12P 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
- 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.

**58. Set Passwords**

This functions sets the passwords for the 3 different levels.

Level 1 – Unlimited access.

Level 2 – Basic functions

Level 3 – Restricted to <calib> and 59. (Change access level) only.

**59. Change access level**

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

**60. Operating mode for ext. connections**

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
- 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. ml or g

**80. Reset memory**

This function resets the memory with the exception of the part used for saving programs. MC12P 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.**

## 4: DAILY USE

### 4.1 Used for controlling a dispenser

Switch on MC12P 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 MC12P 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.

## 4.2 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.

## 4.3 Continuous run.

MC12P 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 11 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.

## 5: 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.

### 5.1 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	11
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. 7

It will be observed that the MC12P 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>.

## 5.2 Calibration of volume (ml) by balance

(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	11
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. 8

It will be observed that the MC12P 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>.

### 5.3 Calibration of grams with balance

A MC12P 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. 9

It can be observed that the MC12P 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>.

## 5.4 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. 10

Enter the measured value, e.g. 8.47: <8>+<. >+<4>+<7>+<ENT>, and MC12P will now automatically correct the filler from 8.47 to 8.5 as asked.

MC12P uses the specific gravity entered in F9.

## 5.5 Calibration in parallel mode

When MC12P is working with several pumps in parallel mode the system is controlled from **Drive 0**.

When calibration or recalibration is needed, at first the MC12P will ask for the actual drive and when this information has been keyed in, the procedure will be the same as described above.

## 5.6 Calibration in serial mode

When MC12P is working with several pumps in serial mode the system is controlled from **Drive 0**.

When calibration or recalibration is needed, the MC12P will consider all drives as being one single filler and the procedure will be the same as described above.

## 6: CLEANING AND MAINTENANCE

### 6.1 Daily cleaning

As MC12P 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 MC12P is provided with open slots for the cooling of the built-in parts. Therefore, liquids must NOT be splashed onto MC12P. 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.

### 6.2 Sterilisation

If MC12P shall be placed in aseptic environments, the sterilisation may be made as described in paragraph 6.1, or you may sterilise MC12P 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.

### 6.3 Maintenance

As there are no movable parts in MC12P, 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.

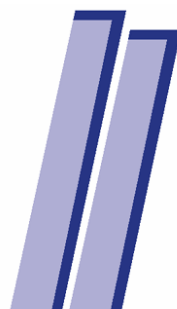
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