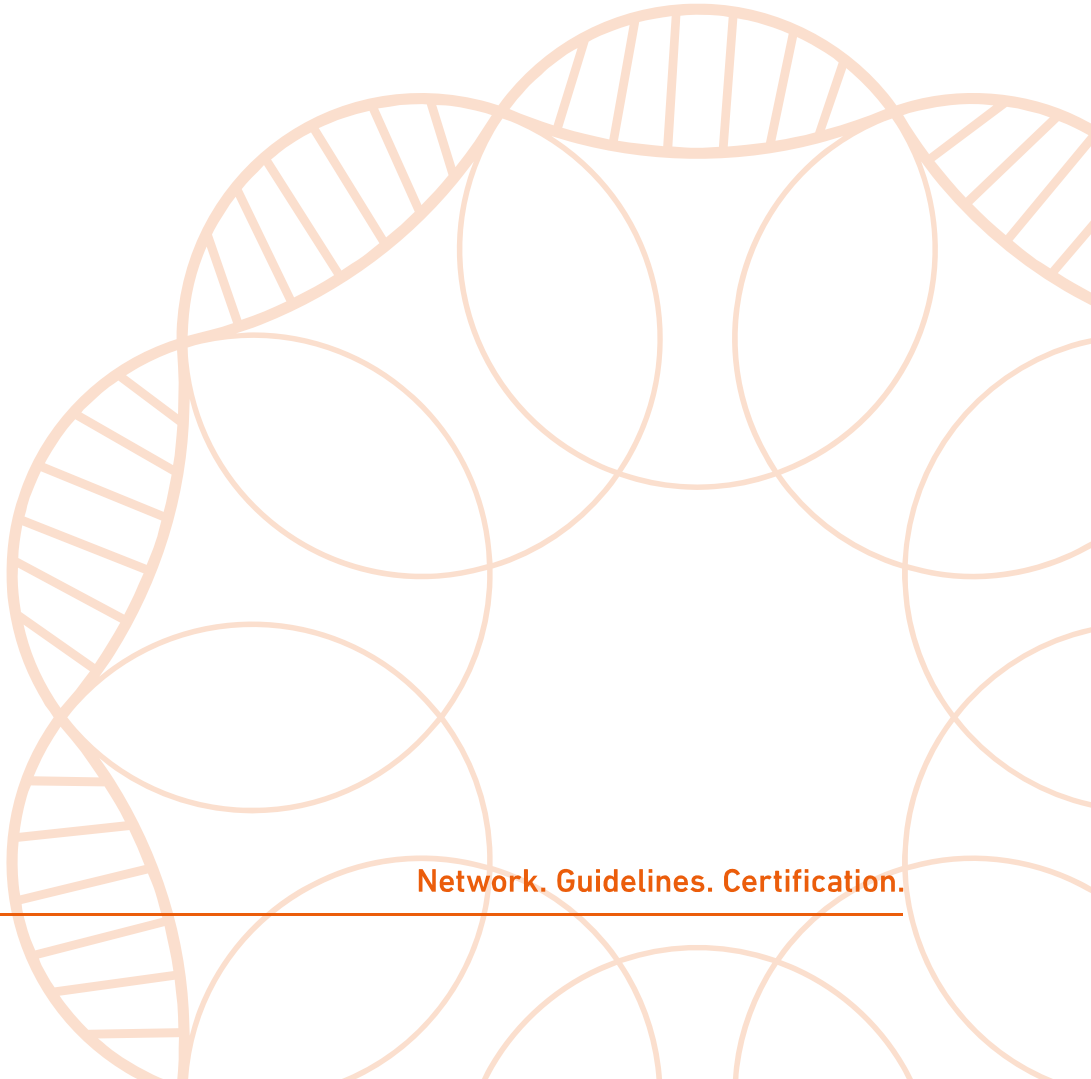
THE GLOBAL STANDARD
FOR LIVESTOCK DATA

ICAR Guidelines for installation of the milk meters

Afiflo 2000

Version July 2018



Network. Guidelines. Certification.

Table of Contents

1 Introduction

The S.A.E. Afikim Afiflo 2000 milk meter is the state-of-the-art milking system.

As part of a computerized system, the Afiflo 2000 performs many tasks essential to a profitable dairy.

AfiFlo abilities are in three categories:

a. Measuring. Afiflo 2000 measures the milk yield and milk conductivity.

b. Operation. Afiflo 2000 performs automatic cluster removal and allows milkers to control other applications such as pulsation, gates, etc.

c. Communication. Afiflo 2000 enables information and data exchange with the computer.

For the most part, the measuring and operational aspects of Afiflo 2000 are automatic.

However, the communication aspect is multi-faceted. The communication:

a. Enables milkers, while still in the parlor, to monitor information about the cows. Based upon upto-date information, milkers and herd managers can make immediate decisions pertaining to milking and treatment of a cow.

b. Alerts milkers to irregularities in milking performance. Significant deviations in milking performance also help provide an early alert for mastitis.

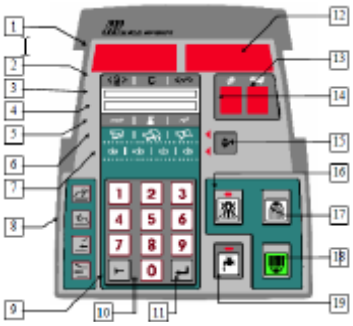
c. Displays codes. Some codes alert to milkers to divert milk from the main milk line. Other codes are reminders needed cow treatment.

d. Enables milkers to send messages to the computer. Messages can serve either as a personal reminder or as communication to the herd manager.

2 The control panel

The AfiFlo 2000 milk meter control panel is essentially a computer terminal. Milking operations are controlled from it and all cow information can be viewed in the display.

It is thin and compact. Below is a picture of the AfiFlo 2000 display. Call outs are defined below the picture



relevant windows.

panel.

1. Milk yield field 2. Upper row of data icons 3. Upper LCD row 4. Lower LCD row 5. Default data icons for lower LCD row	6. Breeding information icons 7. Feed data icons 8. Gate control keys 9. Field select key 10. Number pad	11. Enter key 12. Cow number field 13. Codes display 14. Pulsation and strip display 15. Scroll key	16. Automatic Cluster Removal Cancel key 17. Stop key 18. Start key 19. Cleaning Mode key

3 Chapter 1: Overview

The Afiflo 2000 milk meter is the state-of-the-art milking system. As part of a computerized system, the Afiflo 2000 performs many tasks essential to a profitable dairy.

AfiFlo abilities are in three categories:

a. Measuring. Afiflo 2000 measures the milk yield and milk conductivity.

b. Operation. Afiflo 2000 performs automatic cluster removal and allows milkers to control other applications such as pulsation, gates, etc.

c. Communication. Afiflo 2000 enables information and data exchange with the computer.

For the most part, the measuring and operational aspects of Afiflo 2000 are automatic. However, the communication aspect is multi-faceted. The communication:

a. Enables milkers, while still in the parlor, to monitor information about the cows. Based upon up-to-date information, milkers and herd managers can make immediate decisions pertaining to milking and treatment of a cow.

b. Alerts milkers to irregularities in milking performance. Significant deviations in milking performance also help provide an early alert for mastitis.

c. Displays codes. Some codes alert to milkers to divert milk from the main milk line. Other codes are reminders needed cow treatment.

d. Enables milkers to send messages to the computer. Messages can serve either as a personal reminder or as communication to the herd manager.

The Afiflo 2000 milk meter consists of three components:

a. The AfiFlo milk meter body,

b. The AfiFlo control panel, and

c. The AfiFlo controller.

A brief description of these components follows.

3.1 The Milk Meter Body

The Afiflo 2000 milk meter body needs little space in the parlor and is easy to maintain. Electrodes in the body measures milk yield and milk conductivity.

Milk conductivity is used to help detect mastitis

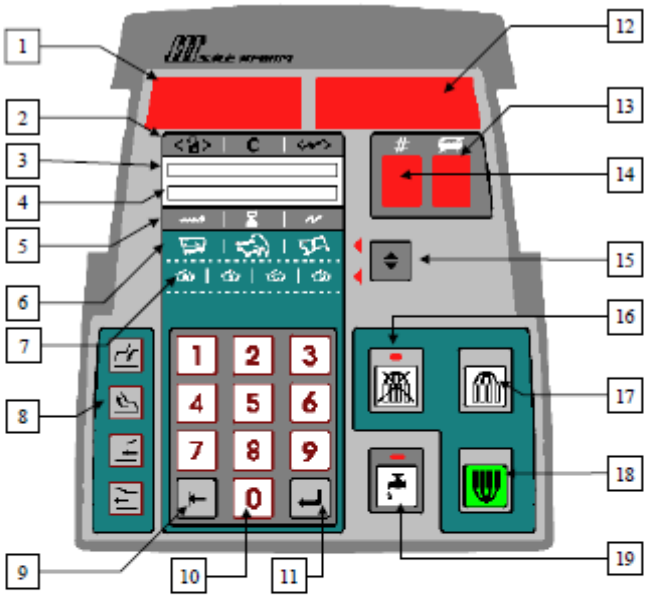
The Afiflo 2000 milk meter body

3.2 The Control Panel

The AfiFlo 2000 milk meter control panel is essentially a computer terminal.

Milking operations are controlled from it and all relevant cow information can be viewed in the display windows. It is thin and compact.

Below is a picture of the AfiFlo 2000 display panel. Call outs are defined below the picture.



1. Milk yield field.
2. Upper row of data icons.
3. Upper LCD row.
4. Lower LCD row.
5. Default data icons for lower LCD row.
6. Breeding information icons.
7. Feed data icons. (Currently not functional.)
8. Gate control keys.
9. Field select key.
10. Number pad.
11. Enter key.
12. Cow number field.
13. Codes display.
14. Pulsation and strip display. (To be used for other features in the new protocol.)
15. Scroll key.
16. Automatic Cluster Removal Cancel key.
17. Stop key.
18. Start key.
19. Cleaning Mode key.

Note: AfiFlo green and red alert lamps, discussed in the following chapter, are not pictured above.

3.3 The Controller

The printed circuit board (PCB) of the AfiFlo 2000 milk meter is contained in the controller. One controller for each meter is mounted overhead in the parlor, above its respective control panel and body. All communication cables, signal cables, and apparatus control cables (to pulsators, gates, and ACR etc.) are connected to the controller

The Afiflo 2000 milk meter controller.

4 Chapter 2: Operation

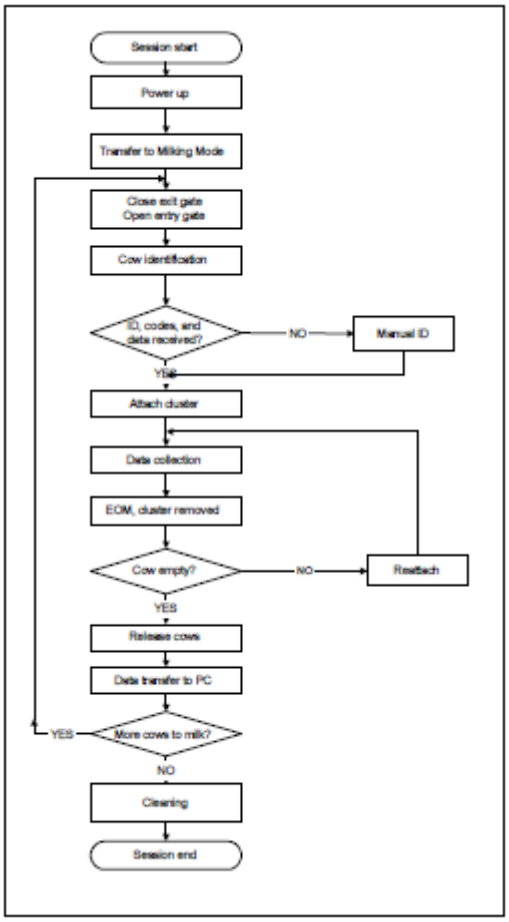
Operation of the Afiflo 2000 milk meter involves three steps:

a. Monitoring primary displays.

b. Use of cluster control keys.

c. Responding to alerts.

This chapter explains the start-up sequence and each of the above actions in the order they are listed. The flow chart below illustrates the sequence of operations.



4.1 The Start-up Sequence

Afiflo 2000 milk meters are usually installed so that the display panels turn on when power to the milking parlor is switched on.

During installation, each milking point is assigned an identification number.

Immediately after power to the milk meters is switched on, the following occurs:

a. For several seconds, the milking point's identification number—**Id##** — appears in the milk yield field. For example, for milk meter number one, **Id01** appears. The identification number is replaced with 00.0 indicating the beginning of normal start-up or **00.0L** if set to work in Pounds.

b. In the cow number field, two zeros flash.

The Afiflo 2000 milk meter starts-up in Cleaning Mode. The red indicator of the Cleaning Mode key indicates that the milk meter is in Cleaning Mode.

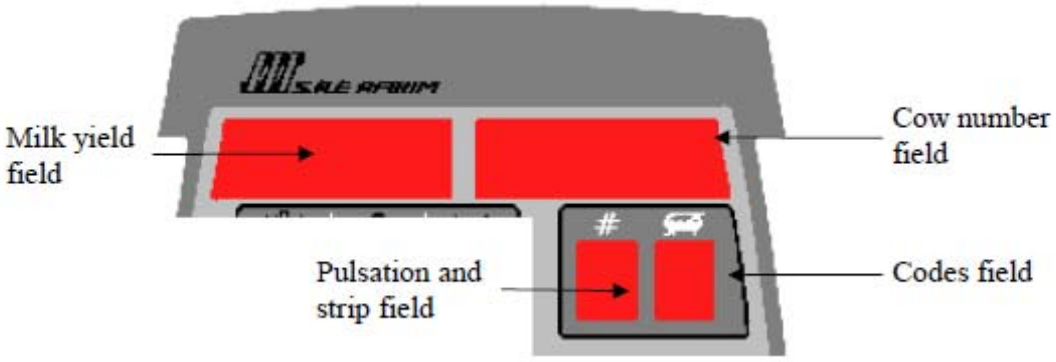
Press  on each meter to alternate from Cleaning Mode to Milking Mode.

When the red LED goes off, the milk meter is in Milking Mode.

4.2 The Primary Fields

Once a cow arrives at the milking point and ***before*** the start of milking, The control panel receives important information from the computer. This information is displayed in two of the four fields pictured below; the milk yield of the present milking is shown in the third field. This chapter describes these three fields. The fourth field, the pulsation and strip field, is explained in a following chapter.

Two LCD (liquid crystal display) fields display milk expectations, messages, and a choice of DIM (days in milk), fertility or, in the future, feed data. The LCD fields are explained in a following chapter.



4.3 Cow Number Field

Upon entering the milking point, the cow is identified. Following identification, the cow's number appears in the cow number field. If the cow is not identified, two zeroes flash. A cow might not be identified if:

a. The tag has fallen off.

b. Either the tag or the receiver is faulty.

c. The ID tag is not registered in the database.

In the event the cow's number is not displayed, enter its number manually:

1. Using the number pad, type the number of the cow. The number flashes in the field as you are typing.

TIP: If a wrong cow no. is entered, press any key *except* ↵; the entry disappears. Alternatively, do not press any key; after 20 seconds the entry disappears.

2. Press ↵.

If recognized by the system, the cow number stops flashing. If not recognized by the system, the number continues flashing for 20 seconds.

The Codes Field

Codes are important features of the milkmeter, allowing the alert of special treatment the cow needs.

Codes are divided into two groups:

- High level codes—that is, codes 01–08—which alert the milker to a cow's special status.
- Low level, alphanumeric codes.

Following identification, high level codes appear in the codes field. They remain until the terminal is reset. (After the cow leaves the milking point).

Codes 01–04, and 06 are variable and can be assigned any definition the dairy manager desires. The three remaining codes are preset:

- 05 indicate a dry cow.
- 07 indicates a cow receiving antibiotics.
- 08 indicates a cow giving colostrum.

Codes 05, 07, and 08 also deactivate the Start key. This alerts the milker to cows requiring special action and prevents the milker from milking colostrum or antibiotics into the milk line or from attaching the cluster to a dry cow. To reactivate, press the Start key *twice rapidly*.

If more than one code has been assigned to a cow, they are displayed consecutively. A maximum of four codes can alternate in the display.

IMPORTANT: 09 is an *alert* which appears in the codes field; it appears *after* cluster removal. 09 is displayed when both yield and conductivity data deviate from the norm. A deviation in both yield and conductivity suggests that a cow has a high probability of having mastitis.

For instructions regarding the entry of codes inside the system, refer to the Afifarm user Guide.

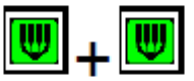
4.4 The operation keys

This section explains use of the operation keys used in Milking Mode.

Start Key

Press the Start key to begin the milking cycle. Pressing  :

- Initiates counting of cluster on-time.
- Opens the vacuum to the cluster.
- Causes the piston to release the cluster.
- If applicable, starts the pulsation sequence.



Restarting

If a health code has deactivated the Start key, press the Start key *twice rapidly* to begin milking.

Similarly, if the ID of a cow was not identified, press the Start key *twice rapidly* to begin milking.

Similarly, if premature cluster removal occurs, milkers are alerted with red parlor lights and an audible alarm. To continue the session, press the Start key *twice rapidly* and, if necessary, reattach the cluster.

Stop Key

Press the Stop key to manually remove the cluster. Pressing  :

- Stops the counting of cluster on-time.
- Shutt off the vacuum to the cluster.
- Causes the piston to retract the cluster.

NOTE:	Opening an exit gate causes the retraction of all the clusters on that side of the parlor.

Automatic Cluster Removal (ACR) key

If the LED of the ACR key is off, the milk meter is in ACR Mode. In ACR Mode, milking automatically finishes when the milk flow rate drops below the preset minimum.

To cancel ACR, press  . The red LED will light up.

If the red LED of the ACR key is lit, the ACR has been canceled. Milking will continue beyond the minimum milk flow rate and until the Manual Finish key is pressed.

To restart ACR, press  . The red LED is turned off.

WARNING:	Overmilking can cause harm to cows. Since automatic cluster removal does not take place in this mode, preventing overmilking—that is, manually stopping the milking—is the full responsibility of the milker.

Pre-Milking Stimulation (Milk Let-down)

To activate the pre-milking stimulation, press the start key *twice rapidly*.

4.5 Parlor alarms

Parlor alarms are situated on both sides of the terminal. Green alarms indicate a normal situation. Red alarms indicate an unusual situation.

Green Parlor Alarms

Green parlor alarms flash for 10 seconds before the cluster is removed. If the milk valve opens during these 10 seconds, the green alarm stops.

After the cluster is removed, the green alarms stop flashing and remains illuminated.

The green alarms reset when the Start key is pressed.

Red Parlor Alarms

In various situations, the milk meters signal milkers with either red parlor alarms only, or with red parlor alarms accompanied by an audible alarm.

The red alarms flash for 30 seconds and remain illuminated until the end of milking. The audible alarm, however, can be reset by pressing the Start key.

The alarms are activated in the following situations:

Situation	Alarm		When activated
	Red lights	Audible alarm	
Codes 05 and 06	✓	✓	before milking
Codes 07 and 08	✓	✓	before milking and after cluster removal
09 alert	✓	✓	after cluster removal
Premature cluster removal (milk yield field flashes)	✓	✓	after cluster removal
High conductivity (milk yield field flashes)	✓	✓	after cluster removal
Malfunctioning milk meter	✓	✓	as occurring
"Milk Meter Card Not Responding" message	✓		as occurring

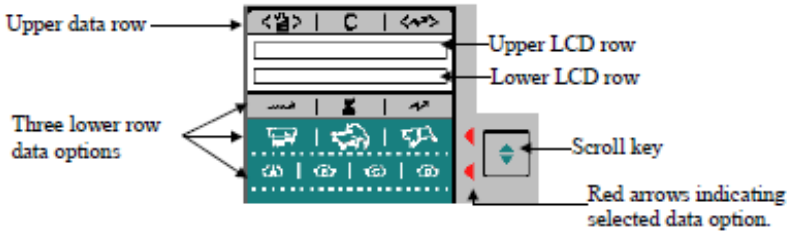
5 Chapter 3. Monitoring data and sending messages

In addition to the primary operations described in the preceding chapter, the *Afiflo 2000* milk meter makes it possible for milkers and herd managers to:

- Monitor additional cow data while in the parlor.
- Send messages to the computer from each milking point.

These operations are described in this chapter.

Monitoring Data



Afiflo displays additional data in the two LCD rows illustrated above.

The data displayed in the upper LCD row is *fixed* and corresponds to the upper data row. As explained on the following page, it always consists of:

- Expected yield.
- Messages.
- Expected conductivity.

The data displayed in the lower LCD row is *selectable*. The data displayed depends upon which of the three lower data rows is selected. Using the Scroll key, the milker can choose from:

- General data, corresponding to the first lower data row and displayed by default.
- Fertility data, corresponding to the second lower data row.
- Feed data, currently nonfunctional, corresponding to the third lower data row.

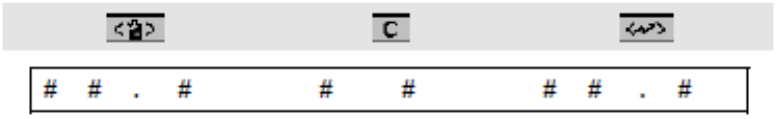
This section defines the icons in the four data rows and explains how to scroll between data rows two, three and four.

Data Display Area: the Upper LCD Row

The following information, corresponding to the upper data row, *constantly* appears in the upper LCD row:

	C	
Expected yield The computer calculates an average yield based upon previous milkings. That average, together with the parameters, defines the *expected yield* which is displayed here. A lower than expected yield will set off an alarm during and after cluster removal.	Messages Messages appear here as they are entered. If no message is entered, two zeros appear. For information about messages see the following section.	Expected conductivity A higher milk conductivity indicates a higher possibility of mastitis. The computer calculates an average conductivity based upon previous milkings. That average, together with the parameters, defines the *expected conductivity* which is displayed here. A higher than expected milk conductivity will set off an alarm during and after cluster removal.

The upper LCD row is formatted as follows:



Scrolling Between the Three Lower Data Rows

Press  to scroll between the three lower data rows. An illuminated red arrow to the right of a row indicates that the row's data is displayed in the lower LCD row. If *no* arrow is illuminated, the default data, explained on the following page, is displayed.

NOTE: The lower LCD row always resets to default when the Start key is pressed.

The three lower data rows include:

- The general data, including current milk flow rate, cluster on-time, and actual conductivity data.
- The breeding data, including lactation, insemination, and activity data.
- Feed data.

The Default Data Display: Milking and Conductivity Data

By default, the data corresponding to the first data row below the LCD area appears in the lower LCD row. It consists of:

Current flow rate in either kg. or lb. per minute.	Cluster on-time.	Actual conductivity.

When displaying the default data, the lower LCD row is formatted as follows:

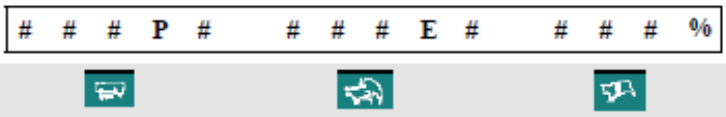
NOTE:	If there is no data, a line (—) appears in place of the number. This is true for all information displayed in the lower LCD row.

Second Lower Data Row: Breeding Data

Breeding information is displayed when the second lower row is selected. The icons correspond to the following information:

Days in milk The first numbers indicate the days in milk. Code **P** indicates that the cow is pregnant. If a "/" appears in its place, the cow is not pregnant.	Days since insemination The first numbers indicate the number of days since the last insemination.	**This display will be available in future applications.**

When displaying this data, the lower LCD row is formatted as follows:



Third Lower Data Row: Feed Data

As of this printing, this data row is nonfunctional.

5.1 Sending messages

The *Afiflo 2000* milk meter enables milkers and herd managers to send messages directly from the milking stall to the computer. Messages can serve either as a personal reminder or as communication to the farm manager.

A message is a two digit number sent during milking. The *AfiFlo 2000* milk meter allows milkers to send *only one* message per cow. If more than one is sent, the computer accepts only the last message.

NOTE Distinguish between codes and messages:

Codes
A *code* is a number or a letter assigned to a cow. A cow's codes are saved in the computer and displayed on the display panel during milking. As explained in chapter 2, codes indicate specific information or status.

Messages
A *message* is a two digit number sent during milking from the display panel to the computer. Some messages cause a code to be assigned or deleted automatically.

Some messages can activate/deactivate codes automatically. There are three different types of such messages. They are:

- Message to assign a high level code, that is, codes 01-08.
- Message to delete a high level code.
- Message to assign a low level, alphanumeric code.

The chart below summarizes the messages and the codes assigned or deleted.

Message	Code assigned	Definition of code	Code deleted
01–04, 06	1–4, 6	variable	-----
05	5	Dry cow	-----
07	7	Antibiotics	-----
08	8	Colostrum	-----
11, 22, 33 and so on until 88	-----	-----	1–8
90–93, 95–99 94	A–D, F–J E	Variable	-----

To send a message:

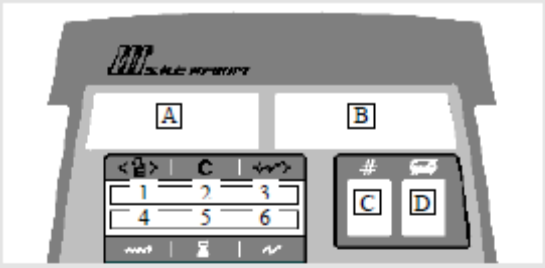
1. Press  . The left rectangle under the C begins blinking indicating the insertion point for the first digit of the message.
2. Using the number pad, type the two digits of the message.
3. Press  . The message has been sent.

TIP: To delete an entry before sending it to the computer, press any key *except* Enter; the entry disappears. Alternatively, do not press any key; after 20 seconds the entry disappears.

To delete a message *after* it has been sent to the computer, send message "00."

Table of *Afiflo* Data

The table below summarizes the data available on the Afiflo displays. The numbers and letters in the Field column correspond to the numbers and letters appearing in the drawing to the right.



Data	Field	Operation
Activity, deviation in (will be available in future applications)	6	Scroll to 2nd lower data row
Cluster on-time	5	none
Codes	D	none
Conductivity, expected	3	none
Conductivity, actual	6	none
Cow number	B	none
Food, type A (will be available in future applications)	4	Scroll to 3rd lower data row
Food, type B	4/5	Scroll to 3rd lower data row
Food, type C	5/6	Scroll to 3rd lower data row
Food, type D	6	Scroll to 3rd lower data row
Group number	B	← + ↕
Insemination, days since	5	Scroll to 2nd lower data row
Insemination, number	5	Scroll to 2nd lower data row
Insemination, prohibited	5	Scroll to 2nd lower data row
Lactation, days in	4	Scroll to 2nd lower data row
Lactation, number	4	Scroll to 2nd lower data row
Messages entered	2	← + 2 digits + ↵
Milk flow, average rate	A	↕ + 8
Milk flow, current rate	4	none
Milk yield, current	A	none
Milk yield, expected	1	none
Pregnancy code	4	Scroll to 2nd lower data row
Pulsation and strip indicator	C	none

6 Chapter 4. Special features and operations

Five additional features of the *Afiflo 2000* milk meter assist milkers. They are:

- Backlighting and contrast of the LCD.
- Controlling entry and exit gates.
- Using the Cleaning key during Milking Mode.
- Power failures and restoring data.

This chapter explains each of the above.

Backlighting and Contrast

Reading the display panel is made easier by the following two features:

- Backlighting.
- Contrast.

Backlighting

Backlighting is activated:

- When the cow is identified. Backlighting is turned on to remain for another 30 seconds.
- By pressing any key. Backlighting is turned on to remain on for another 30 seconds.
- After cluster removal. Backlighting is turned on to remain for two minutes.

Contrast

Field contrast can be adjusted to suit different parlor lighting conditions.

1. Press  and do not release it. The contrast indicators appear in the upper right corner of the LCD. The number of contrast indicators on the screen continues to change so long as the scroll key is pressed.

NOTE:	One contrast indicator represents the minimum setting and four represent the maximum setting.

2. Release the scroll key when the desired number of contrast indicators is shown.

6.1 Controlling entry and exit gates

The *Afiflo 2000* milk meter supports automated parlor and milking stall gates. *If configured*, milkers can control gates with four keys on the display panel. Pressing a gate key causes the corresponding gate to open or close. Every gate can be opened and closed from every milking point.

Following is an explanation of the four gate keys.

Symbol	Description	Function
	Milking point entry-gate key.	Opens/closes the milking stall **entry**-gate, in a tandem parlor.
	Milking point exit-gate key.	Opens/closes the milking stall **exit**-gate, in a tandem parlor.
	Parlor entry-gate key.	Opens/closes the parlor **entry**-gate, in a herringbone parlor.
	Parlor exit-gate key.	Opens/closes the parlor **exit**-gate, in a herringbone parlor.
NOTE:	The icons, as well as the descriptions above, refer to a tandem parlor. However, the keys may have been customized to control other parlor functions.	

6.2 Data storage

The *AfiFlo 2000* milk meter has a data memory storing device. It protects the data and working status of the display panel from a power failure of 20 seconds or less.

If the failure is for 20 seconds or longer, when power returns the display panel restarts, in the normal start up sequence. The data accumulated immediately prior to the power failure is lost.

To delete the data and reset the memory, press keys number 1, 2, and 3 simultaneously.

6.3 Pulsation and strip field

If *AfiFlo* has been configured to regulate pulsation, two flashing, vertical lines in the lower-left field indicate the pulsation rate.

If the strip option has been configured, a single, flashing horizontal line appears under the vertical lines. It indicates that the strip function is in stand-by. The line turns solid while strip is active and disappears when strip is completed. If the strip optoin has not been set, the line does not appear.

If strip is configured, code 2, sent from the computer, deactivates the strip.

7 Chapter 5. Cleaning route

This chapter describes general cleaning guidelines, warnings, and recommendations.

Warnings:

- Always comply strictly with the instructions of the chemical manufacturers! Failure to comply with the instructions can cause injury and damage to equipment.
- Use gloves and protective goggles when working with chemical detergents.
- Prevent any contact with active detergents and acids in the same container.
- Avoid all contact of pesticide materials with the exterior of AfiFlo milk meter bodies and control panels.
- Clean the exterior of the milk meter body with hot water, *without* detergent.

7.1 Recommendations

- Chemical dispensing pumps are recommended for accurate detergent dispensation.
- Butyl Glycol or Butyl Cellusolve in excess of 10% may damage plastic components of the system. We recommend cleaning fluids with a maximum of 10% Butyl Glycol or Butyl Cellusolve.

7.2 General instructions

The cleaning cycle of the *AfiFlo 2000* milk meter body is executed in the same manner as any standard milking system cleaning cycle.

The following conditions must be fulfilled in every cleaning cycle.

- The vacuum pump operates throughout the cleaning cycle.
  A temporary halt in vacuum while the sink is being filled can cause milk and cleaning fluid may penetrate outwardly into the grooves of the gaskets.
- The milk meters are in cleaning mode.
  Press  on each meter, or turn off the power to the milk meters for 30 seconds and turn the power on again, to put the meters in cleaning mode.
- The clusters are connected to the jetters.

During every stage of cleaning, check that there is sufficient water to "flood" the interior chamber of the milk meter bodies.
The volume of each milk meter body is 500cc. The amount of water required per milking point varies between 6 – 8 liters, according to:

- Parlor configuration,
- Length and diameter of milk lines,
- Volume of the receiving vessels.

If:

- A double size milk line is installed in the parlor,
- Or the milk tank is far from the parlor,
- Or both of the above,

Then calculate additional water for cleaning.

7.3 Cleaning cycle

There are various cleaning systems and procedures in use in milking parlors. Nevertheless, the following rules must be followed for all the procedures and detergents in use.

Detergent Wash

1. Initial cleaning in an open circuit, to rinse out residual milk: Use luke-warm water that is emptied in the drain, until the water becomes clear.
   The temperature of this rinsing water should be roughly body temperature:
- If the water is too cold, milk fats will solidify onto surfaces, and will be more difficult to remove.
- If the water is too hot, milk fats may be "baked" onto the surfaces.

2. Circulate the water in a closed circuit (CIP) with detergent.
   Use a basic detergent additive (pH=13) and hot water:
   - Entry water: 70°C [158°F], or hotter,
   - Returning water: 55°C [131°F], or hotter.
   a. Start circulating with hot water, and empty the water in the drain for a short time until the system is warmed up.
   b. Bring the milk line to a circulating position, add the soap and circulate for 10 – 12 minutes.
   c. Drain the cleaning fluid.

3. Rinsing: open circuit.
   Use cold water. Empty the water in the drain until the water becomes clear.

Warnings: Follow all of the manufacturers' recommendations, including: concentrations, temperatures, and cleaning-cycle times. Excessive use of chemicals may damage the milk meters.
Leaving the detergent inside the milk meter may damage its components.

Acid Wash

Do this acid wash once a week, or more frequently, where necessary. This acid wash is not in place of the daily cleaning routine. (There are some cleaning solutions available that remove both milk residues and hard water salts.)

1. Rinse the detergent solution out of the system with cold water.

2. Circulating with phosphoric and/or sulfuric acid.
   Use hot water and a chemical additive:
   - Entry water: 70°C [158°F], minimum,
   - Returning water: 50°C [122°F], minimum,

   Circulate the solution for 10 – 12 minutes and drain.

3. Rinse the system with cold water.

7.4 Operation in cleaning mode

An automatic delay schedule prevents excessive load on the power supply. During Cleaning Mode, valves are pulled up and the milk chamber is emptied. The automatic delay schedule desynchronizes the pulling up of the valves thereby preventing excessive load on the power supply.

The schedule creates a delay of 100 msec between stalls and is set according to milking point numbers. Every seventh milking point has the same delay time. In a 12 station parlor, this results in the following operation pattern:

- The valves of stalls 1 and 7 are pulled up first.
- The valves of stalls 2 and 8 are pulled up after a 100 msec delay.
- The valves of stalls 3 and 9 are pulled up after a 200 msec delay.
- Etc.

The delay is counted from the time the cleaning mode is activated. Synchronize the parlor in cleaning mode by setting all milk meters in cleaning mode and switching the power to the parlor off and on again.

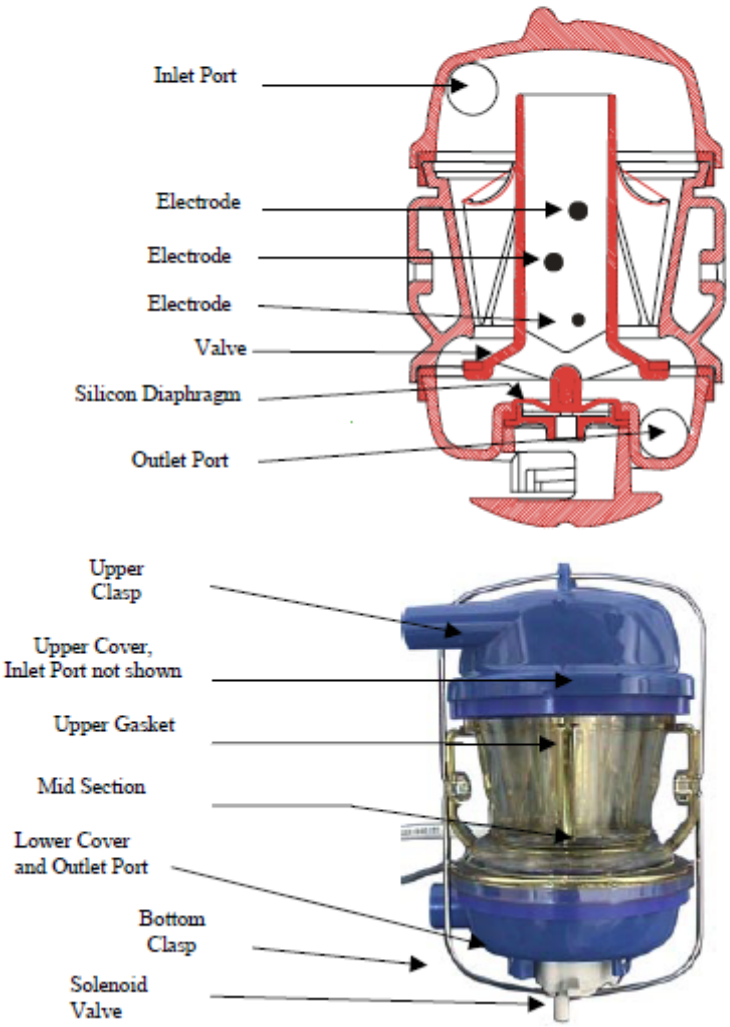
8 Chapter 6. Milk meter body and fat sampler

This chapter contains information about:

- The basic structure and components of the *AfiFlo* milk meter body.
- Silicone and rubber component replacement.
- The fat sampler.

Items highlighted in the call-outs below are explained on the following page.

The Milk Meter Body, Structure and Components



The *AfiFo* milk meter body is a plastic container made up of three main parts:

- The Upper Cover and Inlet Port: Milk enters the main chamber through the inlet port.
- The Main Chamber: Milk fills the mid section while the valve is closed (in upper position).
- The Lower Cover and Outlet Port. When the solenoid is energized, the valve opens and releases the milk. The milk flows through the lower part and outlet port to the milk line.

Within the *AfiFlo* milk meter body are:

- Three electrodes.
- A cylindrical valve, which is also an overflow tube.
- A silicon diaphragm.

The electrodes detect the milk level. A signal prompts the opening and draining of the central chamber. The electrodes also sense the milk's conductivity. The precise amount for measurement is not predetermined, and measured milk portions may vary from 180–250 cc.

When the solenoid valve is energized, vacuum from the solenoid line causes the silicon diaphragm to pull the valve down. This releases a portion of the milk.

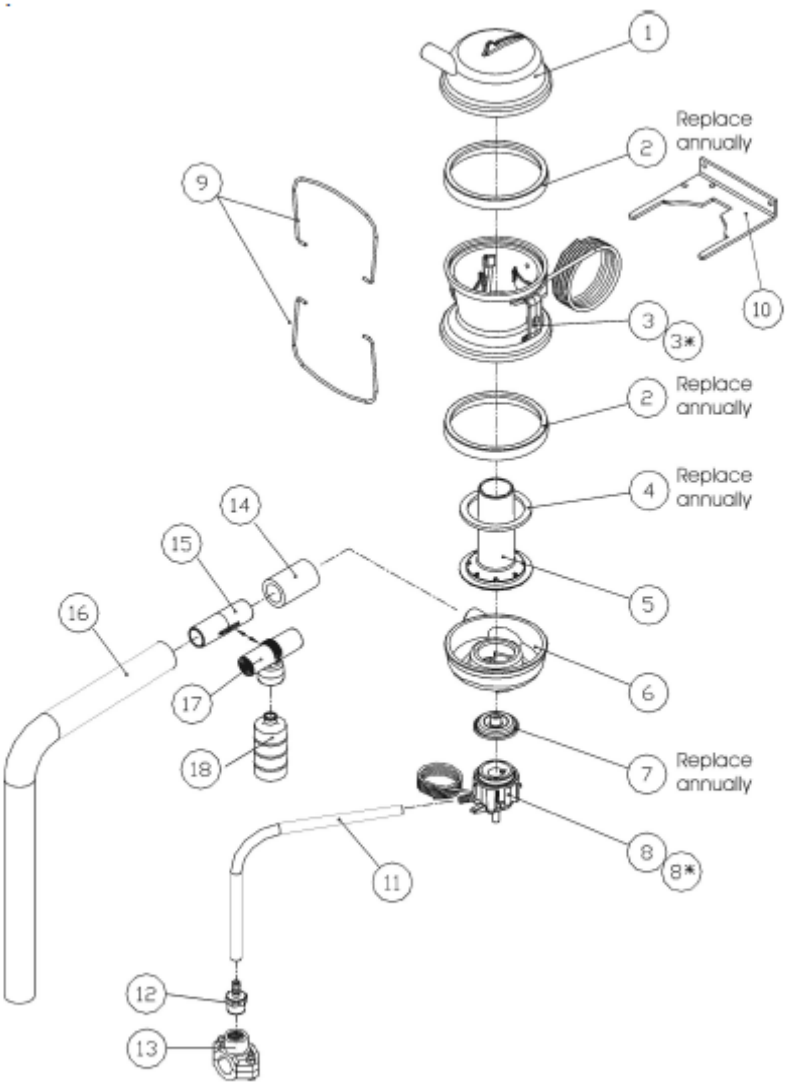
Depending upon local configurations, attached to the exterior of the milk meter body may be:

- A fat sampler attached to the milk outlet. Information about the fat sampler appears below.
- A single vacuum shut-off valve. Upon cluster removal, this valve shuts the vacuum to the cluster.
- A triple diaphragm valve, side mounted, back-flush assembly. This assembly allows for a back-flush between the milking of cows. The back-flush is advantageous in that it decreases the likelihood of cross-contamination of cows between milkings. Upon cluster removal, one of the three valves shuts off vacuum.

8.1 Silicone and rubber component replacement

Replace the following four components once a year: Refer to the illustrations below and on the following page.

:



- The rubber connector between the outlet port and the fat sampler (connector to outlet port in illustration on the following page).

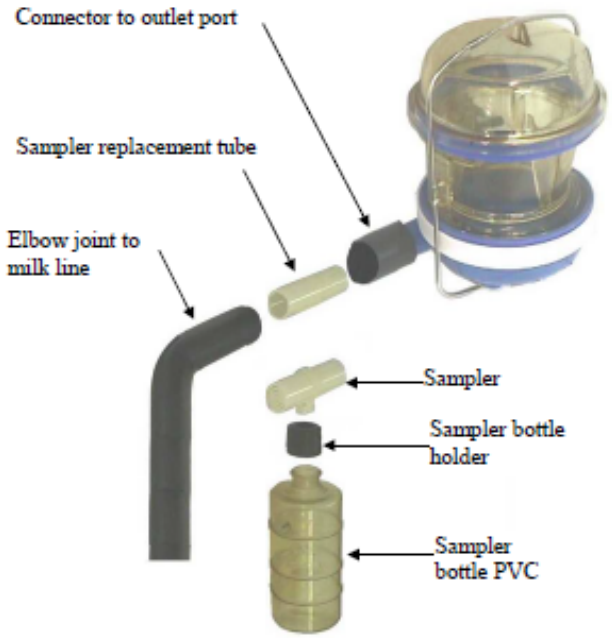
8.2 The fat sampler

International dairy authorities, as well as most local dairy authorities, require the sampling of milk during the milking process. Mounting a fat sampler enables the dairy to comply with these regulations.

Mounting the Fat Sampler

The fat sampler is mounted between the outlet port and the elbow joint to the milk line.

NOTE:	During normal milking, when not sampling, a sampler replacement tube fills the gap reserved for the fat sampler.



Fat Sampler Operation

The fat sampler is made up of a sampling bottle and a sampler head.

Milk is sampled each time the meter body is emptied. As the milk flows out of the milk meter body, a small quantity is diverted by the sampler head into the sampler bottle. This method assures sampling during all stages of the milking session.

9 Chapter 7. Troubleshooting

This chapter contains information about error messages.

Error messages

Error messages appear in the milk yield field and are accompanied by flashing red parlor lights. Error messages alert milkers to *Afiflo 2000* operational faults.

E01 Error Message

The E01 error message indicates an overload or short circuit in either of the eight Afiflo outputs.

When an error occurs, the E01 message alternates on the display with a message indicating the location of the faulty output. The message is made up of the word **OUT** followed by a number. The number indicates the location of the faulty output.

The outputs, and the numbers representing them, are listed below:

Output	Number
Solenoid valve	1
Removal	2
Sweep	3
Water	4
Air	5
Strip	6
Puls-R	7
Puls-F	8

E02 Error Message

This message indicates that the milk valve has been in the Up position (open) for an abnormally long time, and may be stuck in that position.

E03 Error Message

This message indicates a communication problem. Call the dealer for service.

10 Appendix. Milk meter software version 19.01

A memory chip in the control box contains software that controls the milk meter. Milk meter software version 19.01 includes some additional features, and some additional error messages. This appendix explains these new additions.

Additional Features in Software Version 19.01

In addition to the standard operations described in this manual, milk meter software version 19.01 includes some additional functions:

- Cluster level can be toggled by pressing a key, after the cluster removal process has finished.
- For parallel parlors, clusters can be automatically lowered, after each cow is finished, to avoid cluster interference during cow treatment.

- A pulsation ratio of 55:45 can be set for the beginning phase of milking.
- A "Quick removal" feature reduces over milking in the last phase of milking.

These features are explained in greater detail on the following pages.

The above features require milk meter software version 19.01 or above. If your meters have such eprom version, you may ask your dealer for assistance in setting these features.

To identify the eprom version inside your meters refer to the note below.

Note	If milk meter software version 19.01, or higher, is operating your milk meters, the software version can be identified from the milk meter display panel when entering programming mode. To check the software version in the milk meter: 1. Press  &  (simultaneously) to enter programming mode. 2. Observe the milk yield display:  • If *19.01* (or higher) appears for a few seconds, then the new features and additions can function in the milk meter. • If *19.01* (or higher) does *not* appear, then a previous software version is controlling the milk meter, and the additional features will not function. 3. Press  to exit programming mode.

10.1 Toggling cluster level

The milk meter, in accordance with the milking procedure, controls the position of the milking cluster, together with the vacuum supply to the cluster.

- When the meter is in milking mode, the cluster is lowered and the vacuum is open.
- When milk flow through the meter drops, vacuum to the cluster is blocked and the removal piston retracts the cluster from the cow. This is referred to as Removal mode.

In some situations, clusters hanging in the removal position interfere with cow treatment. This feature allows the milker to lower the cluster without opening the vacuum to the cups, and return it to the removal position. This is done by pressing the removal button () on the display.

After the cluster removal process is finished, pressing  lowers the cluster. Pressing it again returns the cluster to the upper position.

Automatic Lowering of Clusters after Removal

This feature is designed for parallel parlors. When this feature is enabled, clusters are lowered automatically, after the cluster removal process is finished. This is convenient for cow treatment. Clusters remain in the lower position until  is pressed, to milk the next cow. When  is pressed, the cluster is raised to the upper position and then is immediately lowered, with vacuum.

Please note:	To activate this parameter, a "Cluster clearance" parameter must be set to a value of at least one. This defines a delay time between the cluster removal process and lowering of the cluster. Ask your dealer for assistance.

Pulsation Ratio of 55:45 at the Beginning of Milking

A pulsation operation ratio of 55:45 can be set for the start of milking. After the milk meter body is emptied the first time, pulsation ratio is the normal milking pulsation ratio.

Please note:	To activate this feature, a parameter must be set. Ask your dealer for assistance.

"Quick Removal"

This feature halves the delay time for removal at the end of milking, thereby reducing over milking in the last phase of milking.

Please note:	To activate this feature, a parameter must be set. Ask your dealer for assistance.

Troubleshooting

Some notes on troubleshooting are explained on this page.

Additional Error Messages

In milk meter software version 19.01, some additional messages aid in troubleshooting:

When E 02 alternates with uALu ("valve") in the milk yield display of a display panel, a solenoid extending from the meter is malfunctioning.

When E 03 alternates with S- -C ("Serial Communication") in a milk yield display, there is interference in communication.

When E 06 alternates with L - -P ("Low Power") in the milk yield display of a display panel, power supply to the milk meter has dropped to a level of 18.5 Volts.

Checking Load

If you suspect that a milk meter is malfunctioning, before doing any other checks, verify (or ask your installer to verify) that the proper load of default parameter values is entered in the milk meter.