

## FLO-MASTER™ MILK METER

## Manual Meter Drain-Down

The operator can use this function to drain the meter manually if the gate switch, which normally triggers automatic meter drain-down, should malfunction. Because the final milk weight does not appear until after the drain-down process is complete, this command may also be used to get a complete milk weight total before the exit gate opens. To manually drain the meter, the operator presses "F4" and "send"



This will cause the meter to open the drain valve after a brief delay, and the stall unit will measure the amount of milk remaining above the low level reed switch. On occasion, the float will be resting at the lower reed switch position, in which case there will be no additional amount added to the display. This is because the tare weight (approximately 2.5 pounds of milk between lower reed switch and bottom of upper chamber) is preprogrammed in the stall unit and added to the first milk yield displayed.

**NOTE: The bellows valve remains open for approximately 35 seconds to allow milk and foam to drain at end of milking. Subsequent milkings cannot begin until the 35-second interval has elapsed.**

## Butterfat Sampler

The butterfat sampler is not designed for cleaning in place. Prior to installing the butterfat sampler, be certain that it has been properly cleaned and sanitized and the milking system has been shut off. Attach the sampler top cover (1, Figure 2) and the short coupling tube (2) to the sampler before attaching it to the milk meter.

Remove the bottom cover plug (3) from the milk meter and install it in the top cover (1) of the sampler. Then remove the milk drain tube from the meter and attach it to the bottom connection (4) of the sampler. Adjust the tube on the sampler so that the sampler aligns with the milk meter.

**CAUTION: Do not attempt to attach the milk drain tube to the sampler with the sampler already attached to the meter. This will put excessive strain on the sampler cover and may cause it to break.**

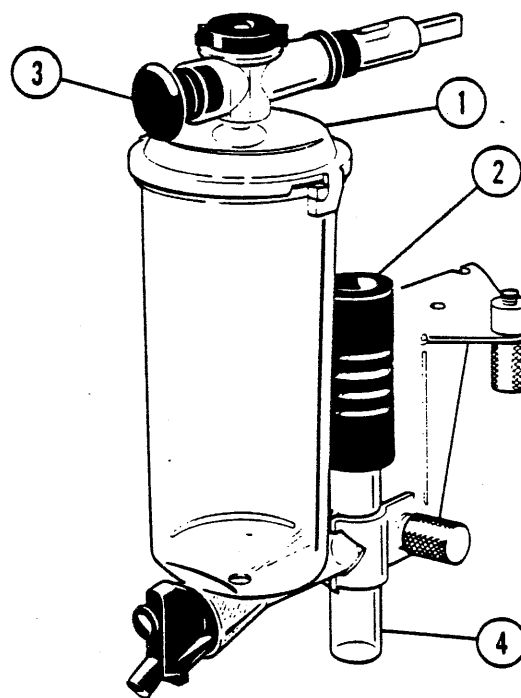


Figure 2. Butterfat Sampler

Align the short coupling tube with the drain connection on the milk meter. Adjust the tube to allow the sampling nozzle of the sampler to align with the sampling port on the milk meter.

**CAUTION: To avoid excessive strain on sampler cover, DO NOT insert the nozzle into the sampling port and then rotate the sampler into position to fasten the coupling tube onto the meter.**

Seat the sampling nozzle carefully into the sampling port. Be certain that the sampler is aligned with the vertical axis of the milk meter after the installation is complete (see Figure 3). The sampler is now ready for operation. With the sampler properly installed on the milk meter, operation is completed as follows:

1. During milking, turn the sampling plug to the **Milking position** (horizontal). (See Figure 4.)

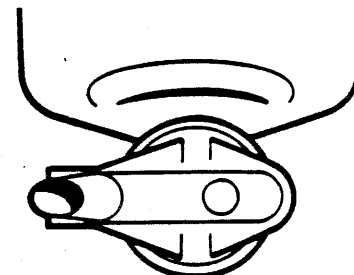
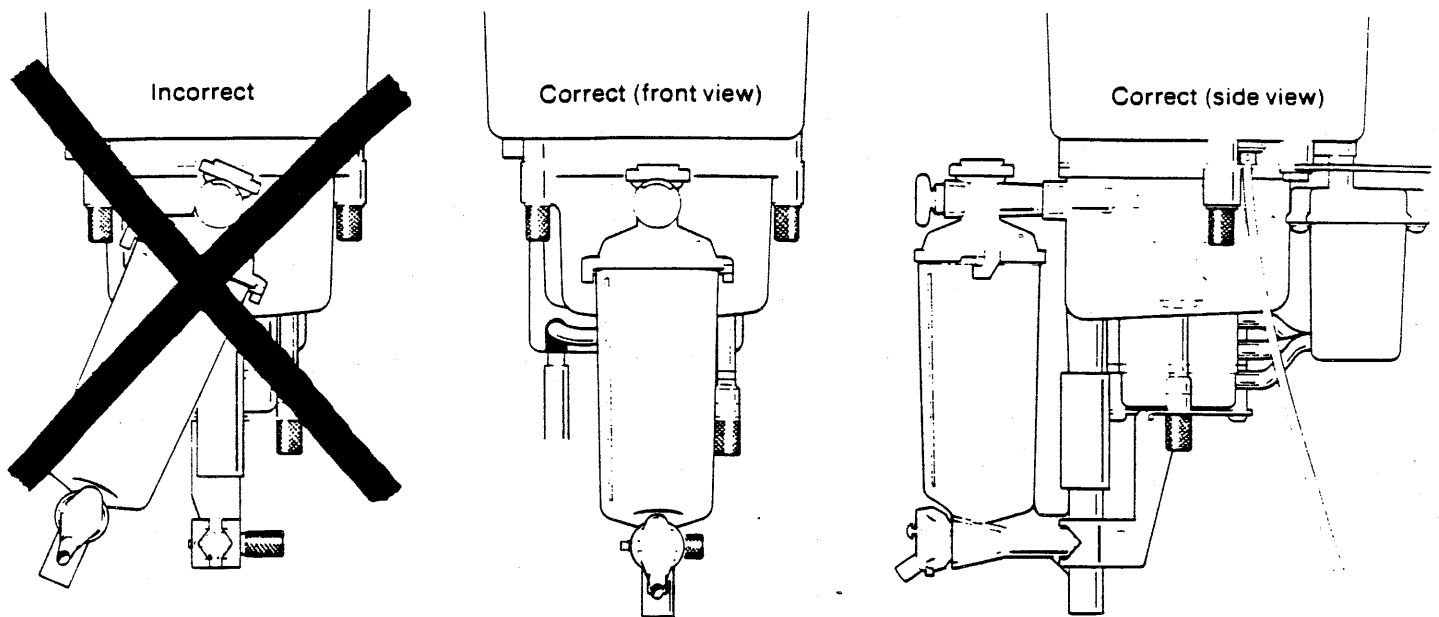
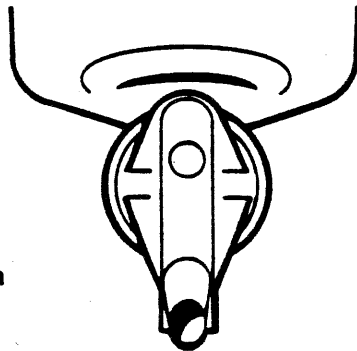


Figure 4.  
Milking position



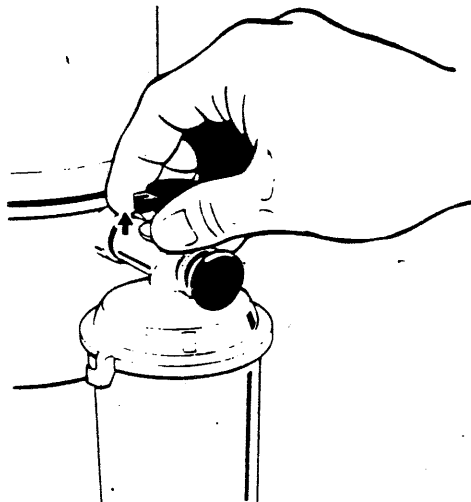
**Figure 3. Attachment of Butterfat Sampler**

2. After milking is completed and drain-down occurs, turn the sampling plug to **Agitation** position (nipple down). The sampler will now let air flow into milk sample for agitation (see Figure 5).



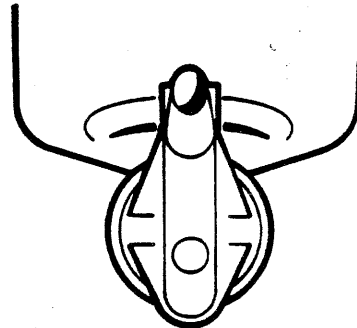
**Figure 5.  
Agitation position**

3. After 5 seconds of agitation, lift the **top valve** on the top of the butterfat sampler to its **Sample** (top) position as shown in Figure 6. Milk will now flow out of the nipple.



**5** **Figure 6. Sample Position**

4. When a sufficient sample has been drawn off, turn the sampling plug to the **Drain** position (nipple up). (See Figure 7.) The milk remaining in the sampler will flow out of the milk drain tube. After milk has drained out, the top valve should drop to the milking position.



**Figure 7. Drain Position**

5. When the sampler has drained at the end of milking, turn the sampling plug back to the milking position (horizontal).

**NOTE: The butterfat sampler is not designed to be cleaned in place. It must be completely disassembled and thoroughly cleaned, manually, with proper washing solution.**

# DESCRIPTION

Milk from the milk claw enters the milk meter tangentially through a tube attached to an inlet (1) on the cover (2) of the top chamber (3). The milk flows down the sides, filling the top chamber until it reaches the level (high level) at which the float/reed switch (4) is preset to activate the bellows valve (5), which then opens, releasing the milk from the top to the bottom chamber (6) and into the pipeline. The milk is measured as it passes from top to bottom chamber. When the milk reaches the low switch level, the bellows valve closes. This process continues until milking is completed. The average flow rate of the milk through the valve remains constant; the length of time the bellows valve is open is measured. The time is then converted into pounds of milk by the microprocessor in the stall unit (7). When milking is completed and the cow exit gate opens, the gate switch triggers "drain-down" of the milk remaining in the top chamber; this milk is then measured and added to the cow's total milk yield, which appears on the stall unit digital display (8) and remains until milking of the next cow begins.

There are specific features about the meter construction that reduce the effects of foam on meter accuracy. In addition, passageways are provided so that wash water can clean all interior surfaces of the meter which are exposed to milk. Air passageways are provided to minimize vacuum variations between upper and lower chambers.

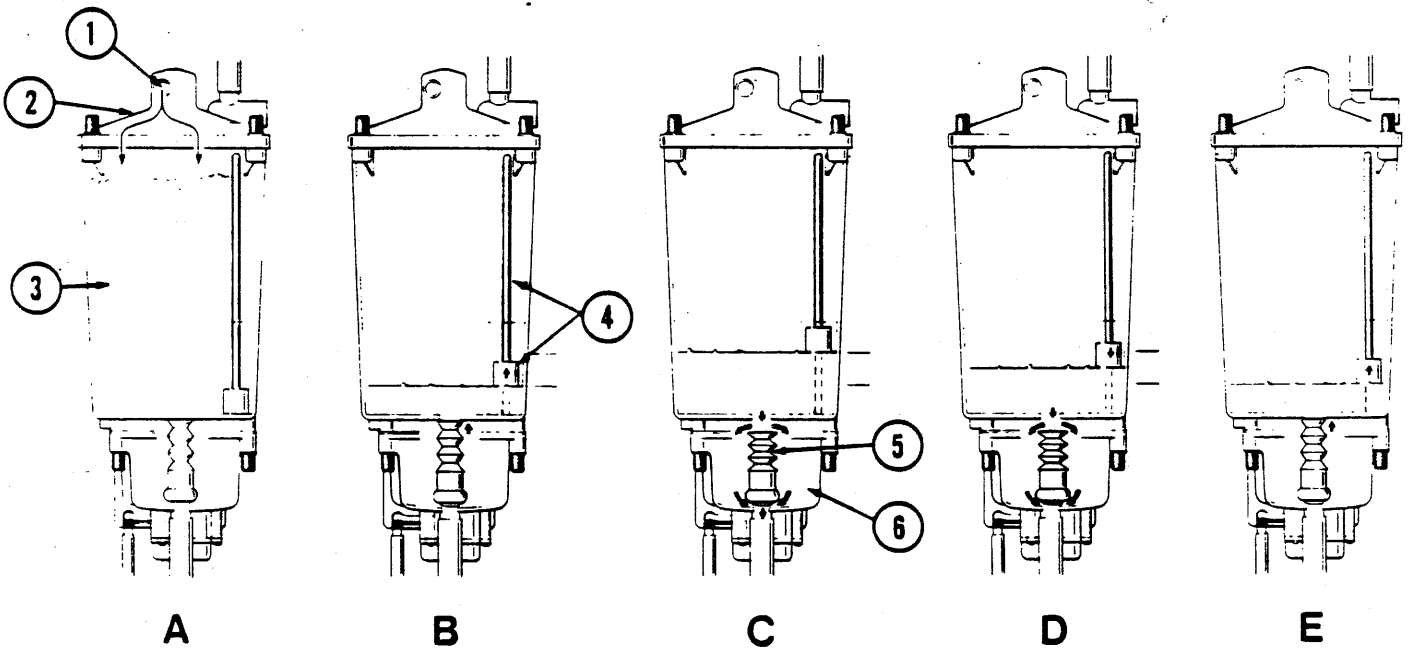
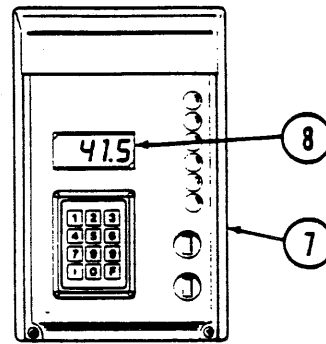


Figure 1. Functioning Principle of the Flo-Master™ Milk Meter

- A. Milk enters top chamber.
- B. Milk starts to fill top chamber; float rises.
- C. Float reaches preset reed-switch high level; bellows opens.
- D. Milk drains into bottom chamber; stall unit monitors valve open time and converts to pounds; float descends.
- E. Float reaches preset low level on reed switch; bellows closes and milk begins to fill top chamber again.

# OPERATION



**CAUTION:** All components of the Flo-Master™ Milk Meter must be properly installed and assembled with all gaskets in place and milk and wash hoses attached before proper milking and metering operation can occur.


## Operating Procedure

After power is provided to the system, the following code will be displayed on the stall unit until the first cow starts milking. This signifies that the unit has been "powered up" and is ready for milking.



## Manual Cow Entry

The manual cow entry command is an option which can simplify recording the milk weights. To enter the cow number, press the cow number on the keyboard. The digits will be displayed and shifted one digit to the left as they are entered. After the last digit has been entered, press the


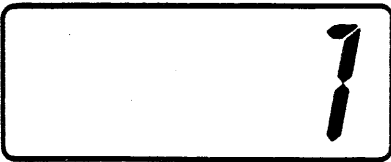








"Send" key (  ) on the keyboard. This will

register the cow number, which will be displayed in an alternating sequence with the current milk yield as soon as milking begins.

The cow number can be changed at any time during milking by using the procedure outlined previously. If a mistake is made during cow number entry, press "Send," then key in the correct cow number, then press "Send" again. This will update the display. If the operator chooses **not** to enter the cow number, "CCCC" will be displayed in alternating sequence with the milk yield as soon as milking begins.

## Example:

Suppose cow number 123 is in milking position. The following steps show the sequence of entries and displays to manually identify the cow.

	Press:	Display
1.		
2.		
3.		
4.		 I.D. displayed until milking begins (as indicated by first "high float")
		 Then, milk yield displayed for one second;
		 I.D. displayed for one second

As soon as milking begins as indicated by milk reaching high float, the cow number and the milk yield will be displayed alternately when upper chamber is filling. When upper chamber is draining, the added milk yield will be calculated and displayed.

## CHECKING FOR METER ACCURACY

### Tools and Equipment Required

- Leveled meter on mounting bracket.
- Vacuum source providing stable 12 to 15 inches of vacuum.
- Vacuum trap which also serves as water collecting container (pail milker).
- Hose (approximately five feet long) with flow restrictor (8304601-01) installed 24 inches from end which is attached to meter inlet.
- Milk pail or container capable of holding 40 pounds of water.

### Procedure

1. Attach correct end of hose with flow restrictor to milk meter inlet. Using another hose, connect vacuum source (milk line vacuum) to vacuum trap and also connect vacuum trap to milk meter outlet nipple. See Figure 39.
2. Fill pail or container with exactly 34 pounds of water and locate near the meter.
3. Apply vacuum to the vacuum trap and milk meter. Place the loose end of hose containing the flow restrictor into the water in the pail and suck all the water through the meter into the trap. (Avoid turbulence in pail and do not pull large volumes of air through meter as this will cause inaccurate metering.)
4. Record meter reading.
5. Perform the following calculation to determine the p-value.

$$\frac{\text{Meter reading}}{32.5} \quad \times 100 = \text{p-value}$$

6. Repeat steps 2 through 5. If both p-values are the same and they fall between 97 and 103 percent (31.5 to 33.5 pounds) the meter is considered accurate.
7. If the two p-values differ, perform a third test. The meter is considered acceptable if no single p-value is outside the range of 90 to 110 percent of the recorded water weight (29.25 to 35.75 pounds) AND if the average of the three p-values is within 97 to 103 percent (31.5 to 33.5 pounds).