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DeLaval milk meter MM27BC

1 Task Schedule

No	Service task	Frequency	Max. interval	Replacement parts or kits
1	Replace MM27BC gasket	2000h	12 months	▪ 91470502
2	Replace fat sampler parts	2000h	12 months	▪ 85132601
3	Periodic checking and hints for sampling	2000h	12 months	▪ 91548202 ▪ 89634701
4	Calibration	2000h	12 months	
5	Change diaphragm of the RS-valve	4000h	24 months	▪ 85850901 ▪ 85531630
6	Replace rubber tubes	2000h	12 months	
7	Replace silicon tubes	4000h	24 months	

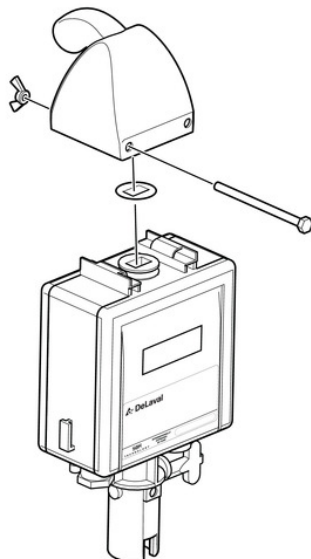| Frequency	2000h of operation
Max. interval	12 months
Estimated time:	5 min
Service type:	Replace

No 1 Replace MM27BC gasket

Replacement parts or kits:

▪ Art No: 91470502

Required tools:

▪ Wrench

1. Dismount the MM27BC.

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4. 3. Lift off the meter inlet and change the gasket mounted in the inlet.

Frequency	2000h of operation
Max. interval	12 months
Estimated time:	5 min
Service type:	Replace

2. Unscrew the wing nuts and remove the bolts.

5. Place the new gasket tightly into the cavity of the inlet tube with the correct orientation to match retangular channel. It is important to press the inlet tube tight against the milk meter to compress the gasket as the screws are reinserted.

No 2 Replace fat sampler parts

Replacement parts or kits:

- Art No: 85132601

2. The silicon tubes and rubber bottle holder must be replaced before they have deteriorated, typically 1-2 years.

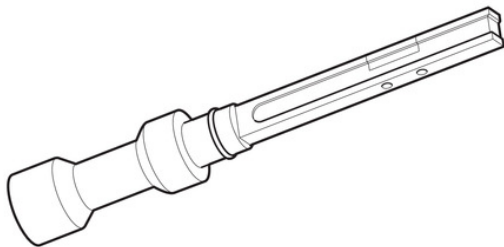| Frequency	2000h of operation
Max. interval	12 months
Estimated time:	30 min
Service type:	Inspect

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1. The fat sampler has two O-rings and a rubber gasket or sampler plug that must be replaced once a year.

No 3 Periodic checking and hints for sampling

Required tools:

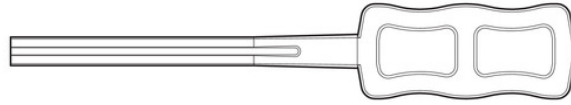- 91548202 Test probe for MM27BC.
- 89634701 MM25 / MM27BC cleaning probe

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Fig. 1: Test probe with optical properties that simulates milk. The test probe fits exactly the interior oft the MM27BC milk channel.

Fig. 2: The MM25 tool brush can be introduced into the MM27BC to remove dirt without damaging the milk meter body.

The testing procedure should be carried out with meters that are cleaned properly, i.e. after good parlour cleaning cycle.

The purpose of the periodic checking is to determine whether the MM27BC is still functioning as it did at the time for the installation and calibration. Reference values and information shall be noted at the time for calibration of the MM27BC milk meter. The new values at the time for the periodic check should be noted and compared with the initial values. See ↻ Chapter 3.1 "Periodic routine test form."

If one or more out of the mentioned tests fail, the meter should be cleaned, checked again and replaced.

Note! *A test probe belongs to each installation and should be contained on the premises, safe from mechanical damage and dirt.*

MM27BC visual inspection

1. ▪ Check the milk unit from cluster to meter for abnormalities with respect to leakages, broken tubes, constrictions and so on.
   ▪ Visually inspect the MM27BC measuring channel to detect dirt, protrusions or other abnormalities, which may effect the performance of the milk meter.

Milking parlour parameters

2. A general visual test of all milking compo-

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nents should be carried out to verify that there are no big changes of equipment installation or leakages.

The five values below represent milking point parameters that if significantly changed may affect the MM27BC bias and therefore the results of the milk yield measurements.

If the routine test should fail, the MM27BC meters must be recalibrated with milk.

- Vacuum level:
  If the vacuum level has changed by more than 2.5 Kpa since the installation test, the routine test fails.
- Claw type:
  If another significantly different claw is installed, the routine test will fail.
- Milk tubes:
  - If the diameter of the milk tubes between milking cluster and the milk meter has been changed, the routine test fails.
  - If the length of the milk tube between milking cluster and the milk meter has been changed by more than +/- 10%, the routine test fails.
  - If the milk tube between MM27BC meter and milk pipe line has been changed in diameter or in length, the routine test fails.
- The height of the MM27BC meter relative to the cow platform:
  If this distance has been changed by more then 7 cm, the routine test fails.
- Air inlet:
  Increased air inlets or leakages will cause deviations in the reading of the MM27BC milk meter. If the air inlet has significantly changed by more than 10% compared with the installation test, for example by air leakages along the cluster to the MM27BC milk meter, the routine test fails. The air inlet can be observed by visual inspection and by measuring the air leakage using the VPR100.

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Check of MM27BC internal parameters

3. Each MM27BC meter has the following internal parameters:

- Bias-Factor:
  One value that is used to fix the measured MM27BC bias.
- Sub-Software:
  This number represents the algorithm used by the MM27BC to compute the yield. It is set when installing the MM27BC and must remain constant. (E.g. low line.)
- Optical channel:
  The milk channel and optical field must stay the same as it was at the time for calibration.

If by some malfunction the parameters above have been changed, these parameters must be restored to the original values. If not, the meters should be recalibrated with milk.

Use VPR100 or PSION to read the parameters.

Check of internal parameters:

The meters Optical channel must be checked. The milk channel characteristics and optical field must stay the same as it was at the time for calibration.

The test probe is simulating a milk flow. The MM27BC flow reading is compared to the original reading obtained during the installation test. If the obtained value is the same, then the optical field and milk channel characteristics have all stayed the same and the MM27BC measures as during the installation test.

For this test, a probe and the remote control unit (Psion/VPR100) are required. The probe should be cleaned before usage and as the probes are not perfectly identical; the same probe should be used during the routine testing. The probe belongs to the milk-

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ing parlour and should be stored under good conditions on the farm, preventing pollution and/or mechanical damage. Such will affect the test results.

Principle of the test:

3.1. Set all MM27BC units to technician mode using the remote control (1:8:3:1, on the PSION remote or by pressing technician mode tool on the VPR100, see picture).

3.2. Wash the test probe GENTLY using any soft soap. Dry the probe afterwards.

3.3. Verify all MM27BC-channels are dry and clean.

3.4. Wait 10 minutes to verify all units are perfectly stable. If on some MM27BC units an **Hxxx** message show, wait until it disappears. The **Hxxx** message implies that the MM27BC internal temperature is not stable yet.

3.5. While the MM27BC is in the technician mode and the MM27BC channel is dry, the meter performs an internal self test. The self test status is shown on the MM27BC display as **Cxxx** (a number between 85 and 100) every 10 to 20 seconds. As long as the meter shows the **Cxxx** message the self test is ok. If no **Cxxx** message is seen or if **SRVx** message appears the Self Test failed.

3.6. If the Self Test failed the operator should verify that the MM27BC channel is dry and clean and wait for the self test status again. If still the MM27BC self test fails, the operator can try to fix the problem by using the Psion "RECAL" option. If still the MM27BC self-test fails the MM27BC meter is defective and should be replaced.
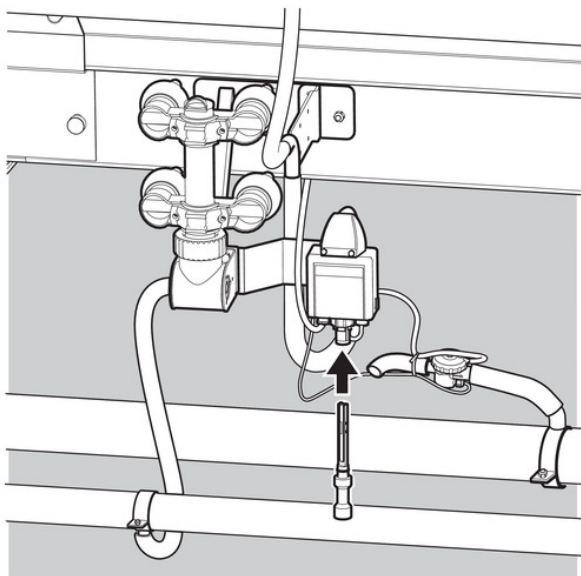
☞ Ratio min = Ref MinF / Current MinF

Ratio max = Ref MaxF / Current MaxF

Write the **Ratio min** and **Ratio max** values on the "DeLaval milk meter MM27BC Periodic routine test form". If **Ratio min** and **Ratio max** are between 0.98 and 1.02 the meter is OK. Values outside the 0.98-1.02 range are too big and the meter fails for the routine test. In case of FAIL the MM27BC channel should be cleaned and inspected visually for any abnormalities. Note that most of deviation from the perfect 1.00 result is usually because the probe test is very sensitive. Small changes in the probe surface and/or cleanness will have affect on the measurement.

Failed meters

Meters that failed the test should be inspected and if necessary cleaned internally and examined again. If a MM27BC Self test fails, a RECAL command using the Psion or VPR100 may solve the problem.

A meter that continues to fail after

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additional cleaning should be re-placed.

Reporting of the results

The results of the periodic checking of the milk meters will be reported to those concerned, the farmer, the main supplier and to the national milk recording organisation.

Cleaning tool:

Insert the tool brush into the MM27BC channel to remove dirt.

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3.7. If the **Cxxx** values are lower than 80, a RECAL of the MM27BC can option-ally be done, although NOT man-datory. After RECAL the meter will with display **Cxxx** again but the **Cxxx** values will be between 98 and 100.

3.8. Insert the test probe into the MM27BC channel. After a few seconds the meter should display a **PASS** mes-sage and two numbers. The two values represent the flows measured by the meter. The lower number is the minimal flow and the higher the maximal flow measured. The numbers shown are 4 digits and usually be-tween 3.000 and 4.000 kg per minute.

3.9. Write the minimal and maximal flows on the "DeLaval milk meter MM27BC Periodic routine test form" under **Cur-rent MinF** and **Current MaxF** col-umns.

3.10. During the routine test, the ratio be-tween the **Current MinF** and **MaxF** to the **Reference MinF** and **MaxF** should be calculated.

No 4 Calibration

Required tools:

- 25-–30 litre bucket.
- Bucket cover with two nipples, milk and vacuum.
- Rubber milk tube 50-–80 cm. length, de-pending on the distance between the MM27BC outlet to the nipple on the bucket.
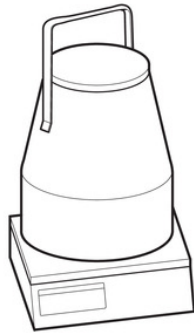- Electronic scale, accuracy ± 5 g. (Enter values in grams)

Calibration routine:

Note! After one week's use of the milk meters or after 30 milked cows per milk meter, the accuracy should be checked and the bias cor-rected.
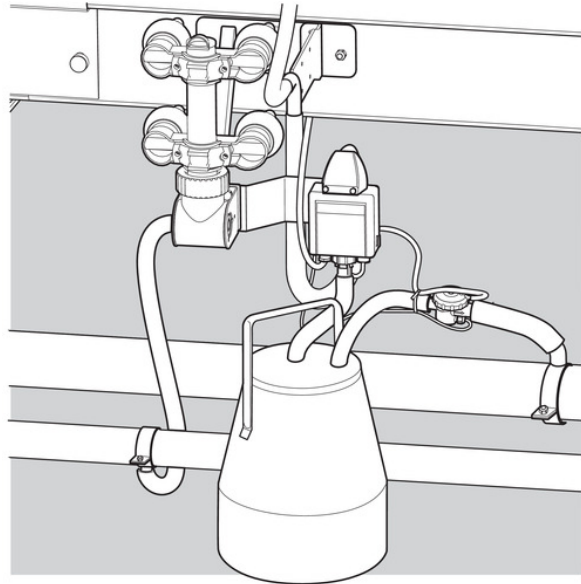
- Check the air bleeds before calibration.

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- Fixed air inlets should be used to obtain best result.
- The calibration must be carried out with real milk (during milking).

Note! *Collect reference values for the Periodic testing using test probe.*

Installation of the bucket for calibration:

It is important to secure the CV is installed between the bucket and the milk line to avoid remaining vacuum on the milk bucket.

Remove the milk tube from the MM27BC and attach on the bucket without stressing the conductivity cable.

Add a new milk tube between the milk meter output and the milk bucket.

Frequency	4000h of operation
Max. interval	24 months
Estimated time:	5 min
Service type:	Replace

No 5 Change diaphragm of the RS-valve

Replacement parts or kits:

- Art No: 85850901
- Art No: 85531630

The article numbers above are kits for 1 and 10 pcs.

1. Open by turning the cover by turning slightly counterclockwise.

2. Clean gently. Do not disconnect the cable.

3. Replace the diaphragm.

No 6 Replace rubber tubes

Frequency	2000h of operation

Max. interval	12 months
Estimated time:	10 min
Service type:	Replace
Frequency	4000h of operation
Max. interval	24 months
Estimated time:	10 min
Service type:	Replace

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1 4. Close the cover by turning it slightly clock-wise.

2. Replace tubes with the service items.

No 7 Replace silicon tubes

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2. Replace tubes with the service items.

1. Find kits that include silicon tube service items in original parts.

2 Calibration routine in VPR100

After the first calibration it is important to take reference values for the periodic checking of the meters using the test probe. Please read the instructions and recommendations from ICAR on periodic checking of MM27BC and how to collect reference values using a test probe.

2.1 Equipment

- VPR100 Software later than 08C
- PC cable 92987001
- Programmer cable 91677780

2.2 Test Procedure

1. Verify that the vacuum level in the milking parlour is between 42 and 44 kPa at low line, 48 or 50 kPa at high line.

2. Check the milk tube connections from the milking cluster through the MM27BC up to the milk line, Verify that there are no air leaks.

3. Check the condition of the milk cluster.

4. Check and verify that there are no error messages on the MM27BC display when it is connected to the power.

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Verify that it is clean, without cracks. Liners and stubs should also be in a good condition without cracks. Check also the air bleed on the claw so that it is not blocked.

Note! *The MM27BC is sensitive when it comes to vacuum leaks, restrictions and blocks so it is of great importance that the installation is according to guidelines.*

When the installation is checked and approved proceed with the actual calibration process:

1. Connect the IR reader to the VPR100

2. In the VPR100 go to menu for MM25W/MM27BC. Choose ALCOM. Use the VPR100 to read all Alcom node number in the parlour. Mark node number on a piece of Tape on each milkmeter. Make sure no milkmeter has the same number. If there are units with the same number reset them to another nr by punching in new number on the VPR100 and sending it to the milkmeter.
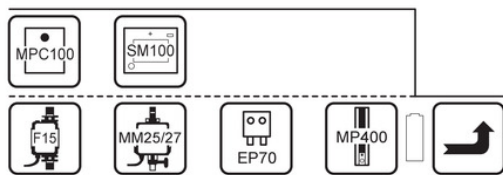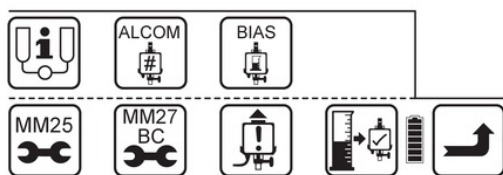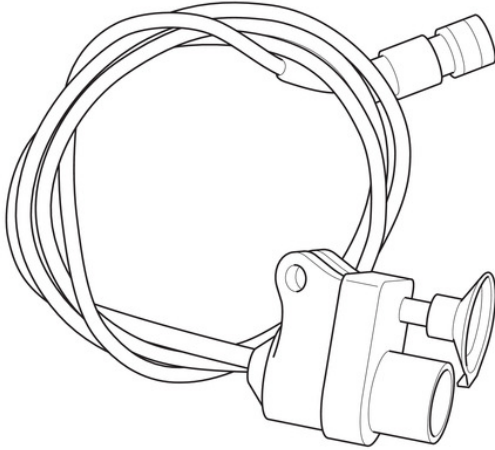
3. Setup Buckets at milking point. Mark each bucket with node number so that it belongs to that specific milking point.

4. When the milking is done push calibration on the VPR100 and read the milking points with buckets by pointing reader to the milkmeter. The VPR100 will automatically

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read node number and yield and store in memory.

Note! *You have to read the units before the milkmeter is reset for next cow. (Cows released).*

5

Note! *Be careful with the reader of the VPR100 – it easily picks up information from other milkmeters. You can omit values in the VPR by pressing "&" sign and erase the specific value.*

Note! *If you see an Icon with bubbles on the VPR this mean that the value is not good enough and can not be used.*

7 6. When you have at least 4 weights per milking point written down on a paper enter them in to the VPR100 per node nr and in the right order. This is done by going into calibration menu, press hash key followed by pressing on the Alcom number that appears (default 80).Enter the MM27BC Alcom number and press return. Press on the screen and manually enter the scale weight. A new bias will be calculated.

8. When all node numbers are done, point the VPR100 (set in calibration mode) to the milkmeter, the right Alcom node number appears and the calibration data. A "enter new bias" icon appears, press the icon and wait for the "saved" sign. If you have entered the weights directly into the VPR100 go to next node nr and send new bias like above.

3   **Accuracy check**

Note! *The reference values shall be recorded at the time for the installation test just after the*

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calibration and compared to when doing the routine test with the test probe.

Every 12 months the MM27BC should be checked so that all internal parameters and software has stayed the same since calibration and installation.

Note! *It is very important that the same test probe is used for reference values and for periodic checking.*

1, Use the VPR100 or Psion (use the GPARS command) to read the meter Id (Alcom node), the bias value and the Sub software version (e.g. low line). Write down the parameters on the DeLaval Milk meter MM27BC Periodic routine test form, see chapter Periodic routine test form. Note down all information regarding installation like vacuum level, claw type, milk tube length and diameter, height of MM27BC as well as air inlet. If any of these parameters have been changed during the year a new calibration of the meter might be needed - the meter might not pass the periodic test.

2, Set the MM27BC into technician mode by pressing tools on the VPR 100 menu or on the PSION press 8: "TECHM" and then 1: "PARMS" . Then insert the test probe in the out let of the meter. After a few seconds the meter should display PASS on the display and two numbers. Those two numbers represent the minimal flow and the maximal flow measured. The numbers shown are 4 digits and usually between 3,000 and 4,000 kg per minute. Write down the minimal and maximal flow under reference MinF and reference MaxF. Calculate the Ratio min and Ratio max value, if it is between 0,98 and 1,02 the meter is ok.

3.1   Periodic routine test form.

DeLaval milk meter MM27BC Periodic routine test form
Reference date:
Test date:
Test probe serial number:

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Parameter	Reference	Current	Difference	Max. deviation	PASS
Vacuum level				2.5 kpa	
Claw type				No change	
Milk tube diameter				No change	
Milk tube length				< 10%	
MM27BC height				+/- 10 cm	
Air inlet				+/- 10%	

Mp#	Ref. bias	Curr. bias	Ref. sub soft	Ref. minF	Ref maxF	Curr. minF	Curr. maxF	Ratio min	Ratio max	PASS
1										
2										
3										
4										
5										
6										
7										
8										

Note! *Ratio min = Ref minF / Current minF*

Ratio max = Ref maxF / Current maxF

(The Ratio min and Ratio max value should be between 0.98 and 1.02)