

Instruction Book

DeLaval voluntary milking system

VMS model 2008

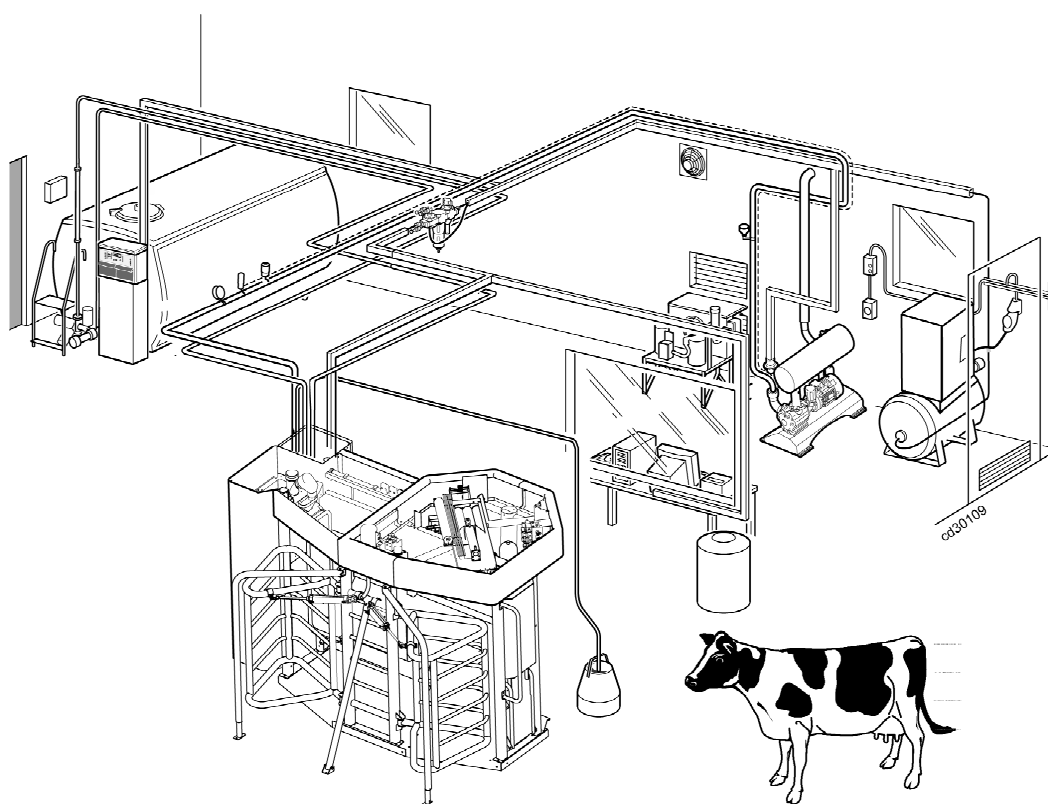




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EC Declaration of Conformity

Name of product: **DeLaval voluntary milking system VMS**
Type: VMS milking station, left: 94765080 through 82
VMS milking station, right: 94765180 through 82

The product complies with requirements of the following directives:

73/23/EEC, 93/68/EEC (Low Voltage Directive)
89/336/EEC (Electro Magnetic Compatibility)
98/37/EG (Machine Directive)

Harmonized standards which have been used:

EN 60204 - 1 :2006, (LVD)
EN 61000(2002)+A1(2002), EN 55011(1998)+A1(1999)+A2(2002), (EMC)
EN ISO 218-1:2006, EN775:1992, (MD)

National technical standards and specifications which have been used:

VMS0612-001 (test report EMC from Delta)
VMS0612-002 (test report LVD from Semko)
VMS0612-003 (test report MD from Semko)
VMS0612-004 (Technical construction file VMS)

Other identifying data:

The product is CE-marked.

Date: 2007-12-11

Signed:

Name: Andrew Turner
Position: Vice President
Business Unit: PA Milking Systems

Name and address of manufacturer:
DeLaval International AB
P.O. Box 39
SE-147 21 Tumba, Sweden

Name and address of agent:





DeLaval voluntary milking system VMS

Safety precautions

Warnings and cautions

Warnings and cautions provide important information that is intended to prevent incorrect or hazardous use of equipment, machinery or software.

The following list defines the different types used in this manual:

Danger: Refers to imminent and severe risk. Failure to comply with instruction will result in serious injury or death.

Warning: Refers to a potential but severe risk. Failure to comply with instruction could result in injury or death.

Caution: Refers to a limited risk. Failure to comply with instruction could result in minor injury or product damage.

Note: Is intended to draw attention to specific points of importance in the text.

The following signs are used in this manual:



- Risk of danger
- Risk of damage to the equipment



- Risk of electric shock



- Risk of laser radiation



- Risk of pinching



DeLaval voluntary milking system VMS

Safety precautions



- Risk of hot surface



- Risk of squeezing/crushing



- Risk for corrosive chemicals



- Risk of slipping on the floor



- Risk of falling into pit



Note: To ensure a safe and correct use of the VMS, read the manual before you start to use the VMS.

Safety during operation



Prohibited: Minors and unauthorized personnel are not allowed within the milking room, unless accompanied by a responsible adult with adequate knowledge.

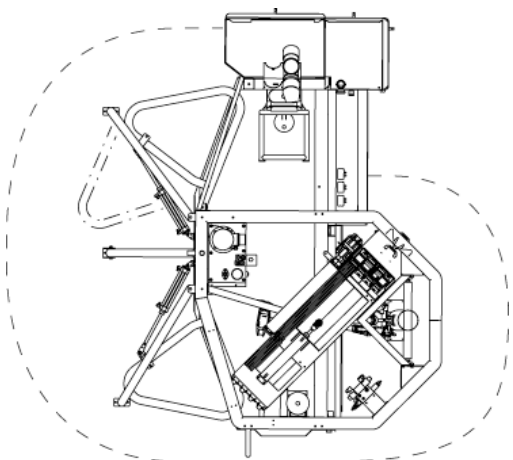


Warning: The VMS system should only be operated by personnel trained by DeLaval. This concerns all parts of the system.



DeLaval voluntary milking system VMS

Safety precautions



Warning: The area within the dotted lines is the working range for the milking station. This area is not safe when the milking station is in operation, especially in automatic mode. Do not stay in this area longer than necessary.

Note: Floor markings indicates the working range of the multi-purpose arm.



Warning: When pressing the emergency stop, the inertial energy in the multi-purpose arm will allow it to continue to move up to one meter. The multi-purpose arm will be totally stopped within approximately one second.



Service mode



Working mode

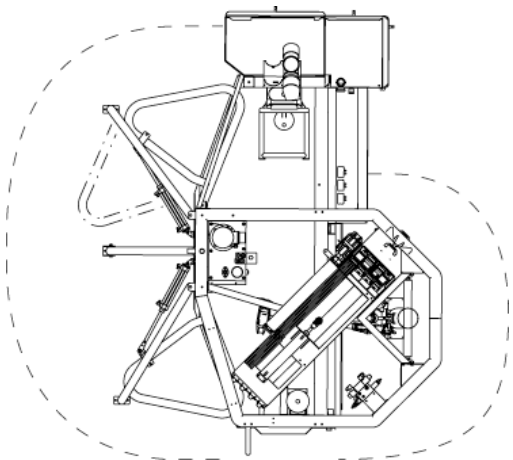


Warning: To avoid the risk of being injured by moving parts on the milking station, always set the service switch to service mode before entering the working range of the milking station.



DeLaval voluntary milking system VMS

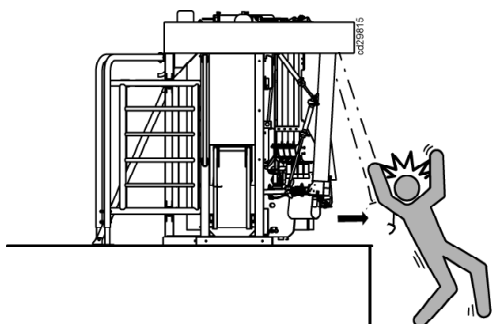
Safety precautions



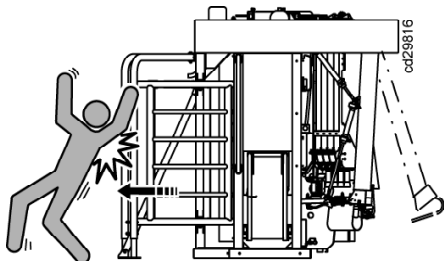
Warning: Do not allow unauthorized personnel and children to be close to the VMS system.



Warning: Risk of falling into pit (if present).



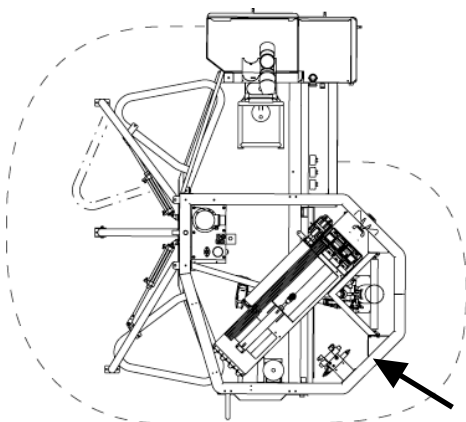
Warning: Do not stay within working range of the multi-purpose arm longer than necessary. If you need to carry out tasks within the working range of the arm, for example attaching teatcups by hand or checking udder health, always set the service switch to service mode, then park the arm. Deactivating the multi-purpose arm provides additional safety.



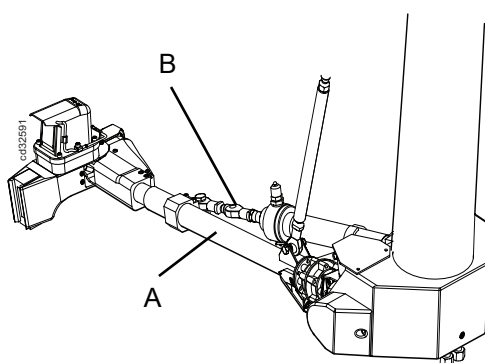
Warning: Do not stay within the working range of the gates. They can move without warning and there is a risk of being hit or squeezed. Always set the service switch to service mode if you need to work near the gates.



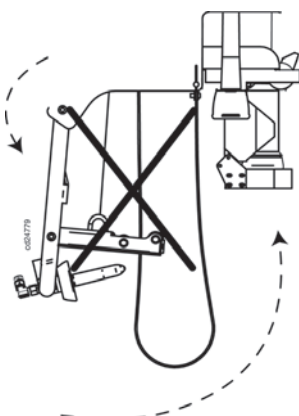
Safety precautions



Warning: Never put any part of your body between the multi-purpose arm and the magazine when the milking station is in operation. You may become seriously injured.



Warning: Keep away from the multi-purpose arm. Risk of pinching at the junction between the lower arm (A) and the cylinder (B). Your hand or fingers may become caught and crushed.

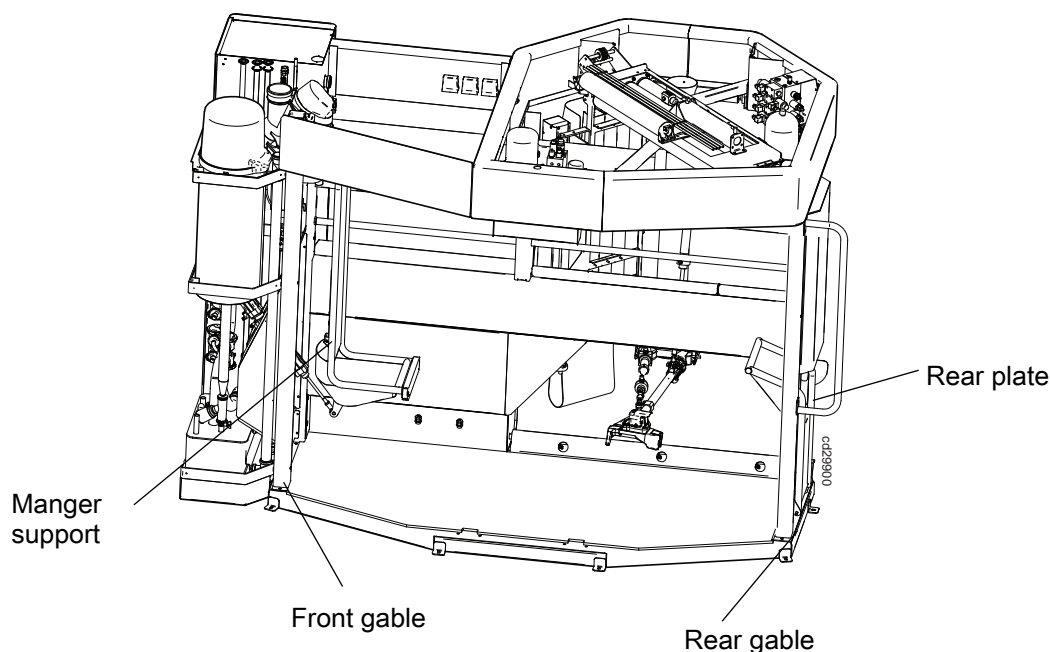


Warning: Keep away from the cleaning shelf area. During backflush and cleaning, the cleaning shelf tilts upwards and your hands or fingers may become seriously injured.



DeLaval voluntary milking system VMS

Safety precautions



Warning: Never put any part of your body between the rear plate and the rear gable, between the manger support and the front gable. You may become seriously injured.



Warning: Never put any part of your body inside the milking station when cow is in the milking station. You might be seriously injured.



Warning: The gates are automatically operated. Never enter the milking station without setting the service switch in service mode.

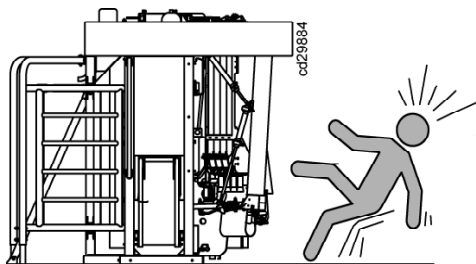


DeLaval voluntary milking system VMS

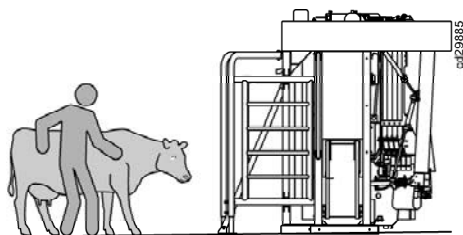
Safety precautions



Caution: Be careful not to hit your head on the structure overhead, when working in the milking station.



Warning: Always keep the floor around the milking station clean. A slippery floor poses a safety hazard.

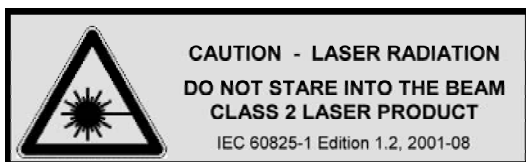


Warning: Make sure that every cow is given the time she needs to become accustomed to the milking station. A forced time schedule might make a cow panic during a milking session, which could result in injuries.



Caution: The sound pressure overrides 83dB(A) during teat cleaning.

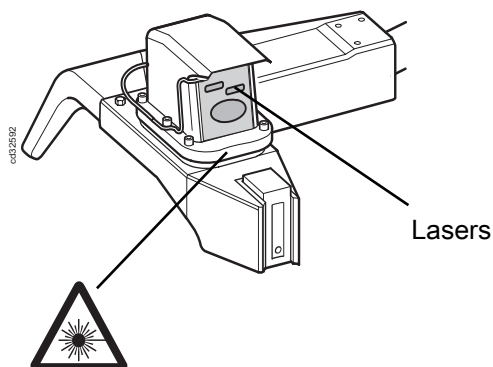
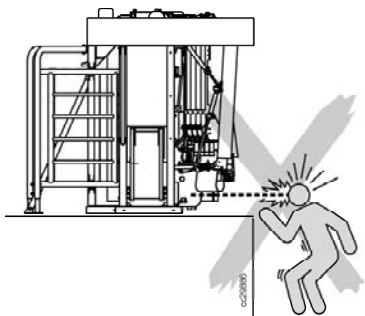
Laser radiation



Caution: Laser radiation. Do not stare into the beam.



Safety precautions



The lasers are used during the procedures listed below. The controls related to the procedures are performed on the touch screen, which are referred to windows and buttons. The names of the windows are printed in *italics*, the names of the buttons in **bold face**.

The lasers are used:

- When the multi-purpose arm is attaching cups. This concerns both automatic and manual mode. *Prepare Cow for Milking: Clean Teats; Teat Attach and Milking: Attach Cups Auto*. These buttons are only used in manual mode.
- When determining teat positions. *Robot Teaching: Teach All Teat Positions, Teach Teat Pos, Auto Teach*.
- When verifying teat positions and testing that the arm can find teats. *Robot Control: Test Start Positions, Attach Without Cups*.
- When testing the lasers. *Robot Service: Main Laser, Teat Laser*.
- When testing misc codes 55 (activates the two laser lines) and 66 (restarts the Camera unit). *Test misc codes: VMS > Robot Service > Test Misc*.
- When using the camera image menu to provide an image of what the Camera unit sees. *Camera image menu: VMS > Robot Control > Analyze Camera Image*.
- When starting the milking station by pressing Start (I) button on the On/Off box after an emergency stop.
- During maintenance and repair: when re-connecting the power to the camera unit.

Note: It is not allowed to dismantle the lasers.

Note: The lasers may not be adjusted on-site.



DeLaval voluntary milking system VMS

Safety precautions

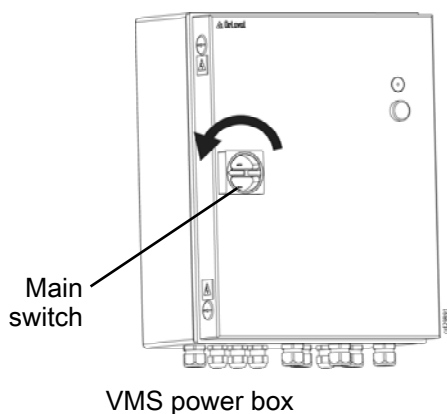


Warning: Use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation.

Safety during maintenance and service



Warning: Service should only be carried out by personnel with the proper training and authorisation. This concerns all parts of the system.



Danger: Always shut down the milking station and switch off the electrical power supply (by turning the main switch anti-clockwise) before service or repair of the electrical system is carried out. Use appropriate lockout/tagout procedures to make sure that the power is not switched on without your knowledge.

Note: Use the touch screen to shut down the milking station. The programs executed in the milking station will then be terminated properly.



Service mode



Working mode



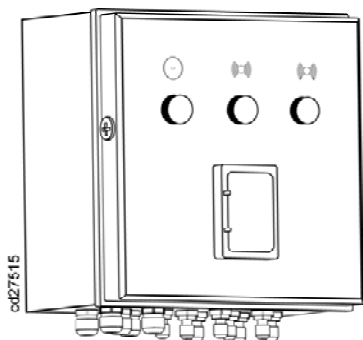
Warning: To avoid the risk of being injured by moving parts on the milking station, always set the service switch to service mode before entering the working range of the milking station.



DeLaval voluntary milking system VMS

Safety precautions

Guardmaster information is valid for the US only.

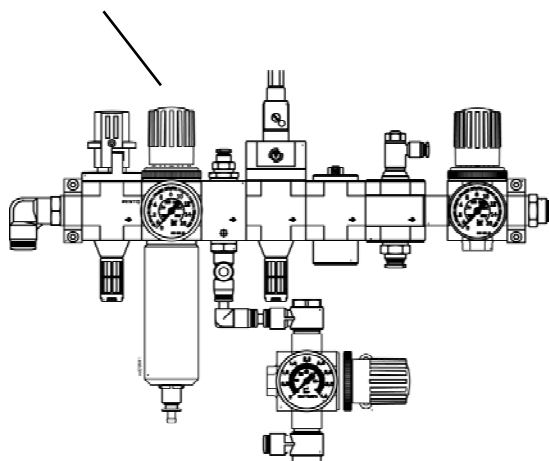


VMS guardmaster box



Danger: Always switch off the electrical power supply to the VMS guardmaster box before opening the cover to the guardmaster box.

Main valve for compressed-air to the milking station.



(Part of the upper beam.)



Warning: Always shut off the main compressed-air supply to the milking station before performing service or making repairs.

Note: Even if the compress-air supply has been shut off, be aware that the

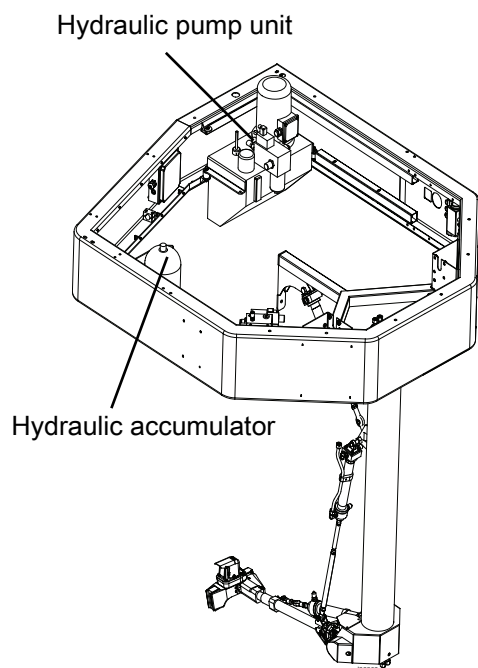


DeLaval voluntary milking system VMS

Safety precautions

multi-purpose arm can still move.

- If service switch is in working mode.
- If service switch is in service mode and the safety button is pressed, and some operation is started.



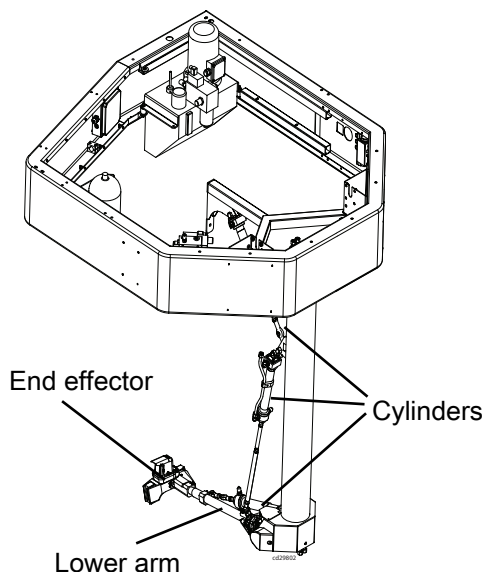
Warning: The VMS system contains one accumulator on the upper part of the arm (bracket). Note that the multi-purpose arm can move even though the hydraulic pump unit has been shut down. Turn off the hydraulic pump unit and depressurise the accumulator on the bracket before performing service or making repairs.



Warning: For additional safety, deactivate the multi-purpose arm. Always set the service switch to service mode when carrying out external cleaning or when performing other kind of maintenance work such as exchanging liners.



Safety precautions



Warning: Be careful when cleaning the end effector. The lower arm has its own air supply and its parts can still move even if the arm is deactivated and the hydraulic system is depressurised. Shut off the main compress-air supply to deactivate the lower arm parts.



Warning: The cleaning detergents contain corrosive chemicals. Be extremely careful when handling corrosive chemicals. Use goggles and protective gloves.



Warning: The multi-purpose arm is driven by hydraulic oil. Avoid skin contact when handling oil. Repeated contact with the oil may cause severe skin injury. Use protective gloves. Keep away from children and animals.



Warning: Dispose used oil properly. Safety sheet data will be available on demand. Ask your DeLaval service engineer.



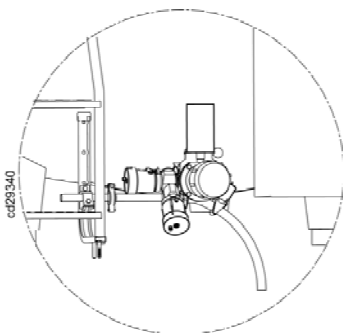
Safety precautions



Note: External cleaning of the milking station should be carried out three times a day. Dirt, dust and feed residues can attract bacteria and insects. Parts that should receive special attention are the manger, rear plate, the teatcups and the teat preparation cup.



Warning: Even if the station is in manual mode, be careful when cleaning parts that can move such as the feeding module, the rear plate, the magazine, and the gates. You may become seriously injured.



Membrane valves at the storage tank(s).



Warning: Never use your fingers directly when carrying out external cleaning of the VMS system, for example when cleaning the membrane valves at the storage tank(s) and the milking station. Use a brush instead to avoid hurting your fingers or harming your skin with detergents.

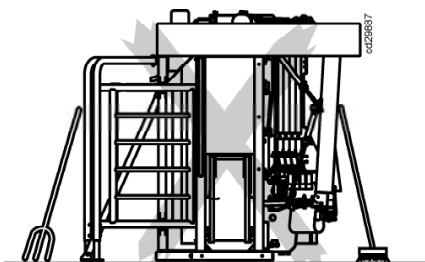


Warning: The cleaning containers gets hot during cleaning. Allow to cool before service.



DeLaval voluntary milking system VMS

Safety precautions



Caution: Never leave pitchforks, brooms or other tools leaning against the gates or the multi-purpose arm. This will prevent these parts from moving normally, and could result in injuries on people or animals, as well as mechanical damage on the milking station.



Caution: Do not use spray cans containing insecticides around the milking station. This will damage the parts that are made of plastic such as the tubes for compressed-air.

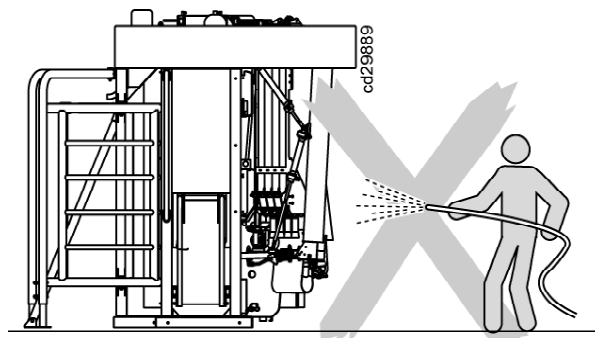
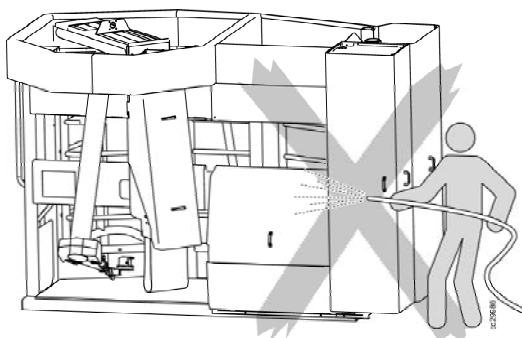


Caution: Never use high-pressure cleaning equipment when cleaning the milking station.



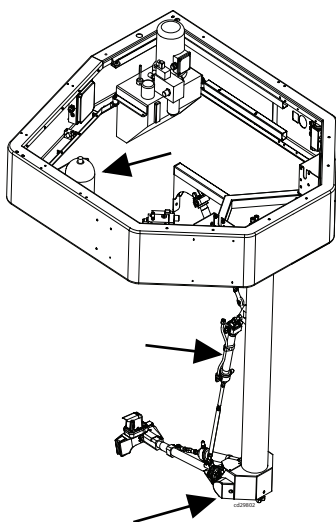
DeLaval voluntary milking system VMS

Safety precautions



Caution: An ordinary water hose may be used when cleaning the milking station. However, use it carefully. Do not flush water directly on the electrical box, and certain parts of the multi-purpose arm (see the picture). Ensure that the electrical box has its cover on during the cleaning procedure.

The milking station is classified as IP55.

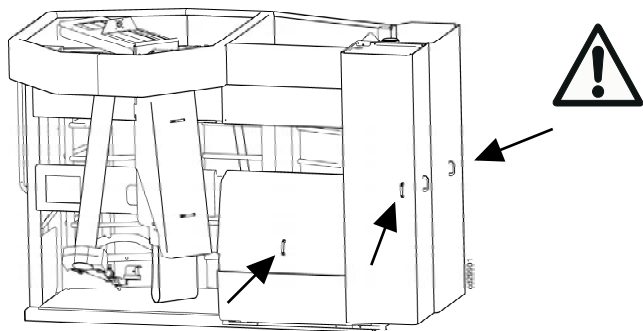


Caution: Avoid using cleaning chemicals when cleaning certain parts of the multi-purpose arm, such as cylinders, accumulator, valve block etc. This may cause corrosion, or damage to rubber or plastic parts. Only use sponge when cleaning the arm.



DeLaval voluntary milking system VMS

Safety precautions

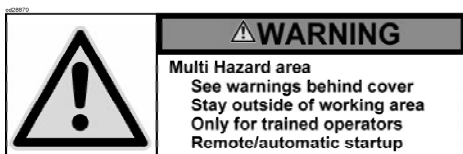
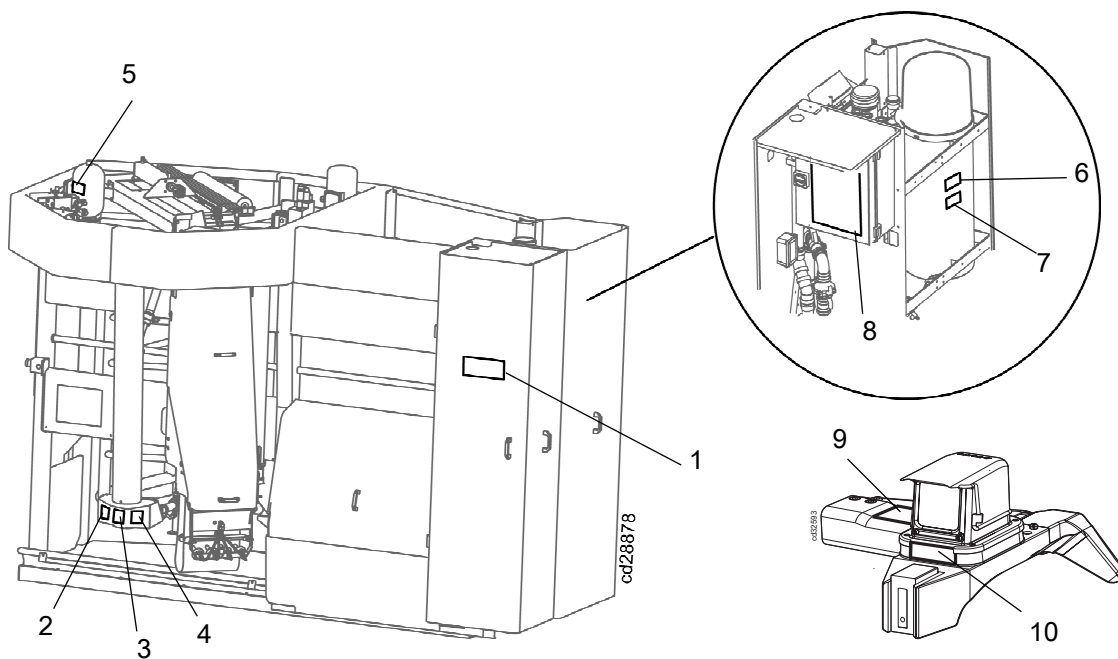


Caution: Do not leave modules or parts that contain electrical components open after maintenance or service. This concerns the electrical box in particular, but also the upper beam and the milking module. Put the covers back on to prevent dust and dirt from causing malfunction.

The milking station is classified as IP55 when all covers are in place.

Position of warning stickers

This section describes where the warning stickers are positioned on the milking station. A sticker must be replaced if it falls off. By safety reasons, all stickers must be kept clean and readable.



1. Warning: Multi Hazard area.

- See warnings behind cover
- Stay outside of working area
- Only for trained operators



DeLaval voluntary milking system VMS

Safety precautions

- Remote/automatic startup



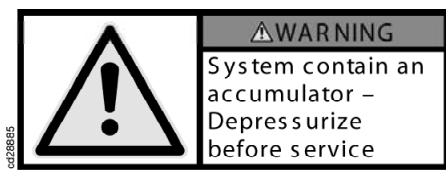
2. Warning: Pinch point.



3. Caution: Laser radiation.



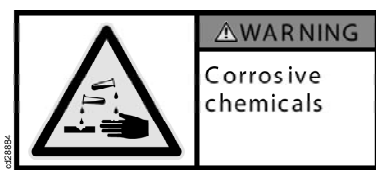
4. Warning: Squeeze risk.



5. Warning: System contains an accumulator. Depressurize before service.



6. Warning: Hot surface. Allow to cool before service.



7. Warning: Corrosive chemicals.



Safety precautions

**DeLaval VMS™**
Safety precautions

**Read the manual.**

**WARNING – pinch point**
Pinch/Squeeze risk, when working inside the restricted area marked by the black and yellow lines.
Pinch risk between movable cleaning shelf on the Magazine.
Pinch risk in feeding and manure equipment.
Pinch risk in the milk-control valves when cleaning.
Pinch risk at the junction between the lower and the upper arm.

**WARNING – Hot surface**
The cleaner containers get hot during cleaning.

**WARNING – Squeeze risk**
Squeeze risk between arm and the Magazine.
Squeeze risk by automatic gates

**WARNING – corrosive chemicals**

**WARNING – System contains accumulator,**
Depressurize system before maintenance

**CAUTION – Floor slippery when wet**

**CAUTION – Risk of falling into pit (if present).**

**PROHIBITED – Minors not allowed within the VMS room Unless accompanied by a responsible adult.**

**CAUTION – Laser radiation. Do not stare into beam**
Class 2 laser product. Wavelength 655 nm, optical output power <15 mW, IEC 60825-1 Edition 1.2, 2001-08.
Complies with FDA CFR 1040.10-2005 with the exception for deviations pursuant to laser notice no. 50 dated July 26th 2001
944213-02

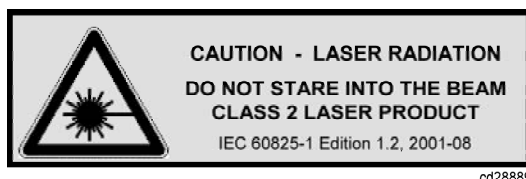
8. Safety precautions: A summary of the warning stickers. The warning stickers that are indicated on different positions are summed up on one list. However, there are four extra warning signs, and information about the laser class, included in this sticker. The additional signs showed in the list are the following:

- Read the manual.
- Caution: Floor slippery when wet.
- Caution: Risk of falling into pit (if present).
- Prohibited: Minors not allowed within the VMS room, unless accompanied by a responsible adult.
- Caution: Laser radiation. Do not stare into beam.

Class 2 laser product. Wavelength 655 µm. Optical output power <15 mW. IEC 60825-1 Edition 1.2 2001-08. Complies with FDA CFR 1040.10-2005 with the exception for deviations pursuant to Laser notice no. 50 dated July 26th 2001.



9. Caution: Laser radiation.



10. Caution: Laser radiation. Do not stare into the beam. Class 2 laser product.

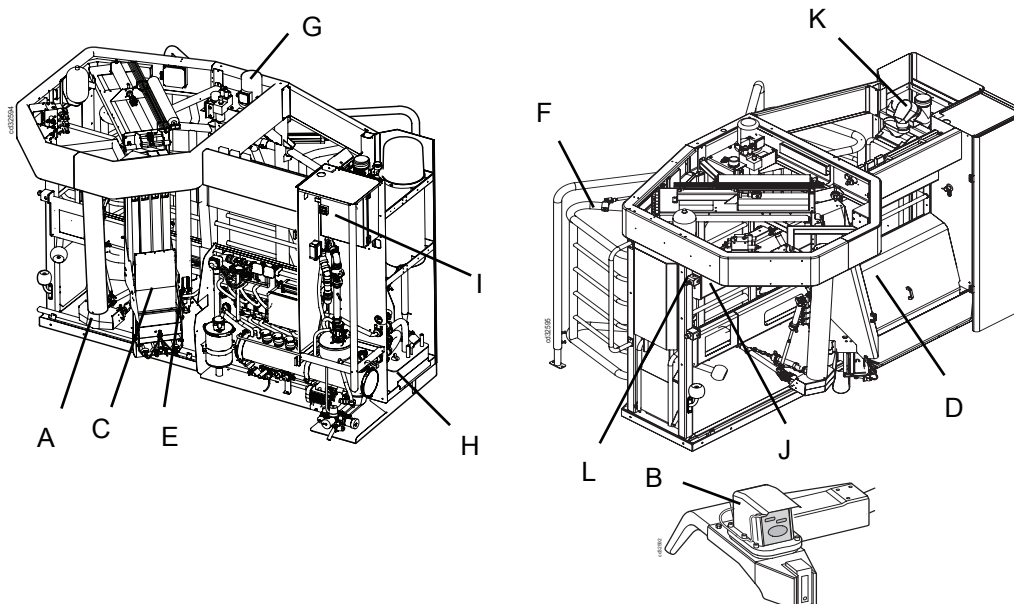


DeLaval voluntary milking system VMS

General description

Introduction

This chapter briefly describes the functions of the major components of the milking station. It also gives a general view of the data communication between the milking station and the PC and how the other systems (for example ALPRO WE) are integrated to the VMS system.



The milking station consists of the following main parts:

- A. Multi-purpose arm
- B. Camera unit
- C. Magazine
- D. Milking module
- E. Teat preparation module
- F. Stall and gates



General description

G. Hydraulic pump unit

H. Cleaning unit

I. Power box

J. Electrical box

K. Feeding module

L. Service switch

Multi-purpose arm

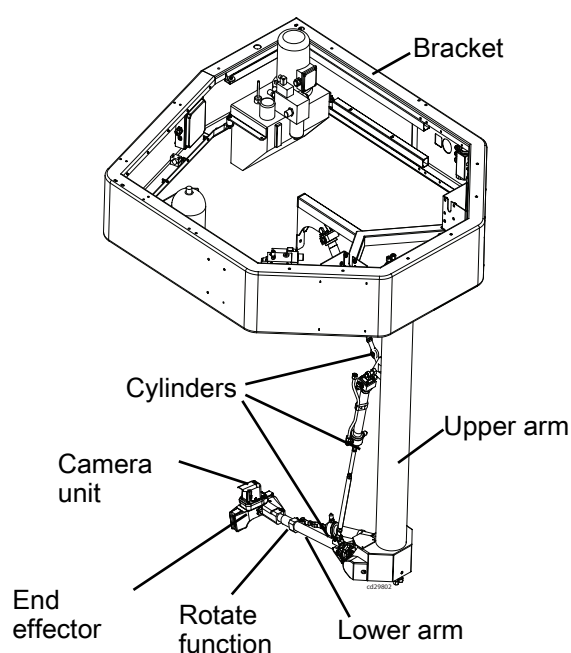
The multi-purpose arm performs seven basic operations during milking:

- Fetching the teat preparation cup from its home position.
- Holding and moving the teat preparation cup to each teat during teat preparation, and finally releasing the cup.
- Fetching the teatcups from the magazine.
- Locating and recognizing teats.
- Attaching the teatcups.
- Holding the milk tubes.
- Post-treatment of teats.

The arm is driven by hydraulic cylinders and uses two lasers and a camera to locate teats.

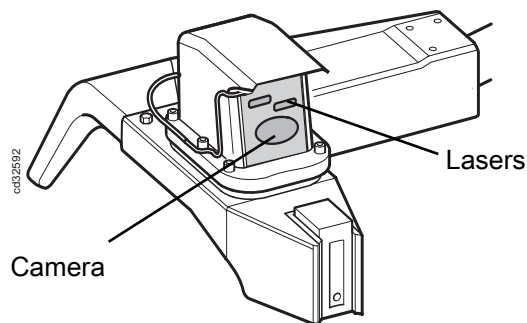
The multi-purpose arm consists of seven main parts:

- Bracket
- Upper arm
- Lower arm
- Three hydraulic cylinders
- End effector with magnetic gripper
- Camera unit
- Rotation actuator





General description

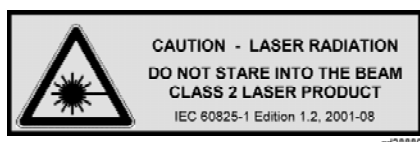


Camera unit

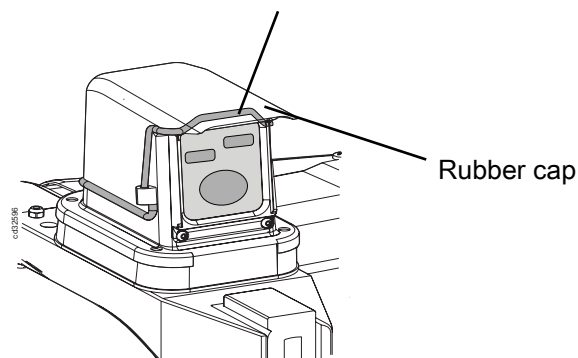
The camera unit contains two lasers, a camera and image processing electronics.

The camera unit is made of stainless steel with a glass window. It has a "rubber cap" for protection against dirt. The glass window in front of the lasers and the camera is cleaned by water and compressed-air after each milking. Additionally, the arm can rub the camera window against a camera cleaner (sponge) at regular intervals.

For best performance, the camera unit should be cleaned regularly. See the chapter "DeLaval voluntary milking system VMS; Maintenance".

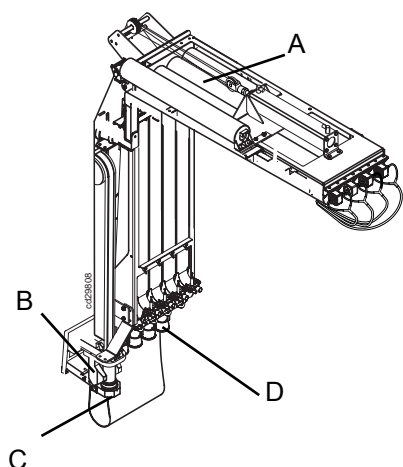


Supply of compressed-air and water
for keeping the camera window clean.





General description



Magazine

The magazine contains the milk tubes and the teatcups. The main function of the magazine is to release and retract the milk tubes and the teatcups at appropriate intervals during milking. The magazine also contains the teat preparation module, which is described in the following section.

The magazine contains following major components:

- A. Retraction cylinders
- B. Cleaning shelf
- C. Teat preparation module
- D. Teatcups

Retraction cylinders

The retraction cylinders are used for holding, releasing and retracting the cups, and to control the cleaning shelf.

Cleaning shelf

The cleaning shelf is used during milking, backflush and system cleaning. During operation, the cleaning shelf is moved between two positions; one for milking and one for backflush and cleaning.

Teat preparation module

See section *Teat preparation module*.

Teatcups

A teatcup comprises the cup, liner, short flexible double-tube and an connection piece.

Milking module

The milking module carries out quarterly milking; that is, it milks each quarter separately. The milking process involves monitoring milk flow, measuring the quantity of milk, supplying the correct vacuum levels in the milk tube and initiating teatcup removal at the proper time.

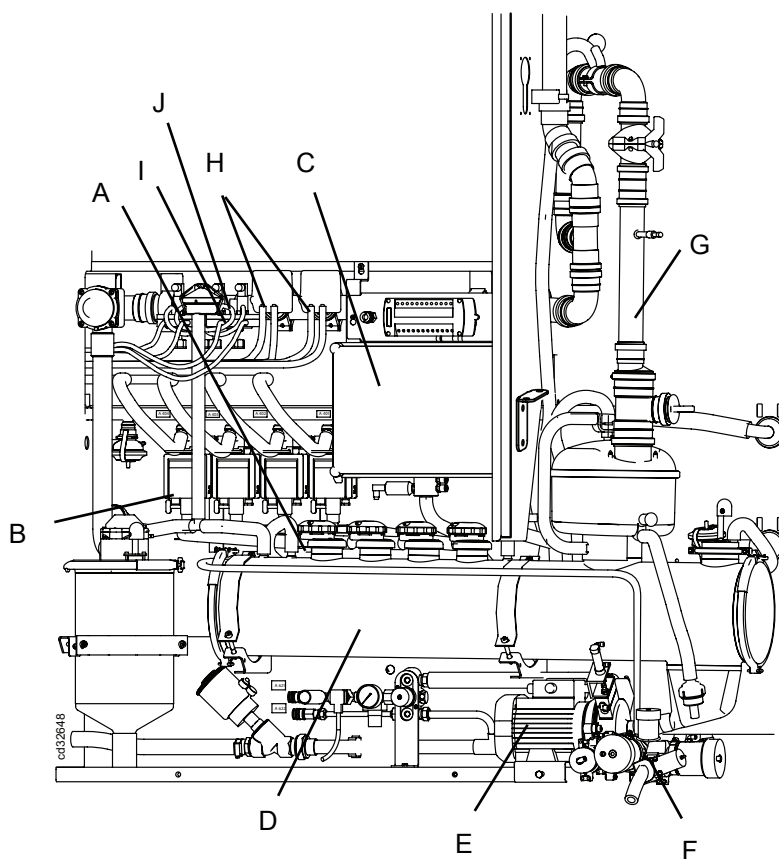
The following parts in the milking module are involved in the milk extraction process:



DeLaval voluntary milking system VMS

General description

- A. Shut off and regulator valves
- B. DeLaval milk meter MM25
- C. Control box
- D. Receiver
- E. Milk pump
- F. Valves
- G. Vacuum supply
- H. Pulsators
- I. Air inlet housing
- J. Vacuum sensors



Shut off and regulator valves

These valves control the vacuum level in the milk tube. If the vacuum level falls, the shut off valves immediately blocks the vacuum supply.



General description

DeLaval milk meter MM25

These four milk meters measure the milk flow to obtain the milk weight from each quarter. They also measure conductivity level of the milk.

Control box

Control box contains electronics and pilot valves that control the milking and cleaning processes, vacuum, and distributed IO.

Receiver

Milk is collected in the receiver before it is transported to its final destination, usually the storage tank.

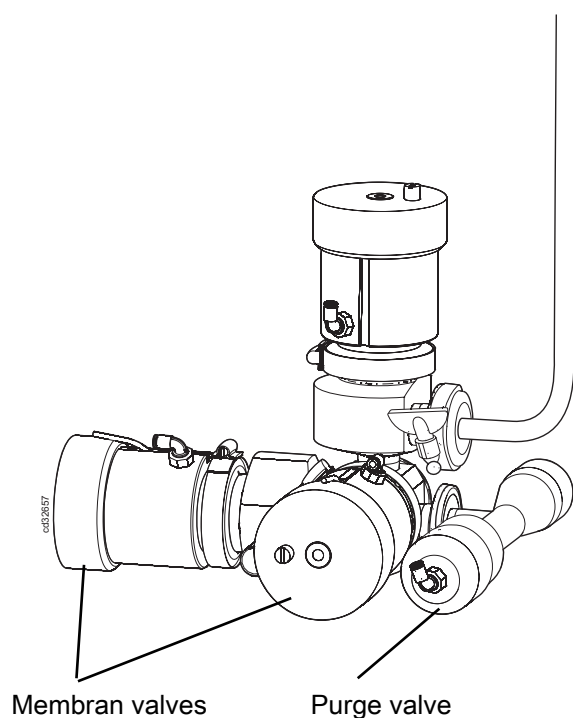
Milk pump

The milk pump pumps the milk to the storage tank after each cow has been milked. The milk pump can also be equipped with milk sample outtake for milk sample and DeLaval online cell counter OCC (both optional equipment).

Valves

The purge valve admits compressed-air into the milk line before a system cleaning is started. The compressed-air pushes the remaining milk in the line to the tank. The valve is also used to clear the lines of water after a system cleaning. There is an indication hole in the bottom side of the valve housing. If milk is leaking out from the hole, it indicates a damaged o-ring in the purge valve.

The two membrane valves direct the milk either through the delivery line (to storage tank) or the divert line (to drain or milk pail). On each membrane valve housing bottom side, there is an indication hole. Leaking milk from this hole indicates damage to the valve membrane.





DeLaval voluntary milking system VMS

General description

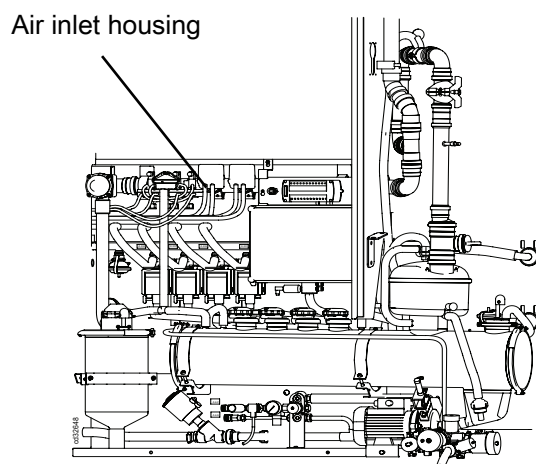
Vacuum supply

The VMS is connected to the vacuum supply system. In some VMS configurations up to three milking stations uses the same vacuum pump. To regulate the maximum vacuum consumption of each VMS, a flow regulating valve (FRV) is installed in the vacuum supply system. This is to ensure a sufficient vacuum to each VMS.

Pulsators

Alternates the vacuum level in the teatcup chamber so that the liner opens and closes.

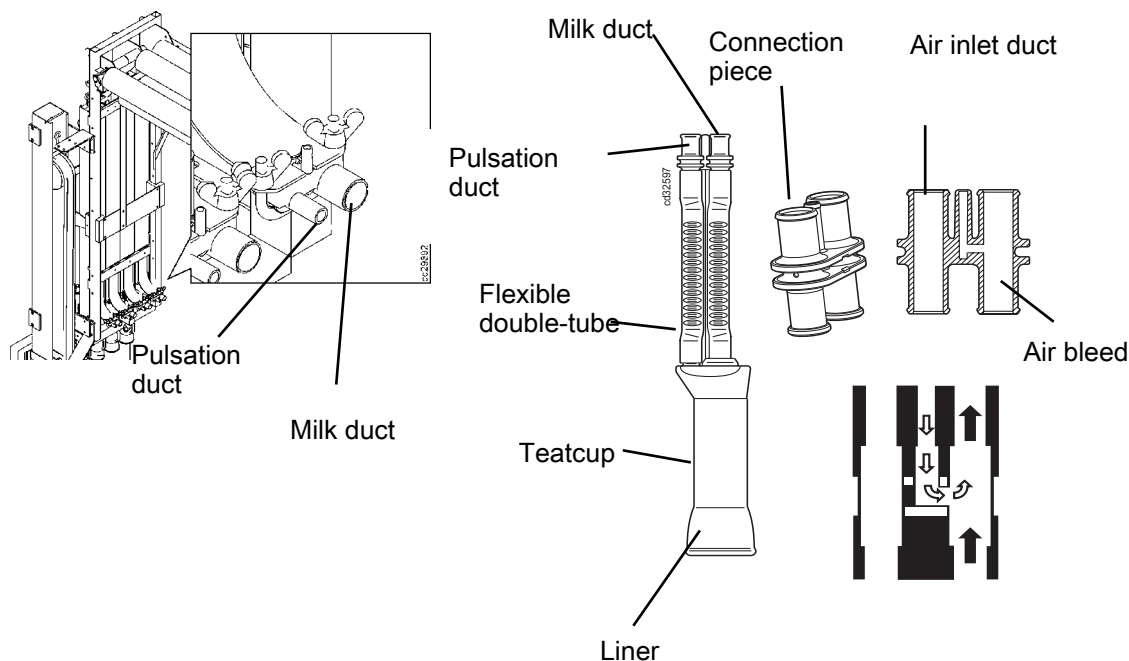
Air inlet housing





DeLaval voluntary milking system VMS

General description



Air is admitted through the air inlet duct and enters the milk duct via the air bleed. The air is needed for the transport of the milk to the receiver. The air inlet holes are located inside the inlet air housing placed on the lower beam. Before the air enters the air hoses connected to the air inlet ducts on the rear side of the magazine, it is filtered in the air bleed filter. All air in the VMS system is filtered before it is put into use. The air is then transferred further on through the milk tube air inlet duct and finally it reaches the air inlet hole in the connection piece.

Vacuum sensors

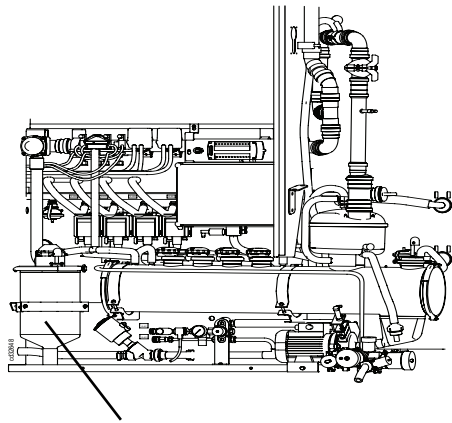
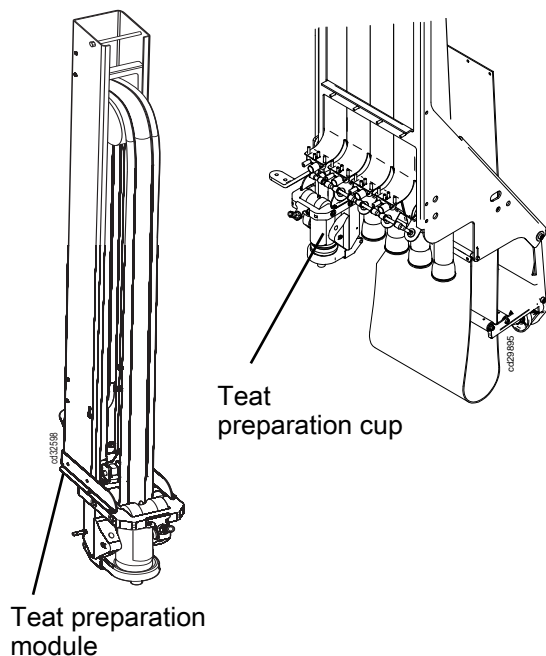
The vacuum sensors are placed on the air inlet housing. At a kick-off, loss in vacuum is immediately detected by the sensors. A signal is sent to the shut off valves, which shut off the vacuum.

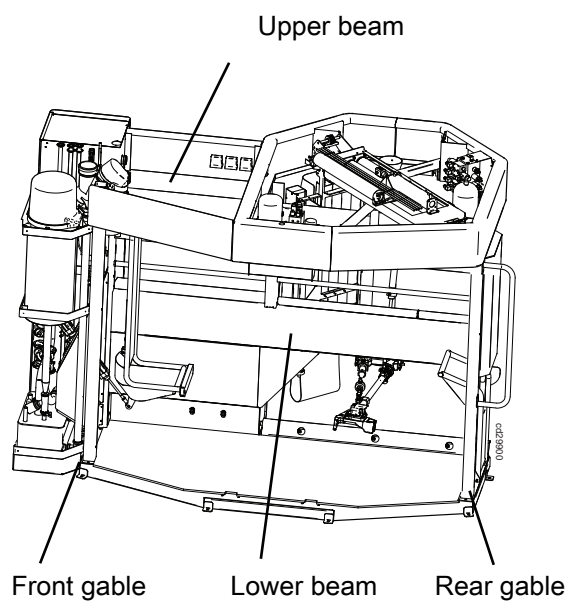


General description

Teat preparation module

Teat preparation is performed by the teat preparation module, which is a part of the magazine. This module has its own distinct functions such as teat cleaning, drawing foremilk, and drying teats. The module has a cup that is designed especially for these tasks. The wastewater and the foremilk are transported to the wastewater tank in the milking module and are never mixed with the extracted milk.

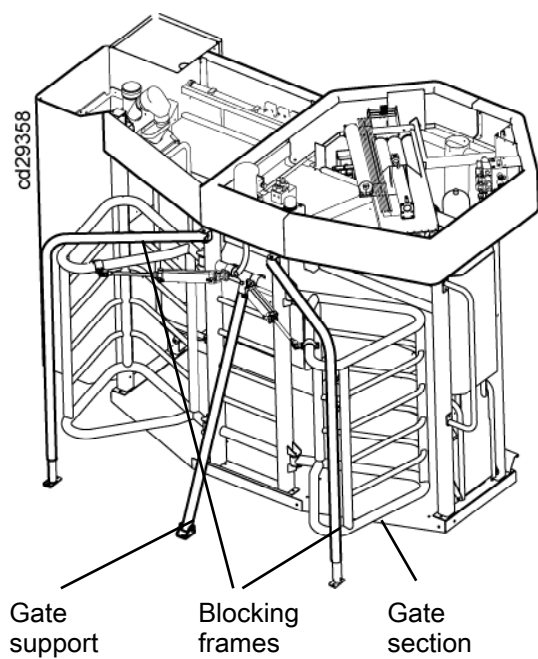




Stall and gates

The stall consists of five parts:

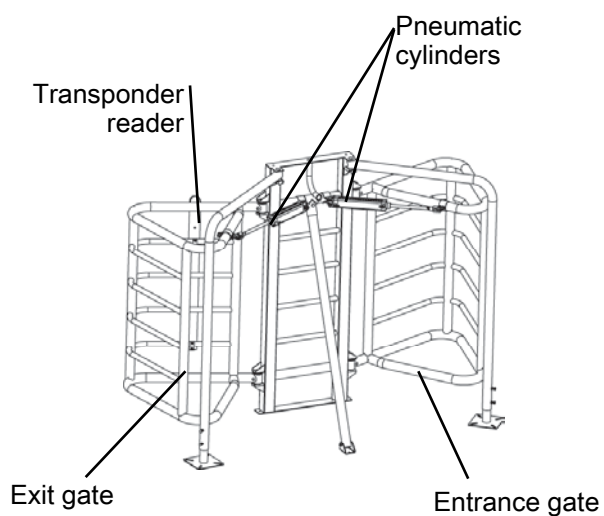
- Rear gable
- Front gable
- Upper beam
- Lower beam
- Gate section





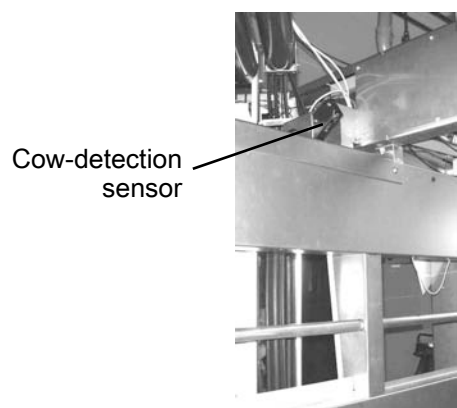
DeLaval voluntary milking system VMS

General description



A cow-detection sensor on top of the upper beam detects a cow when she enters the station. The exit gate has a transponder reader that identifies each cow carrying a transponder.

The gates are controlled by two pneumatic cylinders.



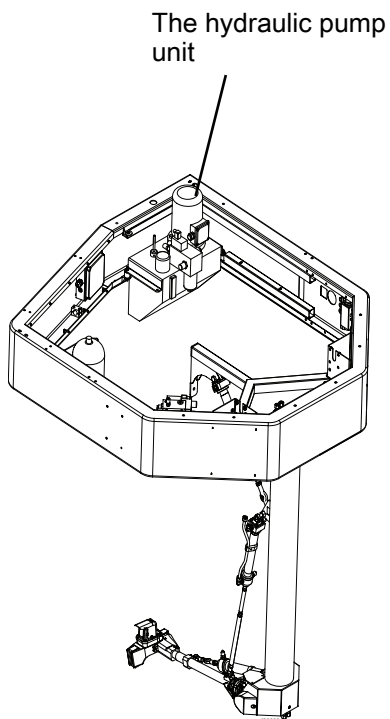
Cow-detection sensor on upper beam.



General description

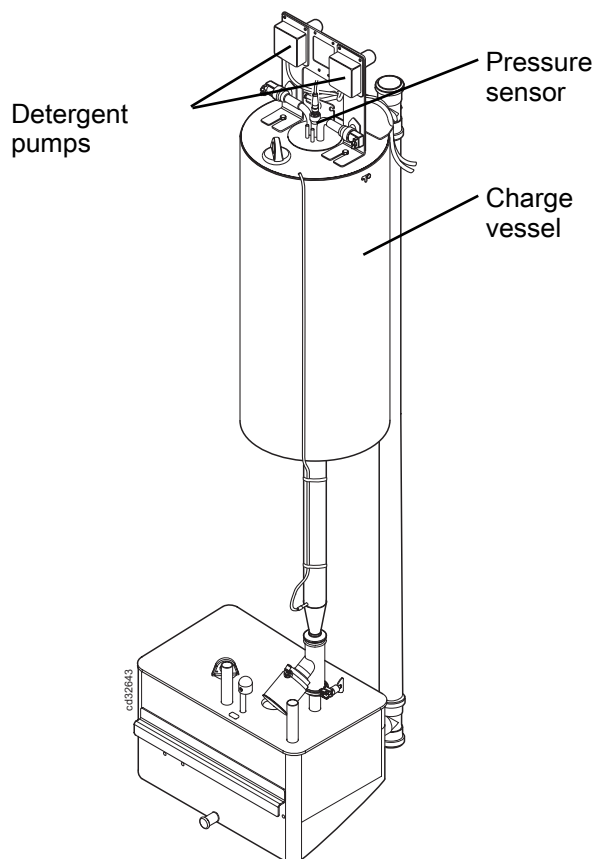
Hydraulic pump unit

The hydraulic pump unit is placed on the bracket of the multi-purpose arm. The short distance to the multi-purpose arm reduces the need of long hydraulic lines.





General description



Cleaning unit

The cleaning unit is integrated in the milking station.

The detergents pumps pump the detergents into the charge vessel, where the detergents are mixed with warm water.

There is no need for calibration of the detergent pumps. A pressure sensor, placed on top of the sensor pipe, ensure correct dosing of detergents.

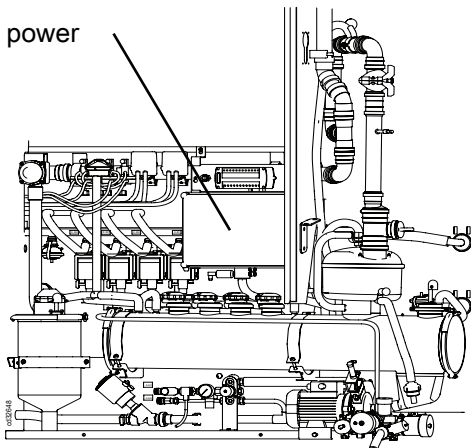
The maintenance is limited to exchange of detergent tubes at the detergent pumps.



DeLaval voluntary milking system VMS

General description

The power box



Power box

The power box is placed in the upper part of the cabinet. It contains motor protection for the hydraulic pump and the milk pump and a control fuse for internal wiring and transformers.

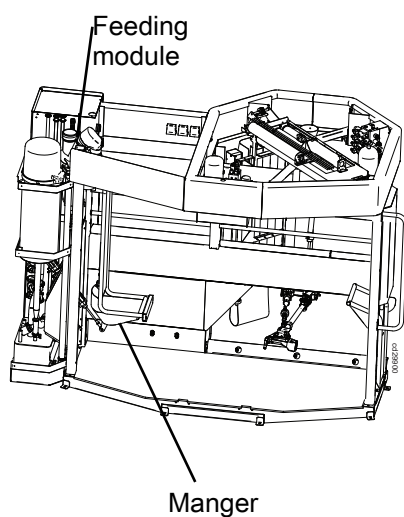
Electrical box

The milking station is controlled by programs executed in the station's computer, located in the electrical box.

Feeding module

The feeding module consists of two main parts:

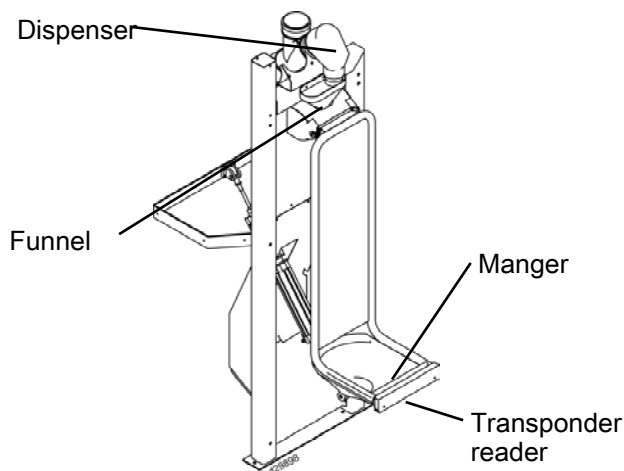
- Feed dispensers
- Manger





DeLaval voluntary milking system VMS

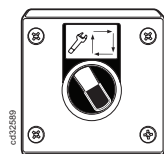
General description



Feed from the dispensers is collected in a funnel, and a tube leads the feed from the funnel via a tube to the manger. Up to two feed dispensers can be installed, each with a different feedstuff.

Like the exit gate, the manger also has a transponder reader that identifies each cow carrying a transponder. Cows are identified when they put their heads down to access the feed.

Note: Calibration of the feed dispensers is important to the feeding precision. Calibrate at regular intervals and each time a new feedstuff has been delivered and comes into use. The calibration is done by using the touch screen.



Service mode



Working mode

Service switch

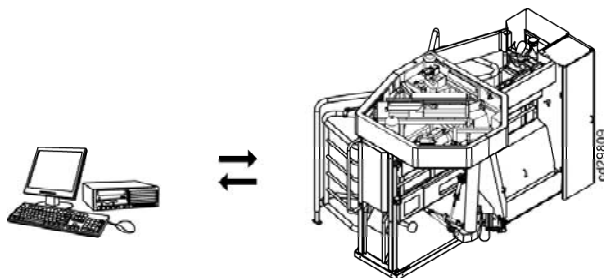
The service switch is a safety device that is used when you need to enter the working range of the milking station. When the service switch is in service mode any sequence is stopped, the moving parts are blocked and remote operation is not possible. The parts can, however, be moved by manual commands. Turning the switch back to operation mode will make the milking station ready for operation again.

Management and supervision

Data communication and the VMS management software

Data communication is an essential feature of the VMS system. The core elements of the VMS system are the milking station and a management software that runs in the PC. The computer inside the milking station and the PC are interconnected and exchange data during operation.

The data can be classified into two main categories: data that control the way the system and the station operate and animal data such as milk yields and feed consumption. Data of the first type are transferred to the station at start-up while the second are transferred continuously between the milking station and the PC





General description

during operation. All data is stored in the PC.

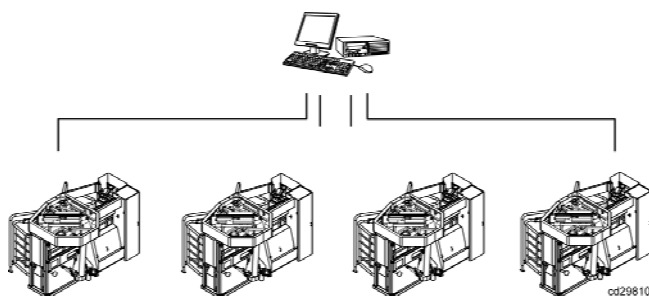
Data can be viewed and edited in the management software. It is a dairy-management software package intended as an aid in the daily dairy-management work.

Configuration data, data that control the way the system and the station operate, can be changed during operation.

Note: *Since the PC is a vital part of the VMS system, other software than the already pre-installed, such as office packages or games, must not be installed. The PC must be devoted exclusively to the management software.*

Multiple systems

The management software can handle up to four milking stations, and thereby up to four separate herds. In addition, left-side-entry or right-side-entry stations can be used within the same VMS system.



Establishing communication

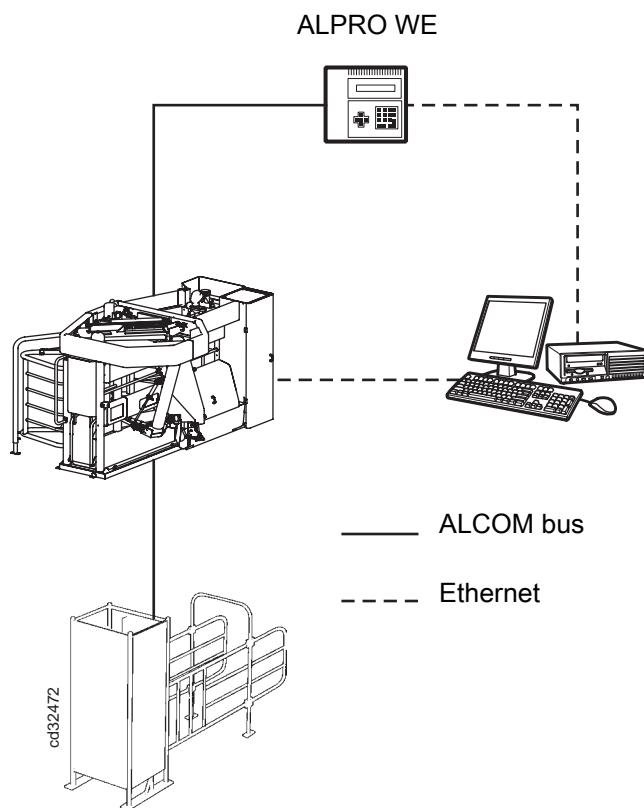
Communication between the PC and the milking station is established during the start of the system. The PC and the station can be started in any order.

If the PC is started first, it tries to establish communication with the milking station. Once the station has been started and the communication is established, the PC transfers the configuration data to the station, which the station then uses for its configuration process.

If the milking station is started first, it waits for the PC to initiate to communication. When this has been done, the process proceeds as above.



General description



Integration with ALPRO WE

VMS make use of the ALPRO WE processor to enable communication with, for example, feeding stations and activity meters. The ALPRO WE unit uses the ALCOM bus for communication between the processor and the sub-units. The processor is connected to the PC via Ethernet cable, through which it synchronises data. Ethernet is a widely used standard for building computer networks that cover smaller areas such as a barn or an office building.

For information about how to install and work with ALPRO WE, see separate memo book, article number 94847401.

Error detection and remote accessing

An all around the clock, all-the-year-round, automatically operated system creates numerous demands, not only in terms of maintenance and service, but also in terms of safety and reliability. The VMS system has a number of features to fulfill these demands.

One of these features is the ability to issue alarms. Alarms can be of different severity. Some are issued to draw the attention of the operator to make him or her aware of a deviation in normal operating procedures, but leave the system operating. Others might pose a safety hazard to personnel or animals and therefore halt the operation of the system immediately.

Alarms can be related to animal behaviour, for example a cow that refuses to leave the station, or to technical errors. In most cases, the system initiates a number of self-tests in



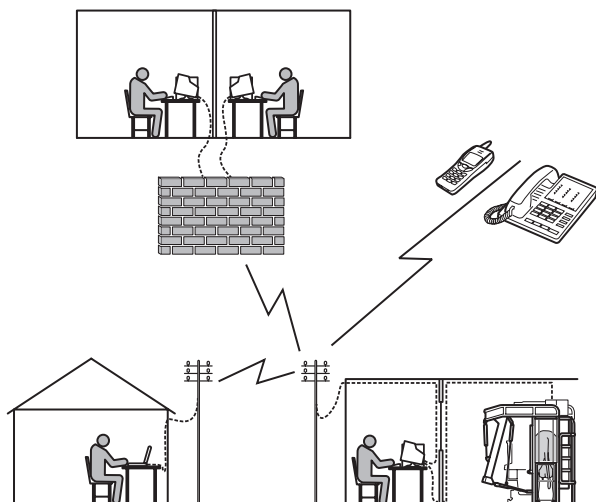
General description

order to try to correct the error before finally issuing the alarm.

As option an external alarm can be connected to the VMS system.

Alarms are displayed on the PC screen and touch screen, but can also be transmitted as SMS (short text messages) to mobile phones as well as voice messages to any type of telephone.

Remote accessing by service personnel provides a means to maintain the system at a high level of performance. A service person can, for example, fine-tune the system configuration by accessing the farm PC from his or her laptop. Another feature of remote accessing is calibration of the multi-purpose arm by a centrally located computer.



Database management

The database is to be back-up copied every 24 hours. This is further described in the instruction book *VMSMgmt 2007*, chapter *Database management*.



DeLaval voluntary milking system VMS

Operation



Warning: To operate the VMS system safely, read the Safety precautions carefully.

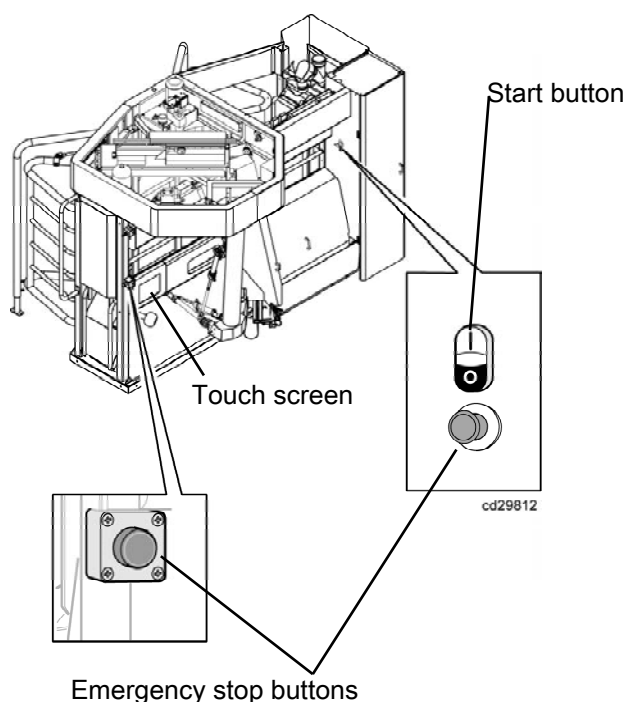
General advice for operating VMS

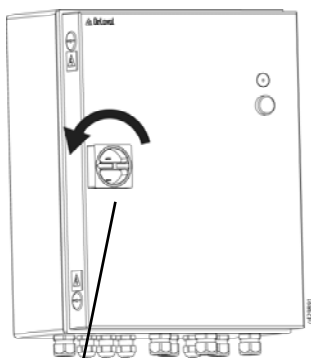
Starting, restarting and shutting off the milking station

If possible, always restart and shut down the milking station from the touch screen as the programs in the milking station's computer then will be terminated properly.

In case of an emergency, use the emergency buttons on the milking station. This will shut off the compressed-air, the electrical power and the vacuum supply to the milking station, and will also deactivate the arm.

The **Start (I)** button is only needed to be used after an emergency stop. See the instructions below on how to restart the station after an emergency stop.





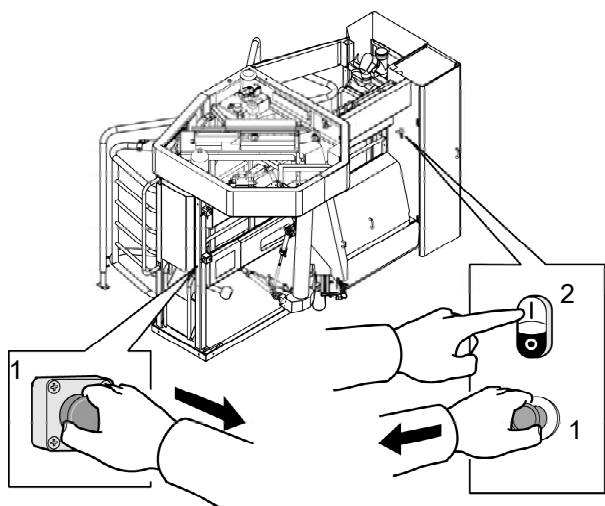
Main switch

The electrical power supply to the station need only be switched off (the main switch turned anti-clockwise) in case of service, when parts are exchanged, or when the electrical system is repaired.

The milking station can be either in manual or automatic mode after it has been started or restarted. If the milking station is in manual mode after it has been started, the system operation can only be started by switching the working mode to the automatic mode or carrying out different tasks manually. On the other hand, if the milking station is in automatic mode after the start up, the system will initiate operating automatically; that is, the milking station will allow cows to enter the station and start milking sessions automatically.

"Manual mode" after the station start up is the default setting, but can be changed to "automatic mode" if preferred. To have the setting changed, contact your service engineer.

Milk lines are drained when the station is shutdown or restarted. To avoid loss of residual milk in the lines, the milk can be transported to the storage tank by using compressed-air that is blown into the lines. See "Emptying the receiver and purging the milk lines" in this chapter.



Restarting the milking station after an emergency stop

1. Pull out the emergency-stop button.
2. Press the **Start (I)** button. This will restart the milking station.



Switching between automatic and manual mode

Switching from automatic to manual mode or vice versa can be done at any point in the milking procedure.

From automatic to manual mode: In this case, the milking station will first finish ongoing actions before it stops and changes to manual mode.

If, for example, the working mode has changed during teat preparation, this procedure will first be completed before the station stops and changes to manual mode.

From manual to automatic mode: In this case, the milking station will carry on in automatic mode from the step it has reached in the milking sequence.

If, for example, the working mode has changed during the main milking phase, the station will continue with post-treatment when the milking phase is complete. When the cow leaves the station, the station will be ready to receive another cow.



Fetch and start positions

In order for the multi-purpose arm to operate, the positions of the cups and the position of each teat of a cow must be determined. There are six options for determining positions:

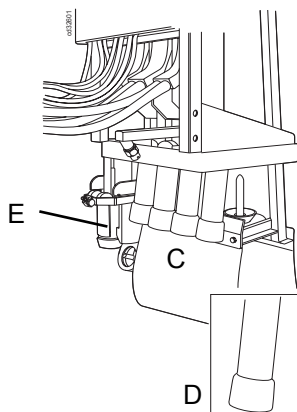
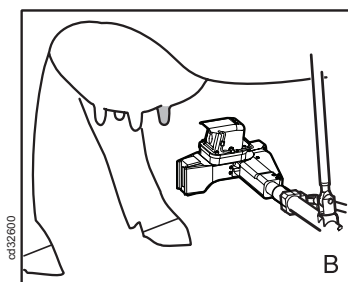
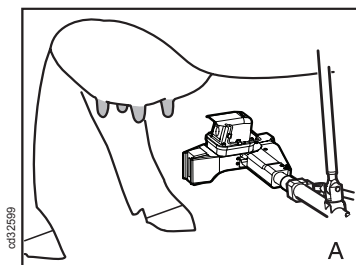
- A. The positions of all teats at the same time.
- B. The positions of individual teats.
- C. The positions of all teatcups at the same time.
- D. The positions of individual teatcups.
- E. The position of the teat preparation cup.
- F. The position of the camera cleaner (sponge).

Determining teat positions (start positions) needs to be done every time a new cow is introduced. Teat positions will be updated after each successful attachment and complete milking in order to take the changing form of the udder during the lactation period into account.

The cow must be registered in the database before the teat positions can be determined.

Note: Ensure that the cow has had some experience of the milking station before determining teat positions.

All positions can be checked by using the touch screen, for example, that the arm can fetch the teatcups in the magazine. See the section "Verification of determined positions" below in this chapter.





Achieving successful teatcup attachment

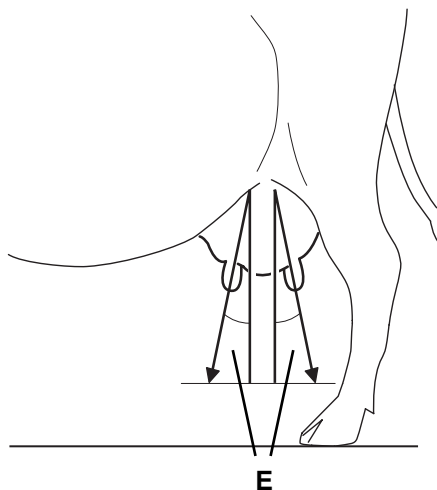
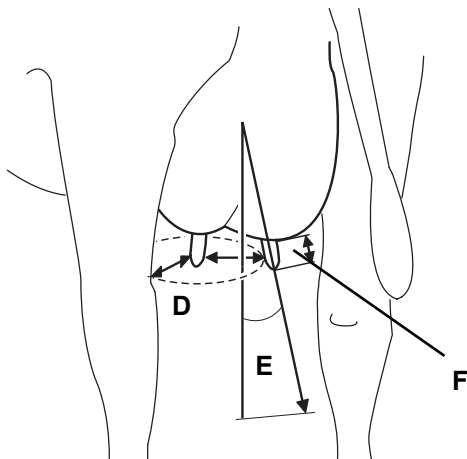
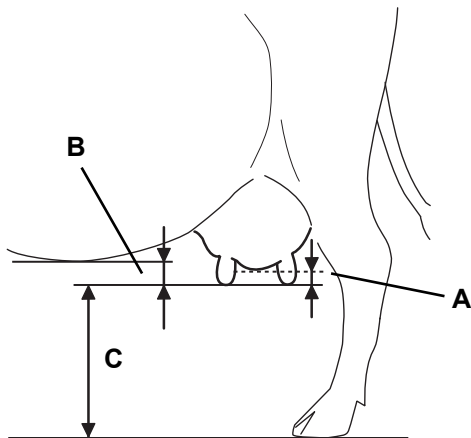
The points below are advice for good working routines concerning teatcup attachment, and suggestions for measures to be taken when the multi-purpose arm has difficulty in attaching teatcups on one or several cows.

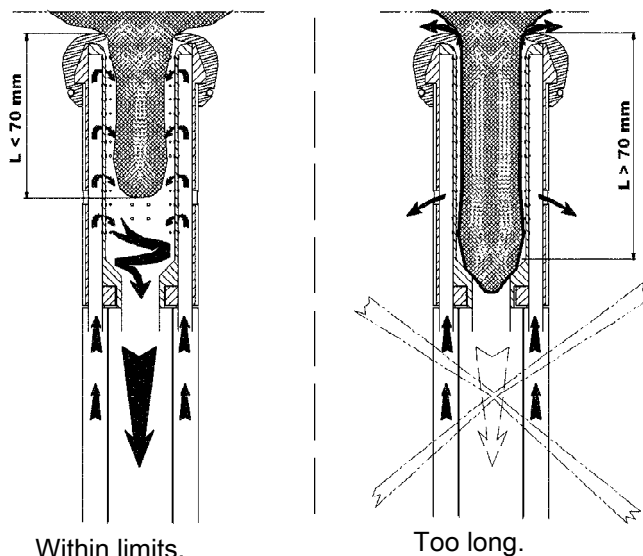
Udder geometry/teat anatomy

The cows should fulfil the following requirements of the udder geometry:

- A. Not less than 30 mm.
- B. Not less than 30 mm.
- C. Not less than 270 mm, and not more than 750 mm.
- D. Not less than 15 mm.
- E. Not more than 45 degrees.
- F. Not less than 30 mm.

The diameter of a teat should not be less than 15 mm, and not more than 50 mm.





Maximum teat length

The maximum teat length that can be handled by the teat preparation cup is 70 mm. An indication of a too long teat is that water escapes from the top or at the holes on the sides of the cup.

Keep udders free from long hair

Long hair on udders can make it difficult for the image-interpreting software to locate teats. In addition, straw can get stuck on udders and impair the teat location further. Cut the hair on the udders to avert this problem. Teats shall always be kept free from hair.

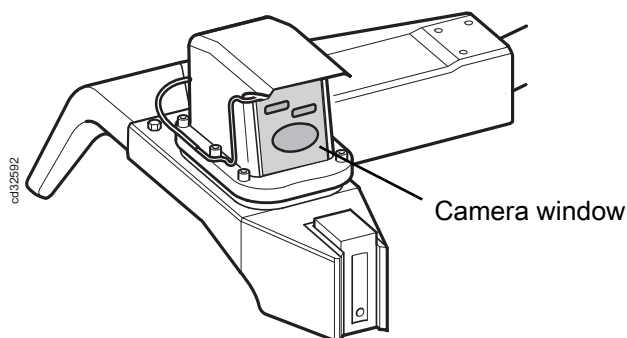
Fetch and start positions

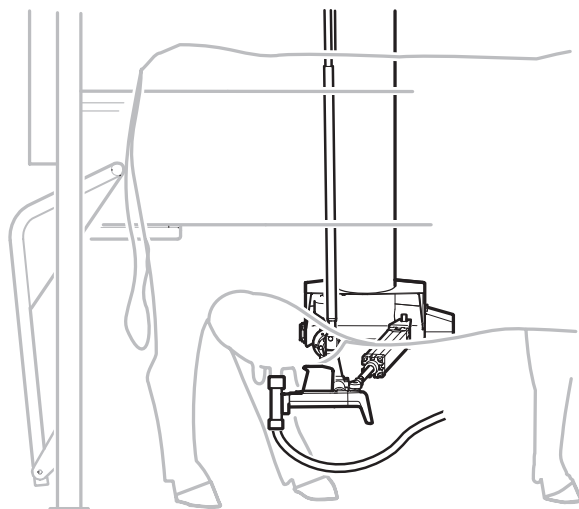
Failure or low performance when fetching or attaching cups may be due to inaccurate position programming. Re-determining the positions may help. Good teat positions (start positions) are best achieved when the cow is due for milking.

Camera window

The camera window should be cleaned manually and regularly. Ensure that the instructions in the chapter "DeLaval voluntary milking system VMS; Maintenance" are followed.

Also check that the automatic rinsing of the camera window is carried out regularly.





Using optional settings for teatcup attachment

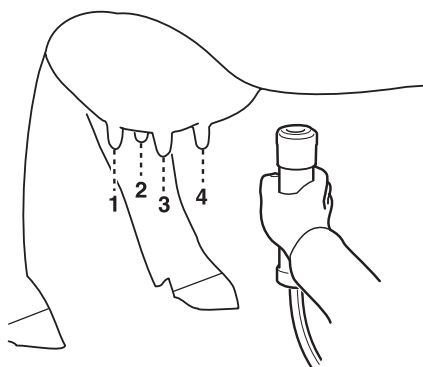
Some attachment problems can be overcome by using the options for teatcup attachment in the management software. These options are not intended for use as a normal operating routine, only as a way of keeping the cow in the VMS herd.

Working in manual mode

When to milk manually

Manual milking should be considered when cows are new to the system or are milked for the first time. New cows need time to become accustomed to the automatic procedures, for instance the teat preparation. Manual milking with teat cleaning in the traditional way may then be an option to overcome the cow's initial reluctance.

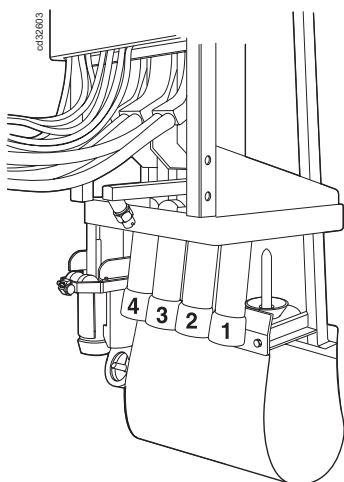
Manual milking might also be considered when cows with a teat anatomy unsuitable for automatic milking need to be milked, when milking colostrum from newly calved cows, or when some teats of a cow should not be milked to tank.



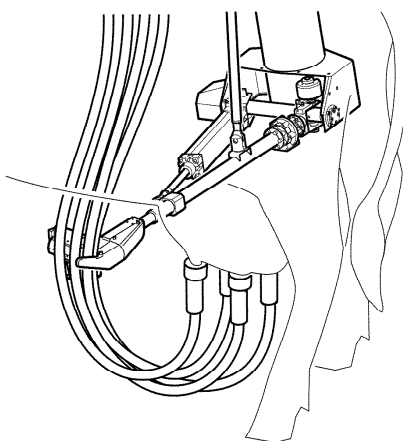
Attaching teatcups

There are three options regarding teatcup attachment in manual mode:

- The multi-purpose arm attaches the teatcups.
- The magazine releases two teatcups at a time in a specific order, and the teatcups are then attached to the teats by hand.
- Each teatcup is released separately from the magazine and each teatcup is attached by hand.



When the teatcups are attached by hand, it is important that the correct teatcup is attached to the correct teat: for example, on a left-side-entry station teatcup number one should always be attached to the right rear teat.



In automatic mode, the multi-purpose arm automatically holds the milk tubes after attachment of the teatcups. However, the arm can also be made to hold the milk tubes if the teatcups have been attached by hand. This prevents the milk tubes from being stepped on by the cows and the tubes from being dragged on the floor.

See the section “Support of milk tubes” in this chapter.



Common manual tasks

The following sections describe the manual tasks that are performed common, for example starting the milking station.

Starting the milking station for automatic operation

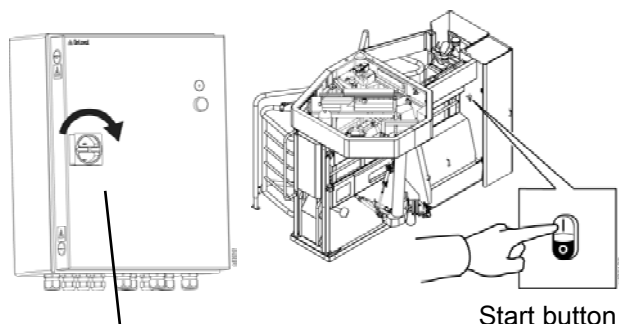
1. Switch on the electrical power by turning the main switch clockwise. Press the start button, then wait as it takes a few seconds until the Waiting for cow window appears on the touch screen.

Note that the milking station may already be in automatic mode after it has been started. In this case, the instructions below should not be carried out.

If the milking station is in manual mode:

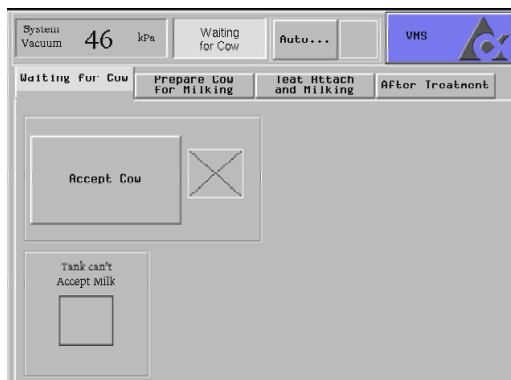
2. In the Waiting for cow window, press the *Accept Cow* button to make the station ready to receive a cow.

3. Press the *Auto* button to display the Auto and manual window.

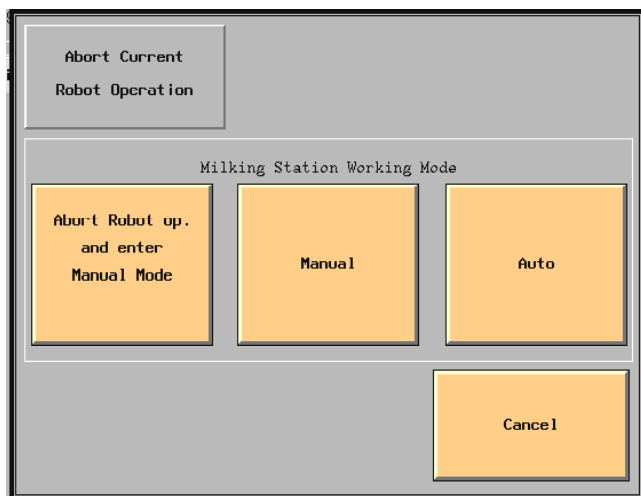


Main switch

Start button

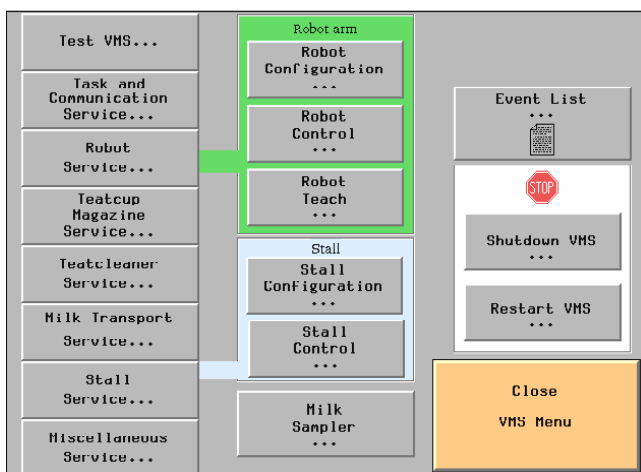


Waiting for cow window



Auto and manual window

4. In the Auto and manual window, press the *Auto* button. The milking station will now continue working in automatic mode.



VMS menu

Shutting off the milking station

Note: The milk lines are drained during shutdown of the station. To transport residual milk in the lines to the storage tank, see the section "Emptying the receiver and purging the milk lines" in this chapter.

On the touch screen:

1. Press the VMS button in the top right corner. This will display the VMS menu.
2. Press the *Shutdown VMS* button and confirm.
3. Wait a couple of seconds until the touch screen is blank.
4. Turn the main switch on the VMS power box into off position.



Restarting the milking station

Note: The milk lines are drained during the start-up of the station. To transport residual milk in the lines to the storage tank, see the section "Emptying the receiver and purging the milk lines" in this chapter.

On the touch screen:

1. Press the *VMS > Restart VMS* buttons.
2. Confirm that you have decided to restart the milking station.

Switching from manual to automatic mode

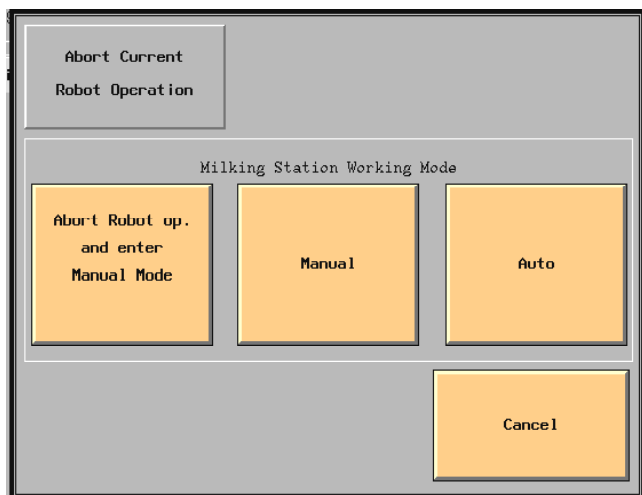
1. Press the *Auto* button at the top of the touch screen to display the Auto and manual window. (The *Auto* button has no cross beside it if the station is in manual mode.)

2. In the Auto and manual window, press the *Auto* button.

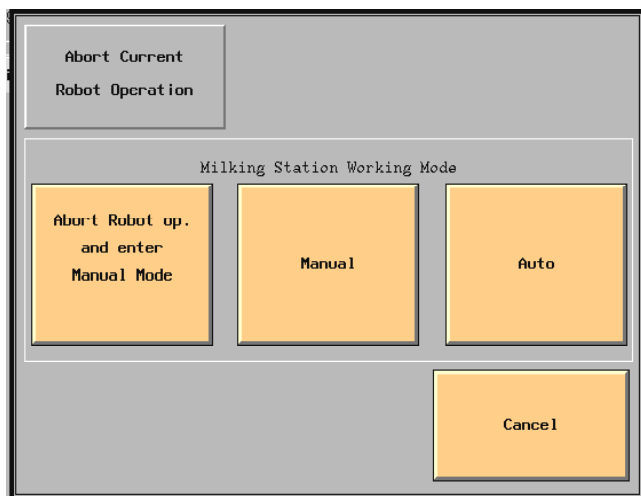
Switching from automatic to manual mode

1. Press the *Auto* button at the top of the touch screen to display the Auto and manual window. (The *Auto* button has a cross beside it if the station is in automatic mode.)

2. Press the *Manual* button.



Auto and manual window



Auto and manual window

Stopping the multi-purpose arm

1. Press the *Auto* button at the top of the touch screen to display the Auto and manual window.

2. To stop the multi-purpose arm, press the *Abort Robot op. and enter Manual Mode* or *Abort Current Robot Operation* button. This will also put the station in manual mode.

3. You can press the *Cancel* button if you do not want to make any changes to the working mode and the arm's activity.



Miscellaneous tasks

The following tasks are performed during service or when the system operation has stopped, for example, because of a power failure.

Parking the multi-purpose arm

Parking the multi-purpose arm can be done either by stopping the arm when it is in automatic mode or using the parking function in the Robot service window (see the section “Stopping the multi-purpose arm” above). In some cases, however, the arm may fail to go to its home position when it has been stopped. If this happens, use the parking function to send the arm to its home position.

Note: Ensure that the station is in manual mode.

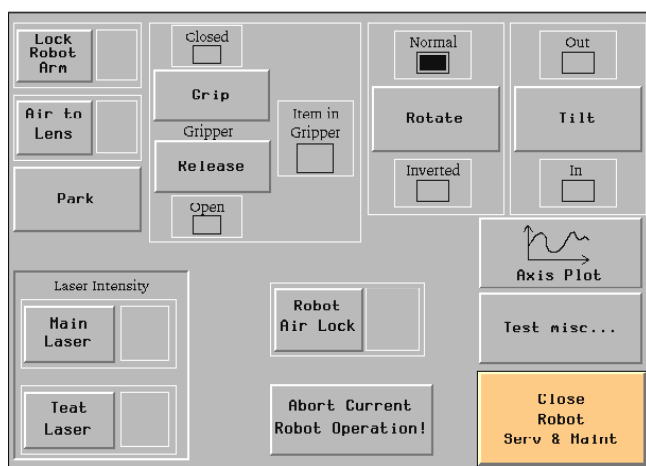
On the touch screen:

1. Press the VMS button in the top right corner. This will display the VMS menu.
2. Press the *Robot service* button. This will display the Robot service window.
3. Press the *Park* button. This will park the multi-purpose arm.
4. Press the *Close Robot Serv & Maint* button to close the window.

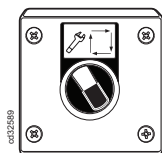
Note: The multi-purpose arm can not move if the service switch is in service mode.

Setting the multi-purpose arm to service mode

The multi-purpose arm is deactivated by setting the service switch to service mode.



Robot service window



Service mode



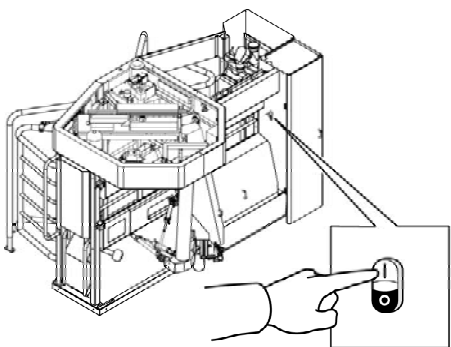
Working mode



Warning: The Robot Air Lock button does not deactivate the end effector.



Warning: The two buttons Main Laser and Teat Laser in the lower left corner of the window turn on the lasers. Do not stare into the laser beam.



Restarting the milking station after a power failure

When the power comes back, the milking station will be in stand-by mode. Do the following to restart the milking system:

1. Press the start button. This will restart the milking station, then *Waiting for cow* window will appear on the touch screen.
2. After the restart, the milking station will be in manual mode (if the default value is set to manual mode). To switch the milking station to automatic mode, see the section "Switching from manual to automatic mode" above.

Starting the hydraulic pump unit after oil temperature, oil level or motor protection alarms

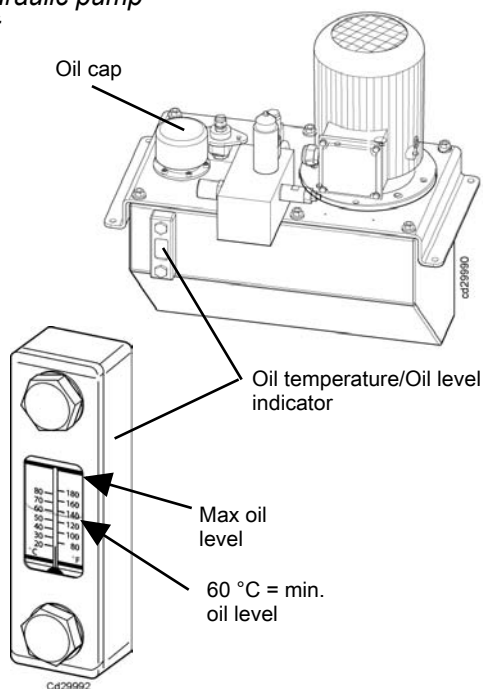
The oil temperature and oil level sensors triggers an alarm and stops the operation of the hydraulic pump unit when the oil temperature is too high (over 60 °C), the oil level is too low or the motor protection stops the motor. Perform the following tasks if any of these alarms are issued:

Oil temperature alarm

Make sure that the ambient temperature in the VMS room is below 40 °C. Wait until the oil temperature of the hydraulic pump unit drops below 55 °C. The hydraulic pump unit will then start automatically.



Hydraulic pump unit



Oil level alarm

Check the oil level on the indicator. The oil level should not decrease below the minimum level. Minimum oil mark is located at the same level as 60 °C. If necessary, open the oil cap and fill the pump unit with hydraulic oil recommended by DeLaval.



Warning: The multi-purpose arm is driven by hydraulic oil. Avoid skin contact when handling oil. Repeated contact with the oil may cause severe skin injury. Keep away from children and animals.



Caution: Only use DeLaval synthetic oil. Mixing this oil with hydraulic standard oil or any other type of oil may damage the system.



Caution: When filling the hydraulic pump unit with oil, ensure that no dirt or particles enter into the unit.

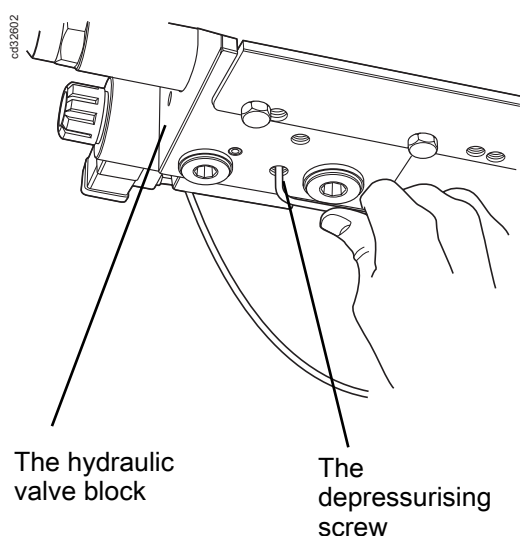


Shutting down the hydraulic pump unit

- To shut down the hydraulic pump unit, press the *Shut down hydraulic pump unit* on the touch screen. If any work should be done on the hydraulic system, the accumulator and must be depressurised, see section "Depressurising the hydraulic system" below..

Depressurising the hydraulic system

1. Turn off the main switch.
2. On the hydraulic valve block, open the depressurising screw until the system is depressurised.
3. Verify that the system is depressurised using a manometer.



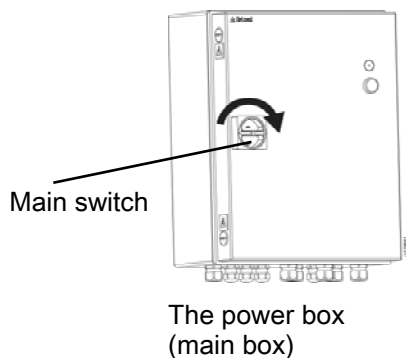
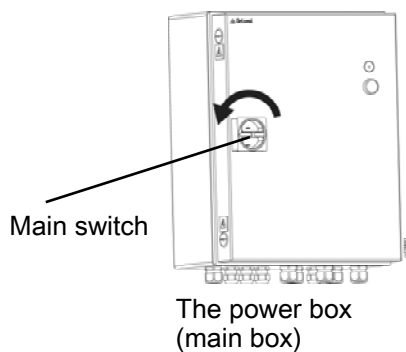
Resetting motor protection and control fuse



Warning: Service should only be carried out by personnel with the proper training and authorisation. This concerns all parts of the system.

Before anything else is done, check the main fuse for the VMS. Reset or replace the main fuse if necessary.

The motor protection covers the hydraulic pump unit motor and the milk pump motor. The control fuse covers internal wiring and



transformers.

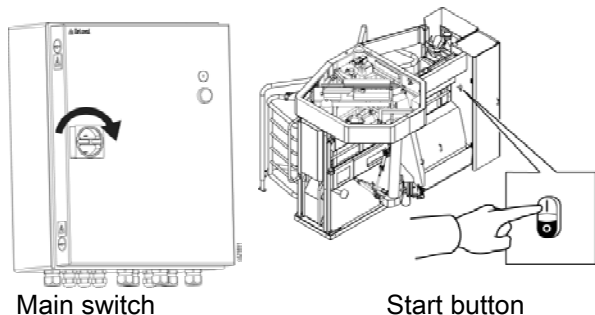
Resetting motor protection F01/F02

1. Shut off the electrical power supply by turning the main switch anti-clockwise.
2. Open the two latches on the power box and open the cover.
3. Reset the motor protection.
4. Close the cover and close the two latches.

5. Turn on the electrical power supply by turning the main switch clockwise.

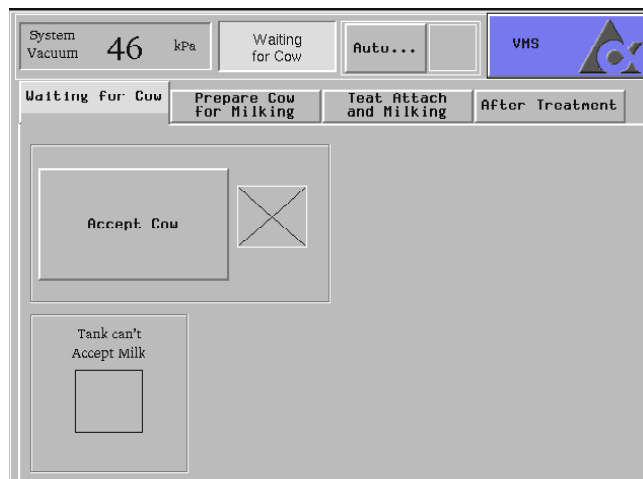
Resetting control fuse F03

1. Shut off the electrical power supply by turning the main switch anti-clockwise.
2. Open the two latches on the power box and open the cover.
3. Reset the control fuse.
4. Close the cover and close the two latches.
5. Turn on the electrical power supply by turning the main switch clockwise.

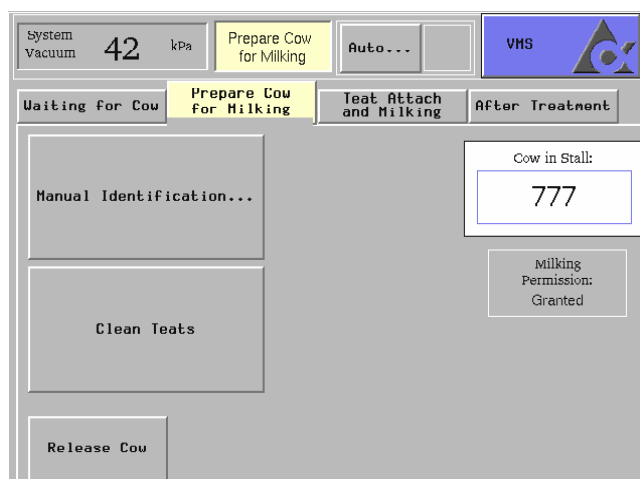


Main switch

Start button



Waiting for cow window



Prepare cow for milking window

A complete manual milking procedure

To milk a cow in the milking station manually, carry out the following procedure:

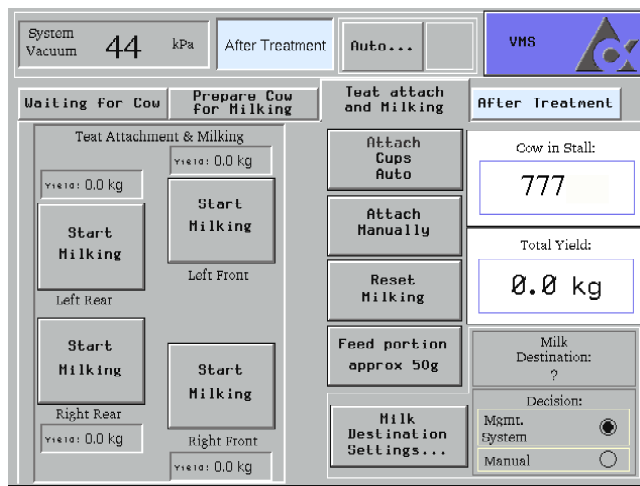
1. Switch on the electrical power by turning the main switch clockwise. Press the start button, then wait as it takes a while until the *Waiting for cow* window appears on the touch screen.
2. Make sure the service switch is in working mode. Stay outside the working range of the milking station (except when using touch screen).
3. In the *Waiting for cow* window, press the *Accept cow* button to make the station ready to receive a cow.

4. Press the *Prepare Cow for Milking* tab.

5. Make sure that the cow has been identified. An identified cow is indicated by the cow number, an unidentified by 0 (zero).

- If the cow has not been identified, press the *Manual Identification* button, enter the cow number on the keypad and press the *Ask for Permission to Milk* button.

6. Make sure that the cow has received milking permission. This is indicated by the word *Granted*. On the other hand, if she has not received milking permission this is indicated by the word *Denied*. If the cow has not received milking permission, she can be released from the station by pressing the *Release Cow* button.



Teat attach and milking window

7. Press the *Clean Teats* button to start the teat preparation.

8. When teat preparation procedure is complete, press the *Teat Attach and Milking* tab.

9. Check that the milk destination is the desired one. *Tank* means that the milk will be transported to the storage tank, *Divert* that the milk will be transported through the divert line. To have the milk pumped to the storage tank, make sure the milk tank is chosen as milk destination. (For further information, see the section “Change of milk destination” below.)

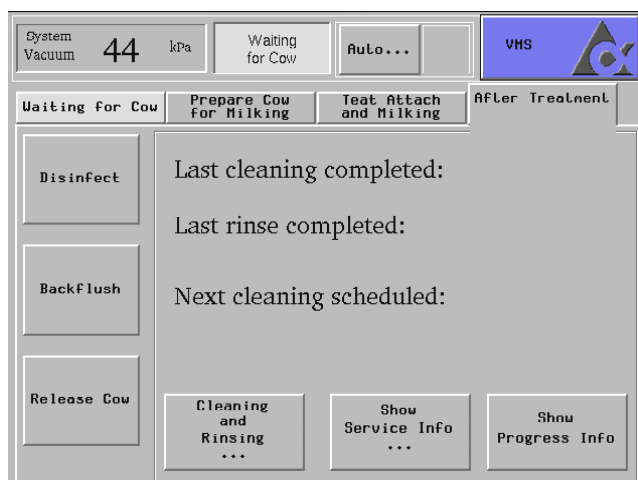
10. Press the *Attach Cups Auto* button to make the multi-purpose arm attach the teatcups. The station will start milking as soon as each cup has been attached.

Note: Never move a teatcup from one teat to another without using the buttons “Stop milking” and “Start milking”. Otherwise, the start positions (the arm’s latest attach positions) will be incorrectly updated.

Tip: The multi-purpose arm can hold the milk tubes during the milking. This prevents the cow from stepping on the tubes. This is performed automatically in automatic mode, but must be done via the touch screen in manual mode. See the section “Support of milk tubes” below.



Warning: Keep away from the milk tubes while they are being retracted into the magazine. You might be hit if you are standing too close.



After treatment window

10. When the milking is complete, press the *After Treatment* tab.

11. Press the *Disinfect* button to make the multi-purpose arm disinfect the teats.

12. When disinfection is complete, press the *Release Cow* button to open the exit gate and release the cow.

13. Press the *Backflush* button to carry out backflush.



The tasks that are carried out during the manual milking procedure, for example identification of a cow, are described as separate tasks in more detail in the following sections.

Stall and feeding functions

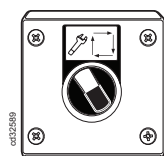
Stall and feeding functions include opening and closing gates, dispensing feed, adjusting the manger, controlling the rear plate and using the floor cleaning. These functions are performed using the Stall control window.

Note: Ensure that the station is in manual mode.

To display the Stall control window:

1. Set the service switch in service mode.
1. Press the VMS button in the top right corner. This will display the VMS menu.
2. Press the *Stall Control* button.

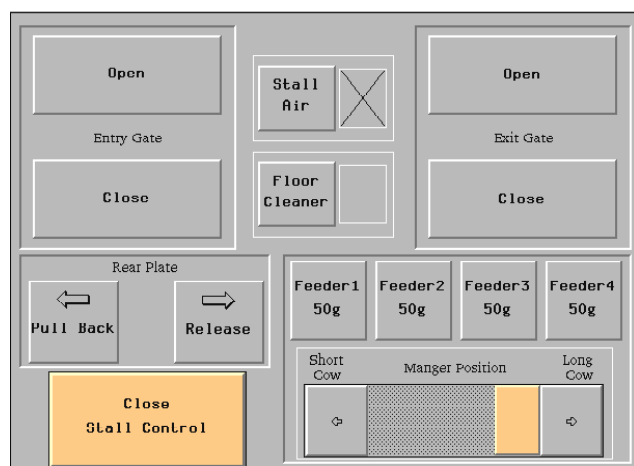
The buttons are used in the following way:



Service mode



Working mode



Stall control, left side-entry station

Open and **Close** buttons: opens or closes the entrance and the exit gates.

Release (Rear Plate): releases the rear plate against the back legs of the cow to make the teat attachment work properly.

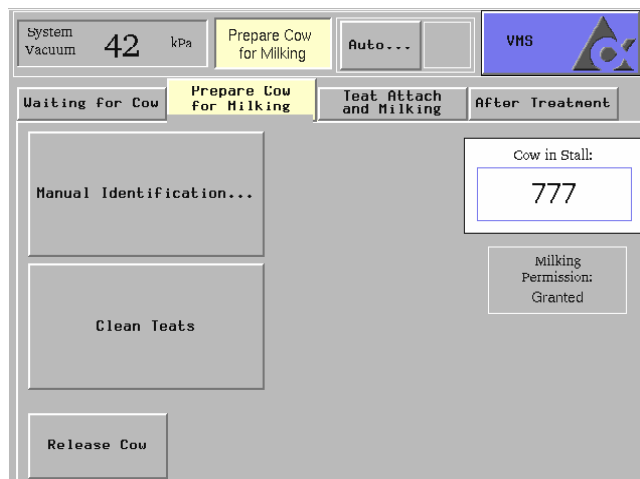
Pull Back (Rear plate): retracts the rear plate to the upright position.

Long Cow or **Short Cow** (Manger Position): adjusts the position of the manger. Short Cow moves the manger towards the cow, Long Cow further away.

Feeder 50 gr: dispenses 50 gram feed into the manger. (The number of buttons that can be used depends on the number of dispensers that are installed and in use.)

Floor Cleaner: flushes the floor with water.

Close Stall Control: closes the window.

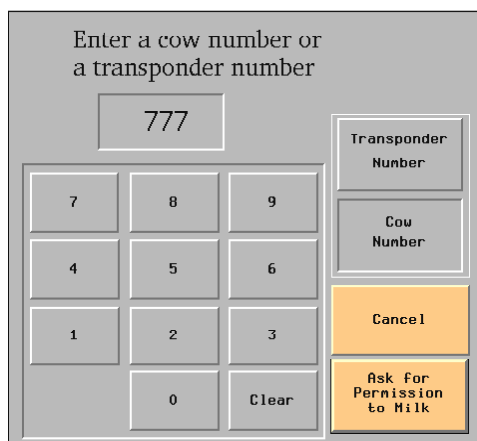


Prepare cow for milking window

Manual identification

Note: Ensure that the station is in manual mode.

1. Press the *Prepare Cow for Milking* tab on the touch screen. This will open the Prepare cow for milking window.
2. Press the *Manual Identification* button.
3. Choose to enter either the cow number or the transponder number. The cow number is default.



4. Enter the number on the keypad. The number will be shown above the keypad. Use the *Clear* button if you enter the wrong number.
5. Press the *Ask for Permission to Milk* button. A request will now be sent to the management software.
6. The procedure can be cancelled by pressing the *Cancel* button.

Change of destination

Note: Ensure that the station is in manual mode.

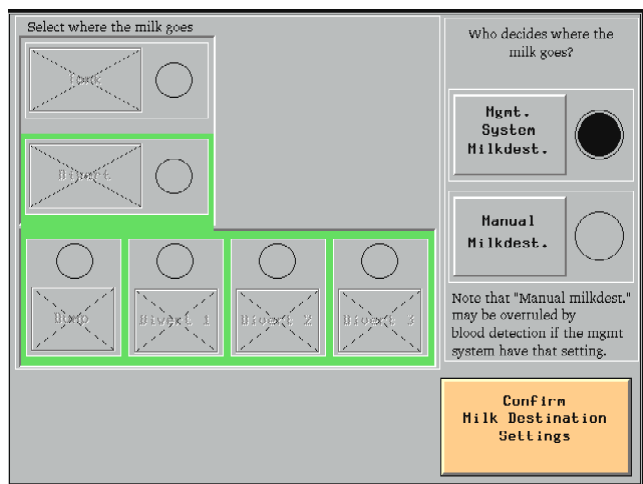
1. Press the *Teat attach and Milking* tab on the touch screen.



System Vacuum 44 kPa		After Treatment	Auto...	VMS
Waiting For Cow		Prepare Cow For Milking	Teat attach and Milking	After Treatment
Teat Attachment & Milking		Attach Cups Auto		
Yield: 0.0 kg		Cow in Stall: 777		
Start Milking		Attach Manually		
Left Front		Reset Milking		
Left Rear		Feed portion approx 50g		
Start Milking		Milk Destination Settings...		
Right Front		Milk Destination: ?		
Right Rear		Decision:		
Yield: 0.0 kg		M&M System <input checked="" type="radio"/>		
Yield: 0.0 kg		Manual <input type="radio"/>		

2. Press the *Milk Destination Settings* button.

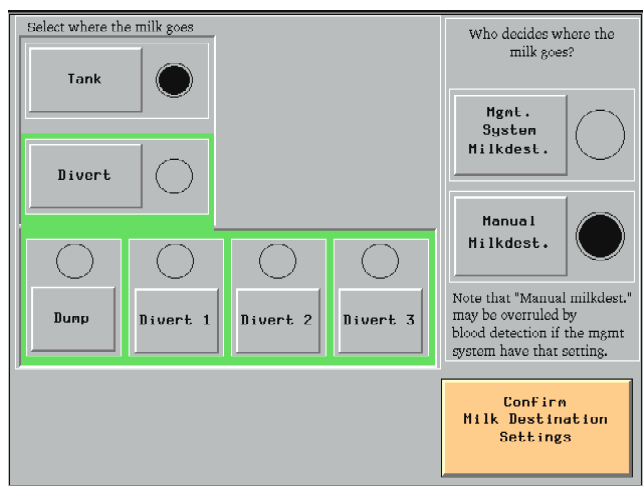
Teat attach and milking window



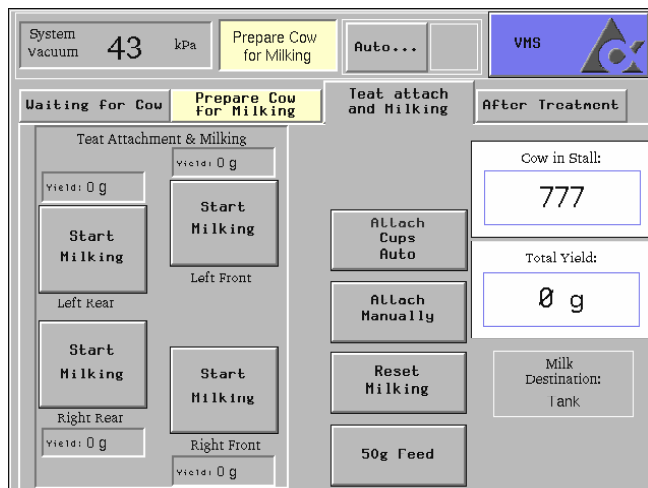
This is the setting for the Management System Milk Destination current milking session.

It is possible to change milk destination by clicking Manual Milk Destination. The milk destination can now be set manually.

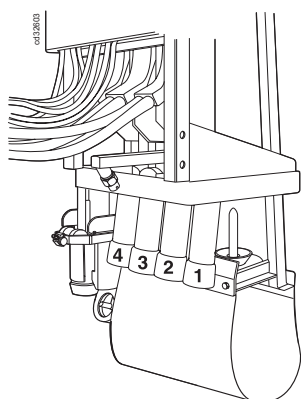
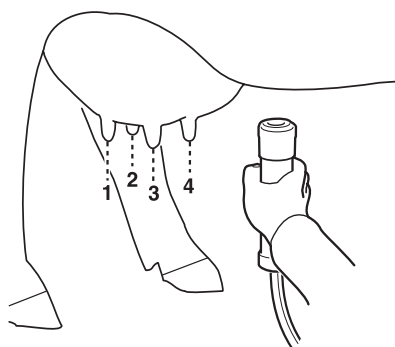
Milk destination set to Management System Milk Destination.



Milk destination set to Manual Milk Destination.



Teat attach and milking (left-side-entry station).



Teat attach and milking (left-side-entry station).

Attaching teatcups by hand

Attaching one cup at a time

Note: Ensure that the station is in manual mode.

In this procedure, the *Start Milking* buttons are used to release the teatcups.

The pictures are valid for left-side-entry station.

1. Press the *Teat attach and milking* tab on the touch screen.

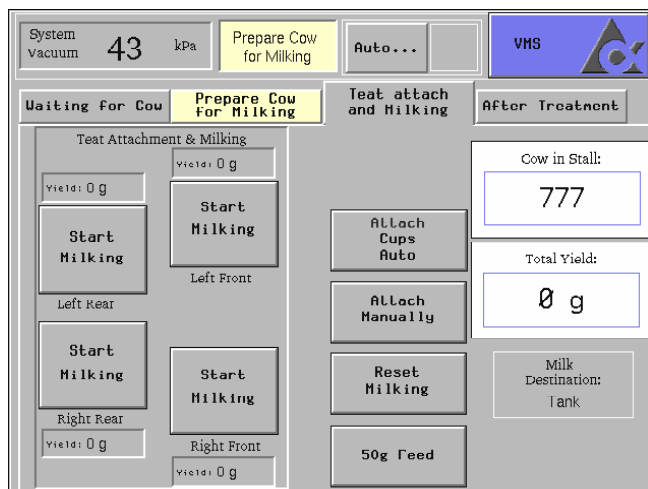
2. Press the *Start Milking (Right rear)* button. This releases teatcup Right rear and turns the vacuum on in the milk tube. Take the cup and attach it to teat number 1.

3. Press the *Start Milking (Left rear)* button. Take the cup and attach it to teat number 2.

4. Press the *Start Milking (Right front)* button. Take the cup and attach it to teat number 3.

5. Press the *Start Milking (Left front)* button. Take the cup and attach it to teat number 4.

Note: If the cow kicks off the teatcup during a milking the "Stop Milking" button will change to "Start Milking". Press the "Start Milking" button and attach the cup. Note, however, that the arm reattaches the cup if the station is working in automatic mode.



Teat attach and milking window

Attaching two cups at a time

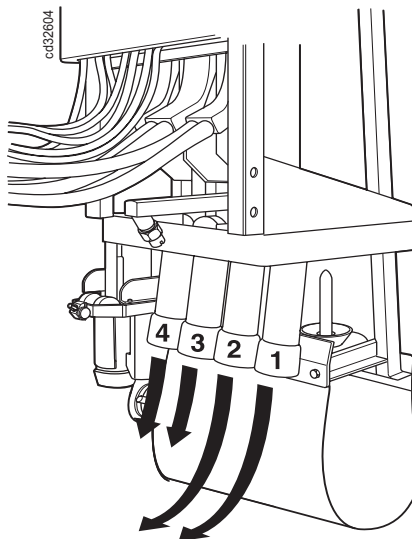
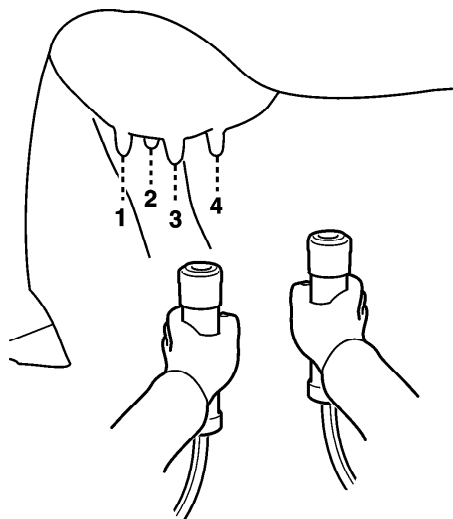
Note: Ensure that the station is in manual mode.

The pictures are valid for a left-side-entry station.

1. Press the *Teat Attach and Milking* tab on the touch screen.

2. Press the *Attach Manually* button. The cups will be released in pairs. Teatcups 1 and 2 will be released first, then 3 and 4.

3. Take each pair of teatcups and attach them to the correct teats.



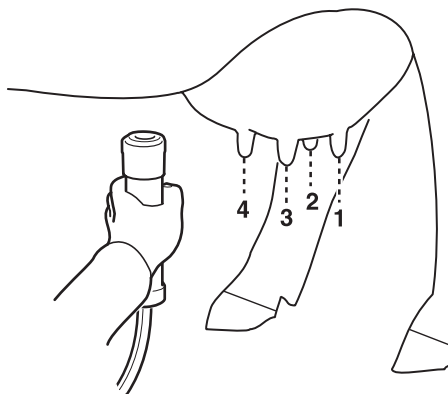
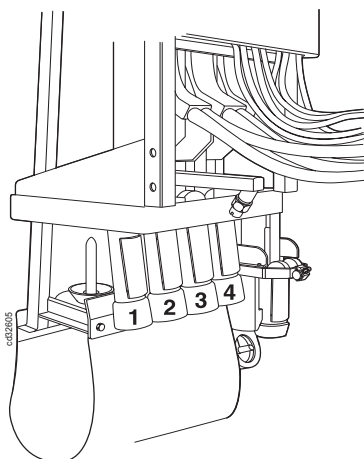


Attaching teatcups by hand on a right-side-entry station

The procedures for a right-side-entry station are the same as the ones for left-side-entry station.

Follow the instructions on the previous pages and use these pictures as guidance when working with a right-side-entry station.

Note that the buttons for the front and rear teats are placed differently on the touch screen.



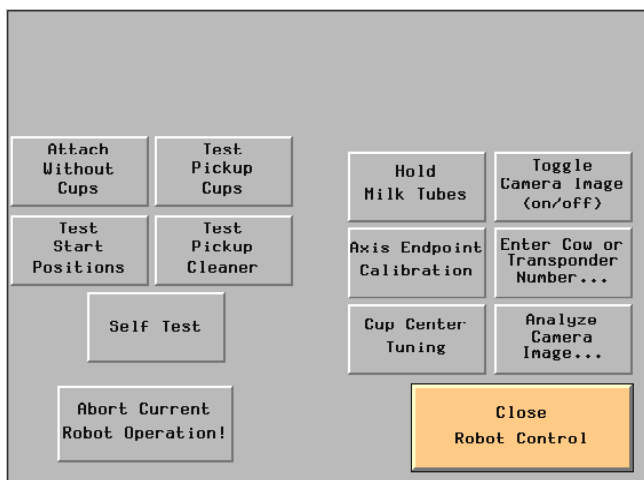
Teat attach and milking (right-side-entry station).

Support of milk tubes

Note: Ensure that the station is in manual mode.

To hold the milk tubes, on the touch screen:

1. Press the VMS button in the top right corner. This will display the VMS menu.
2. Press the *Robot Control* button.

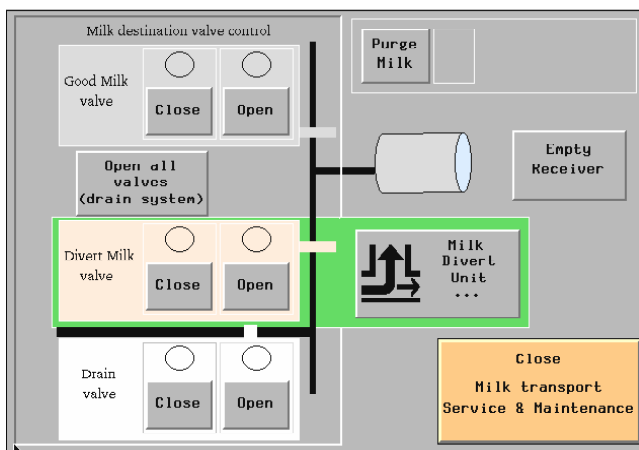


Robot control window

3. Press the *Hold Milk Tubes* button.

4. Press the *Close Robot Control* button to close the window.

The arm will hold the milk tubes during the milking. It will move away from the tubes when a teatcup is being retracted into the magazine.



Milk transport service and maintenance window

Emptying the receiver and purging the milk lines

Note: Ensure that the station is in manual mode.

Emptying the receiver and purging the milk lines are done from the Milk transport service and maintenance window.

On the touch screen:

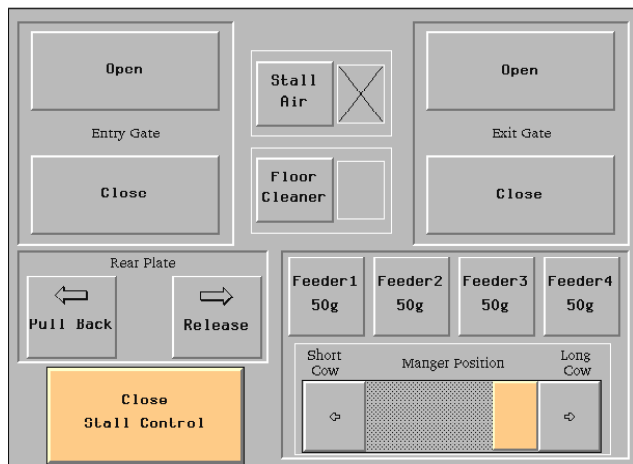
1. Press the VMS button in the top right corner. This will display the VMS menu.

2. Press the *Milk transport Service* button.

- To empty the receiver, press the *Empty Receiver* button.

- To purge the milk lines, press the *Purge Milk* button.

3. Press the button in the lower right corner to close the window.



Stall control window

Shutting off the compressed-air to the gates

Shutting off the compressed-air to the gates enables you to open or close the gates by hand. This is useful when cleaning the milking station since closing the gates prevents cows from entering while you clean the interior of the station, for example the manger.

Note: The *Stall Air* button shuts off the air supply to the end effector.

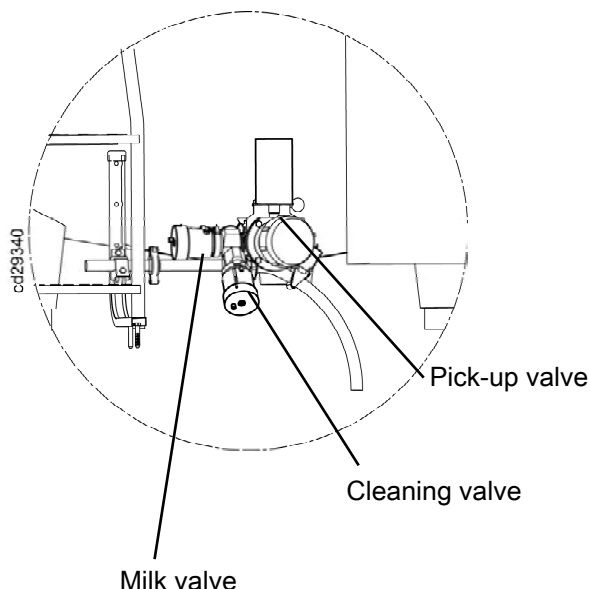
On the touch screen:

1. Set the service switch in service mode.
2. Press the VMS button in the top right corner.
3. Press the *Stall Control* button.
4. Press the *Stall Air* button. Make sure that there is no cross beside the button. This means that the air supply to the gates is shut off.

Tank emptying

Note: It is very important that the dairy personnel is informed about all handling and safety aspects concerning tank emptying.

Note: Additional instructions concerning tank handling, for example safety precautions, can be found in the documentation delivered with the tank. We strongly recommend you to read these before carrying out tank emptying or operate the tank in any other way.



Tank emptying process Flow controlled cooling (FCC)

In a Flow controlled cooling system, the tank emptying process is started by pressing the pick-up button on the tank. The current amount of milk in the receiver of the milking station is pumped to the tank. After this, the milk valve closes the inlet to the tank and the cleaning valve opens the return line to the cleaning unit. (The way the system works during tank emptying can be changed to suit requirements or local regulations. See "Options" below.) Cleaning of the VMS system is then started automatically.

Next, the hose from the dairy truck is connected to the tank outlet, the pick-up valve is opened and the tank emptying started.

When the tank has been emptied and the hose disconnected, the tank cleaning is started. When both systems have been cleaned, milking is resumed.

Options

There are two main options regarding tank emptying in an FCC system:

1) Milk delivery to the tank is not permitted after the pick-up button has been pressed.

The current amount of milk in the receiver is pumped to the tank. Milk extracted after this point can either be kept in the receiver until the tank cleaning is complete or, if the milk divert unit is installed, be pumped to divert 3, the pail furthest away from the drain.

Note that keeping milk in the receiver during the tank cleaning, excludes the possibility of cleaning the VMS system at the same time as the tank.



2) Milk delivery to the tank is delayed a specified number of minutes after the pick-up button has been pressed.

The milk is pumped to the tank when the milking session is complete or the delay has elapsed.

Instructions for both situations are provided below.

Note that local regulations might not permit tank emptying and milk delivery from the VMS system at the same time.

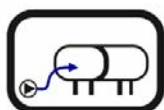
The choice to stop or delay milk delivery to the tank after the pick-up button has been pressed, depends on parameter settings in the MS config in PC. These are usually set during the start-up of the VMS system. Consult your service engineer if you have questions about these settings.

For instructions about how to specify the delay of milk delivery or, put differently, the time milking can continue after tank emptying has started, see chapter "Milking station" in the instruction book "VMSMgmt 2007".

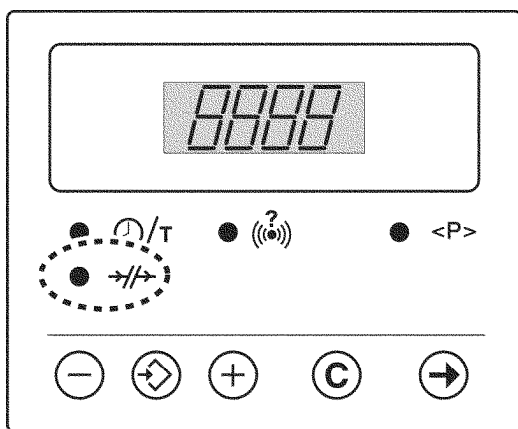
Tank emptying FCC: milk delivery to tank is stopped immediately

1. Press the yellow pick-up button on the tank's controlling/cleaning unit.

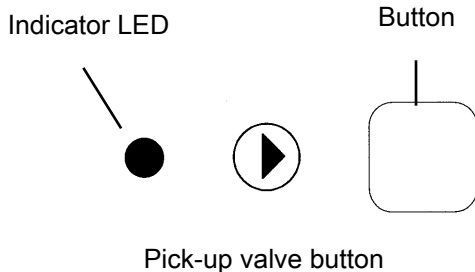
The button will start flashing, indicating that the VMS system has been notified that tank emptying is about to take place. Depending on parameter settings in the cleaning unit, the milk will now either remain in the receiver or be pumped over to the tank. The milk and cleaning valve at the tank will then switch their positions so that the delivery line closes and the return line opens; the tank will start stirring the milk. At this point, the button will stop flashing and shine with steady light.



Pick-up button



2. Check the indicated LED on the operating panel. This small lamp indicates whether there have been any errors in the cooling process. If the lamp is lit, do not proceed with the tank emptying. (Note: requires the Watchdog option. See the FCC instruction book.)



3. If desired, take a milk sample via the manhole at the top of the tank.

4. Remove the grey cap from the outlet.

5. Connect the hose of the dairy truck to the tank outlet.

6. To start tank emptying, open the pick-up valve by pressing the pick-up valve button in the lower right corner of the operating panel. (Pressing twice on the button closes the valve.) The cooling will now be stopped automatically.

If it is not possible to empty the tank completely, press the yellow pick-up button once more. Note that this will stop the tank-emptying procedure completely. The pick-up valve will then be closed and the milk and the cleaning valve return to their original milking positions.

7. When the tank is empty, disconnect the hose from the tank outlet.

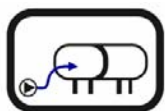
8. Fit the black cap on the tank outlet.



Start/stop cleaning button

9. Press the start/stop cleaning button to start the tank cleaning.

The yellow pick-up button will go off and the pick-up valve close when the tank cleaning is complete.



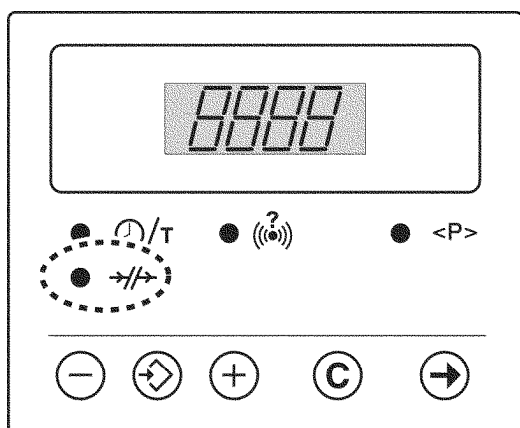
Pick-up button

Tank emptying FCC: milk delivery to tank is delayed

1. Press the yellow pick-up button on the tank's controlling/cleaning unit.

The button will start flashing, indicating that the VMS system has been notified that tank emptying is about to take place. The VMS system will start a timer that controls how long milking can continue during the tank emptying.

The yellow pick-up button will continue flashing until the milking station has finished milking the cow or the timer has elapsed, and until the milk has been pumped over to the tank and the milk and the cleaning valve have switched position. At this point, the button will stop flashing and shine with steady light. The idea is here to start the tank emptying before all this takes place.

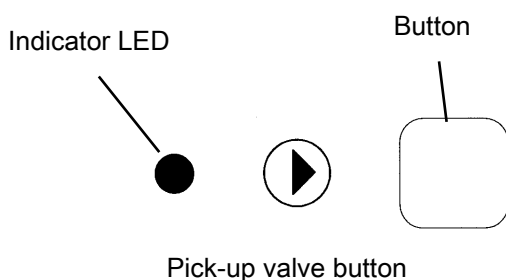


2. Check the indicated LED on the operating panel. This small lamp indicates whether there have been any errors in the cooling process. If the lamp is lit, do not proceed with the tank emptying. (Note: requires the Watchdog option. See the FCC instruction book.)

3. If desired, take a milk sample via the manhole at the top of the tank.

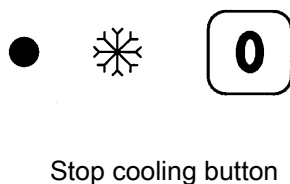
4. Remove the grey cap from the tank outlet.

5. Connect the hose of the dairy truck to the tank outlet.



6. To start the tank emptying, open the pick-up valve by pressing the pick-up valve button in the lower left corner of the operating panel. (Pressing twice on the button closes the valve.)

If it is not possible to empty the tank completely, press the yellow pick-up button once more. Note that this will stop the tank-emptying procedure completely. The pick-up valve will then be closed and the milk and the cleaning valve return to their original milking positions.



7. Stop the cooling by pressing the stop cooling button on the operating panel.

For the cooling to stop automatically, the pick-up button must shine with steady light and the pick-up valve be open.

8. When the pick-up button shines with steady light and the tank is empty, disconnect the hose from the tank outlet.

9. Fit the black cap on the tank outlet.



10. Press the start/stop cleaning button to start the tank cleaning.

The yellow pick-up button will go off and the pick-up valve close when the tank cleaning is complete.



Tank emptying: tank systems from other manufacturers

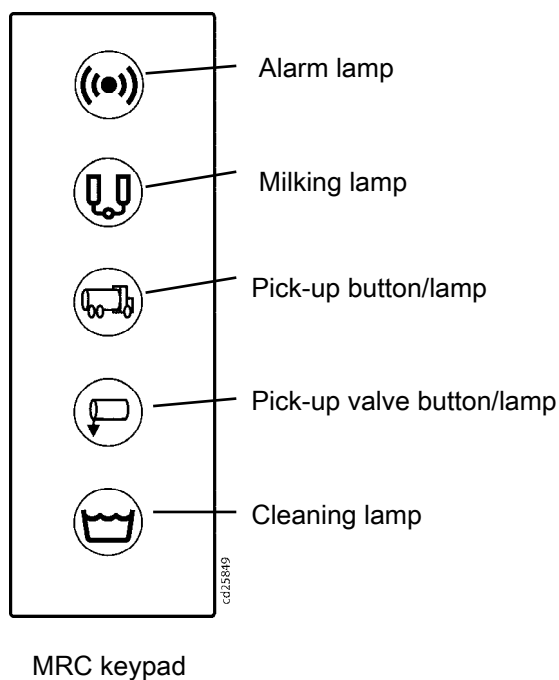
The tank emptying process for VMS systems using storage tanks from other manufacturers is, in principle, the same as for FCC systems. The process is, however, carried out by using the MRC keypad (MRC = Milk room controller) instead of the operating panel on the tank.

The options regarding tank emptying are also the same as for FCC systems. See "Options" above.



Warning: To ensure that you carry out the tank-emptying procedure safely and properly, see the tank manual for any additional notes.

Controls on the MRC keypad.





DeLaval voluntary milking system VMS

Operation

Control	Status	Meaning
Alarm lamp	ON	User notification concerning the tank system. The VMS system is still operating.
	Flashing	Stop alarm. The VMS system has been stopped.
	OFF	No alarm.
Milking lamp	ON	Milk can be delivered to the tank; milk in tank should be cooled.
	Flashing	Milk can be delivered to the tank; milk in tank should not be cooled (tank is probably empty).
	Flashing fast	Milk cannot be delivered to the tank. (An alarm will be issued if this state is held for too long.)
	OFF	No milking takes place.
Pick-up button/lamp	ON	Button has been pressed to notify the VMS system that tank emptying is about to take place. The VMS system has stopped, or has just finished, conveying milk to the tank. Inlet to tank (milk valve) has been closed.
	Flashing	Button has been pressed to notify the VMS system that tank emptying is about to take place. Milking session is still in progress and the VMS system will convey milk to the tank when the session is complete or the delay has elapsed. Inlet to tank has not yet been closed.
	OFF	Button has not been pressed.
Pick-up valve button/lamp	ON	The pick-up valve is open and the tank is (probably) being emptied.
	Flashing	The pick-up valve is open and the tank is (probably) being emptied. Milking session is still in progress and the VMS system will convey milk to the tank when the session is complete or the delay has elapsed. Inlet to tank has not yet been closed.
	OFF	Pick-up valve is closed.
		Pick-up valve button is used to open the pick-up valve.
Cleaning lamp	ON	Tank cleaning is running; not possible to convey milk to tank.
	OFF	Tank cleaning is not running.

To empty the tank, carry out the steps below. If necessary, see the tank manual for additional instructions on how to operate the tank.

1. Press the pick-up button on the MRC keypad.
2. Stir the milk for at least two minutes.
3. When the stirring is complete, switch off the cooling.



4. If desired, take a milk sample via the manhole at the top of the tank.

5. Remove the grey cap from the tank outlet and connect the hose from the dairy truck.

If local regulations permit milk delivery to tank while tank emptying takes place, the pick-up valve can be opened and the tank emptying started while the pick-up lamp is flashing. If not, these actions should not be carried out until the pick-up lamp is shining with a steady light.

6. To start the tank emptying, open the pick-up valve by pressing the pick-up valve button.

7. When the tank is empty, disconnect the hose from the tank outlet.

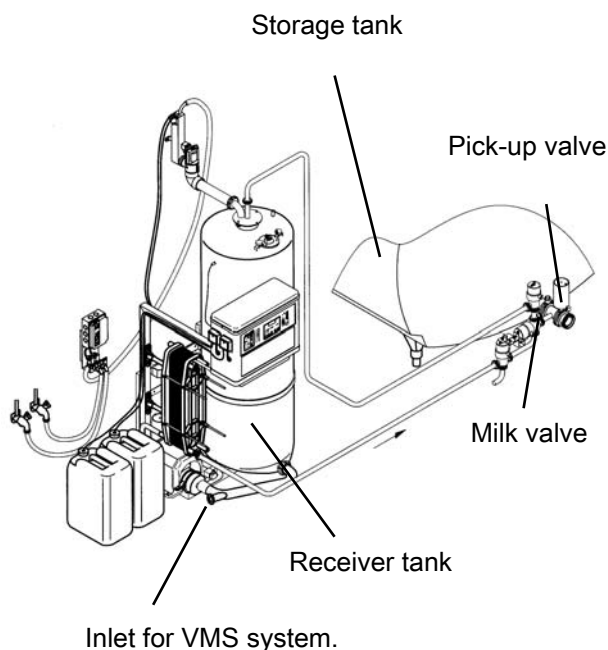
8. Fit the black cap on the tank outlet.

9. Start the tank cleaning.

Tank emptying process: VMS/IN cooling systems

In an Instant cooling system, the milk in the receiver tank must first be pumped over to the storage tank before the tank emptying can begin. When the milk has been conveyed to the storage tank, the milk valve at the inlet to the storage tank is closed. The VMS system will, however, still be able to deliver milk to the receiver tank.

The hose from the dairy truck is then connected to the outlet of the storage tank; the pick-up valve is opened and the tank emptying started. When the tank has been emptied and the hose disconnected, the tank cleaning is started. When the tank cleaning has been completed, the receiver unit can resume pumping milk to the storage tank.

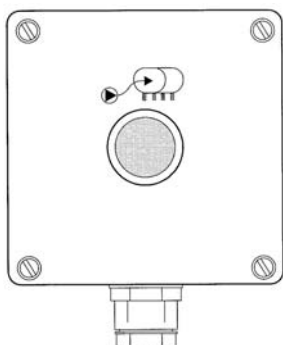




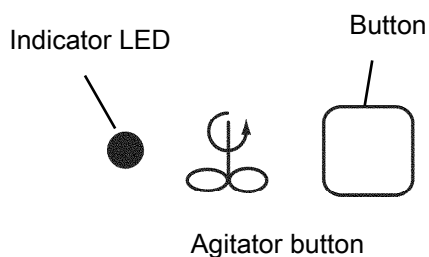
Warning: To ensure that you carry out the tank-emptying procedure safely and properly, see the tank manual for any additional notes.

Tank emptying: DeLaval storage tanks

1. To pump the milk in the receiver tank to the storage tank, press the milk-pump button on the pick-up box.



Pick-up box with milk-pump button.



cd26143

2. Press the agitator button on the storage tank and stir the milk for at least two minutes.



3. When the stirring is complete, press the stop cooling button to switch off the cooling.



4. If desired, take a milk sample via the manhole at the top of the tank.
5. Remove the grey cap from the tank outlet.
6. Connect the hose of the dairy truck to the tank outlet.
7. To start the tank emptying, open the pick-up valve by pressing the pick-up valve button in the lower right corner of the operating panel. (Pressing twice on the button closes the valve.)



Pick-up valve button

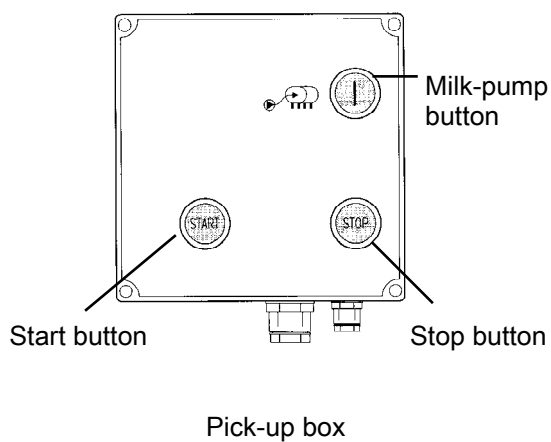
8. When the tank is empty, disconnect the hose from the tank outlet.
9. Fit the black cap on the tank outlet.
10. Press the start/stop cleaning button to start the tank cleaning.



Start/stop cleaning button

Tank emptying: storage tanks from other manufacturers

If in doubt on how to operate the tank, see its manual for further instructions.



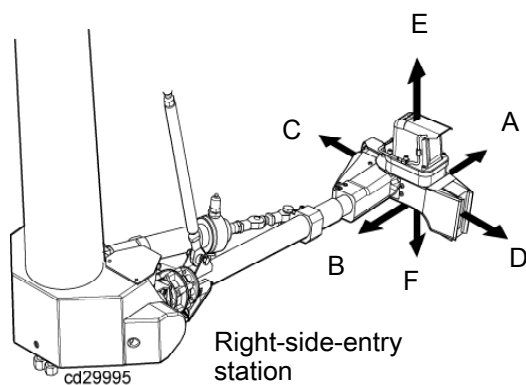
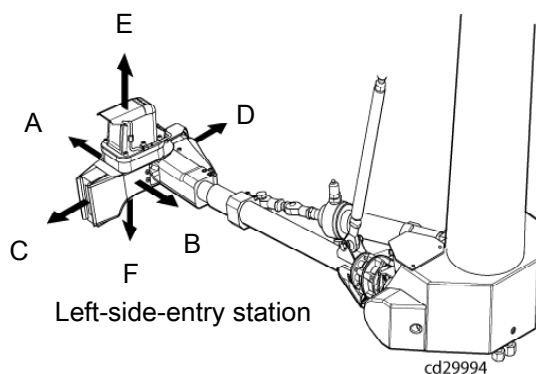
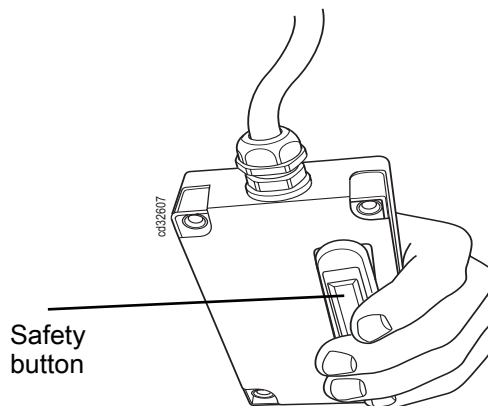
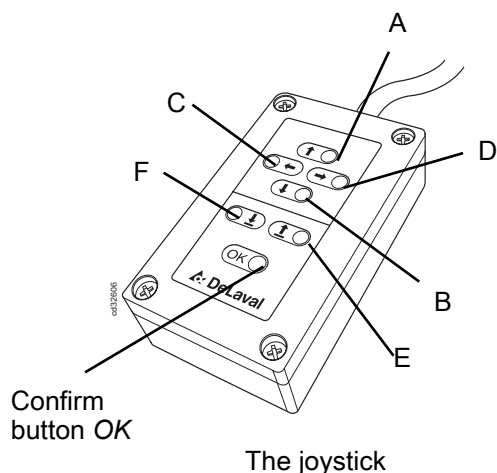
1. To pump the milk in the receiver tank to the storage tank, press the milk-pump button on the pick-up box.
2. Stir the milk inside the storage tank for at least two minutes.
3. When the stirring is complete, switch off the cooling.
4. If desired, take a milk sample via the manhole at the top of the tank.
5. Remove the grey cap from the tank outlet.
6. Connect the hose of the dairy truck to the tank outlet.
7. To start the tank emptying, open the pick-up valve by pressing the Start button on the pick-up box. (The Stop button closes the valve.)
9. When the tank is empty, disconnect the hose from the tank outlet.
10. Fit the black cap on the tank outlet.
9. Start the tank cleaning.



Determining cup and start positions

General principle

The letters A, B, C etcetera in the joystick picture corresponds to the same letters in the left-side-entry station and right-side-entry station pictures. The joystick is a two-hand-operation device. This means that the safety button on the back of the joystick must be pressed (half way in) to enable the multi-purpose arm to move and to make it possible to use the positioning buttons on the front. This is the case whenever you want to move the multi-purpose arm with the service switch in service mode, also when not determining positions.



The general procedure when determining positions is the following:

1. Setting the service switch to service mode. For further information, see chapter "Setting the multi-purpose arm to service mode" above.
2. Choosing which position or positions you have decided to determine. This is done from the touch screen.
3. Moving the multi-purpose arm carefully to the desired position by using the joystick.
4. Pressing the confirm button OK on the joystick to verify the position. If it is ok the multi-purpose arm moves away from the cup position.
5. If the camera cleaning nozzle start to spray after the confirm button OK has been pressed, this means:

- The arm is having difficulty in reaching the position,
- or the cup handle has not been detected by the sensor (this only occurs when determining teatcup or teat preparation cup positions).

Correct the problem and press the confirm button OK again.



Warning: If possible, stay out of the working range of the multi-purpose arm during the procedures. If you need to be within the working range, release the safety button on the joystick. In this way, you can stop any sudden movement the arm might make in your direction.

To determine the positions on the touch screen

1. Press the VMS button in the top right corner.
2. On the VMS menu, press the *Robot teaching* button.
3. On the appearing menu, press *Manual Teach*.

The buttons in the Robot teaching window have the following functions:

Teach All Teat Positions: for determining all teat positions at the same time.

Teach All Cup Positions: for determining the positions of all the teatcups at the same time.

Teach Teatcleaner Position: for determining the position of the teat preparation cup.

Teach Camera-clean. Pos.: for determining the position of the camera cleaning.

Cow Number: displays the cow number for an identified cow.

Identify Cow: for manual identification of a cow.

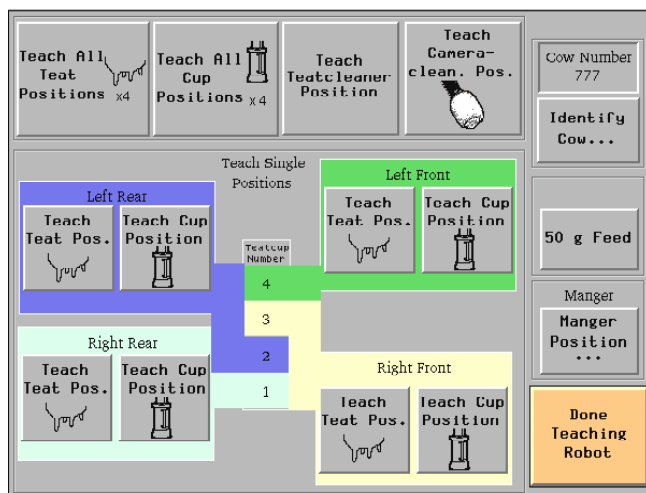
50 g Feed: for feeding a cow.

Manger Position: for adjusting the manger position.

Teach Teat Pos.: for determining the position of a particular teat.

Teach Cup Pos.: for determining the position of a particular teatcup.

Done Teaching Robot: closes the Robot



Robot teaching window



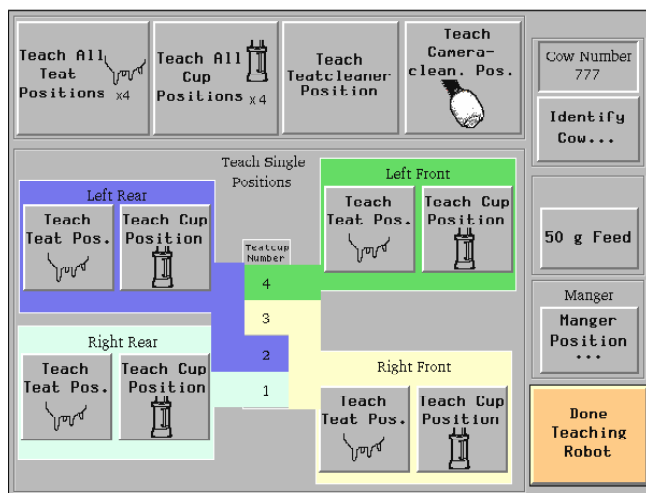
teaching window.

Determining the positions of all teatcups at the same time

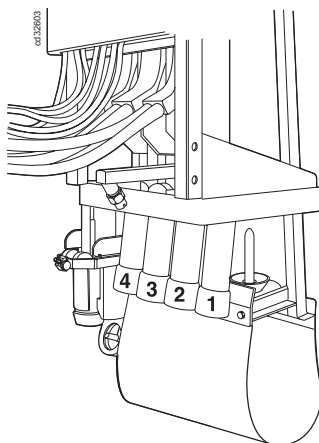
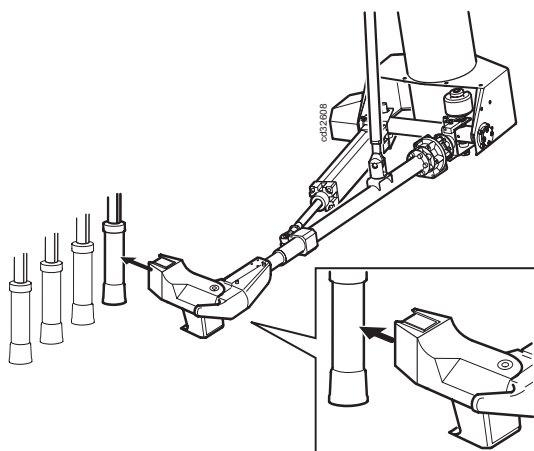
Note: Ensure that the station is in manual mode.

On the touch screen:

1. Set the service switch in service mode.
2. Press the VMS button in the top right corner.
3. Press the *Manual Teach* button.
3. On the VMS menu, press the *Robot Teaching* button.
4. Press the *Teach All Cup Positions* button. This will move the arm to an initial position near the teatcups.
5. Hold the safety button on the joystick and keep it held during the procedure.
6. Press (and release) the confirm button OK on the joystick as the appearing pop-up window requests.



Robot teaching window



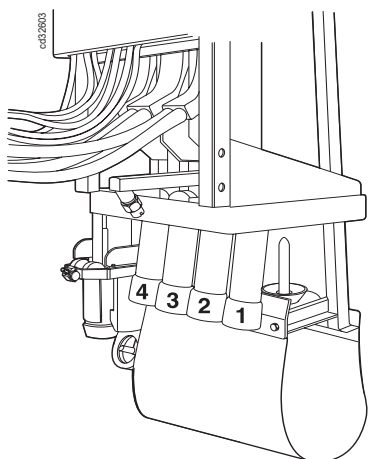
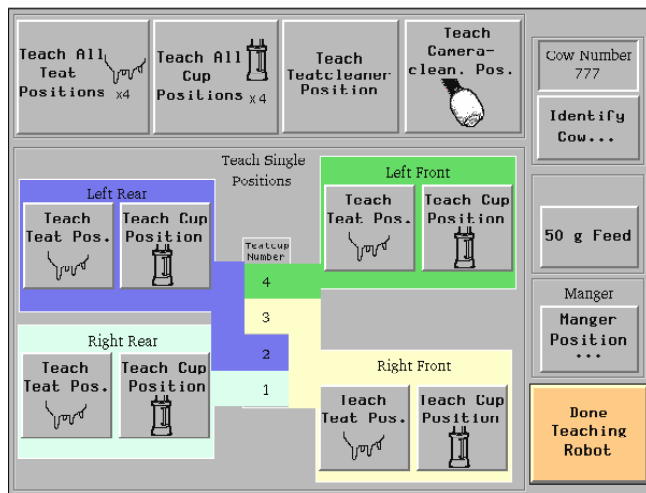
Left-side-entry station

7. Follow the instructions on the touch screen:

- Position the arm by using the joystick; the end effector must be able to attach the teatcup.
- Press the Confirm button OK on the joystick. The end effector will respond by magnetically attach the teatcup, and then release it. The arm will move away a short distance from the teatcup.
- Repeat the two previous sub-steps for the remaining teatcups. The order of determining the positions of the teatcups is shown in the picture.

The arm will be parked and the positions will be saved in the VMS database when you have confirmed the position of the last teatcup.

The procedure can be cancelled at any time. No changes in the VMS database will then be done.



Determining positions of individual teatcups

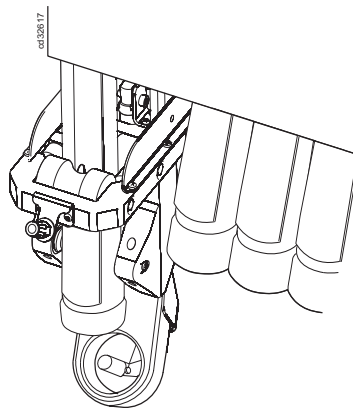
Note: Ensure that the station is in manual mode.

1. Set the service switch in service mode.
2. To start the procedure, on the touch screen press the *VMS > Robot teaching > Manual Teach > Teat Cup Position* buttons.
3. Hold the safety button on the joystick and keep it held during the procedure.
4. Press (and release) the confirm button OK on the joystick as the appearing pop-up window requests.
5. Follow the instructions on the screen.

Teatcup positions for left-side-entry station:

- Teach Cup Position (Right Rear): 1
- Teach Cup Position (Left Rear): 2
- Teach Cup Position (Right Front): 3
- Teach Cup Position (Left Front): 4

Note: The same principle is followed for a right-side-entry station.



Determining the position of the teat preparation cup

Note: Ensure that the station is in manual mode.

1. Set the service switch to service mode.
2. To start the procedure, on the touch screen press the *VMS > Robot teaching > Teach Teatcleaner Position* buttons.
3. Hold the safety button on the joystick and keep it held during the procedure.
4. Press (and release) the confirm button *OK* on the joystick as the appearing pop-up window requests.
5. Position the arm by using the joystick; the end effector must be able to attach the teat preparation cup.
6. Press the Confirm button *OK* on the joystick.

Note: To cancel the procedure you have to press the *"Done Teaching Robot"*, then *"Auto"* at the top of the touch screen, and finally *"Abort Current Robot op. and Enter Manual mode"* buttons.

Determining the position of the camera cleaner (sponge)

Note: Ensure that the station is in manual mode.

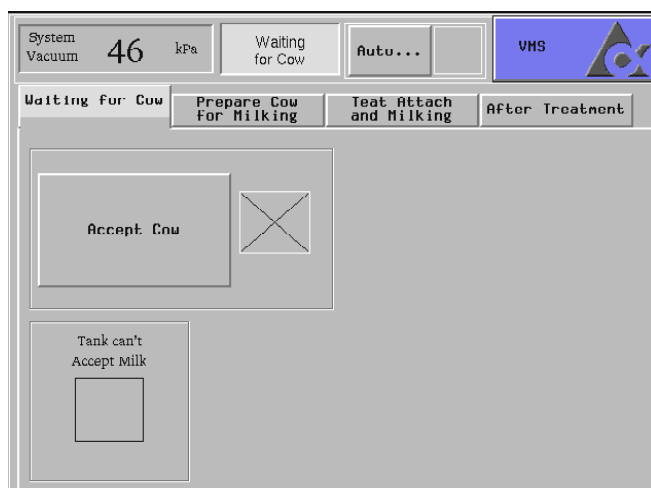
1. Set the service switch in service position.
2. To start the procedure, on the touch screen press the *VMS > Robot teaching > Teach Camera-clean Pos.* buttons.
3. Hold the safety button on the joystick and keep it held during the procedure.
4. Press (and release) the confirm button *OK* on the joystick as the appearing pop-up window requests.
5. Use the joystick to move the arm so that the camera cover touches the sponge.
6. Press the Confirm button *OK* on the joystick.



Determining all teat positions at the same time



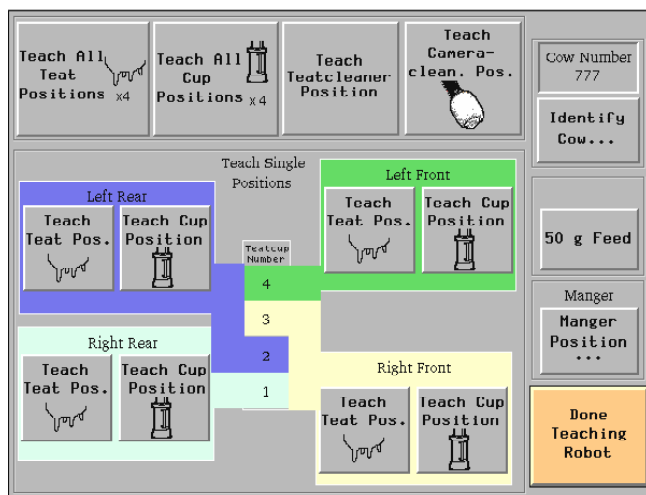
Warning: The milking station is using the lasers during this procedure. Do not stare into the laser beam.



Waiting for cow window

Note: Ensure that the station is in manual mode.

1. Set the service switch in working mode.
2. Let the cow enter the station.
3. On the touch screen, press the *Waiting for Cow* tab.
4. Press the *Accept Cow* button. Make sure that there is a cross beside the button.
5. When the cow has entered the station, allow some time for the cow to be identified.
6. Set the service switch in service mode.
7. Press the *VMS > Robot Teaching > Manual Teach* buttons.



Robot teaching window

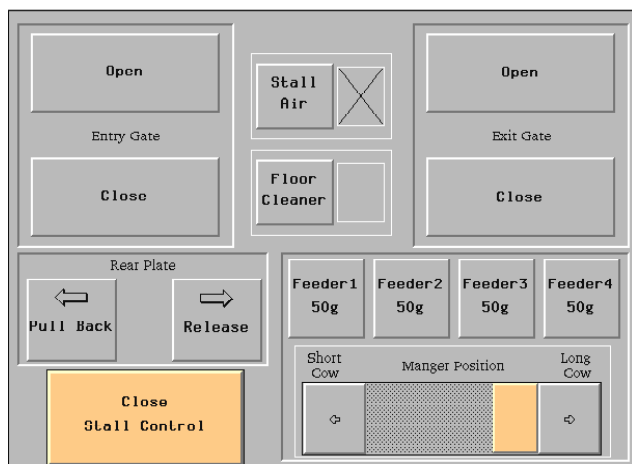
8. Make sure that the cow has been identified. An identified cow is indicated by the cow number, an unidentified by 0 (zero).

- If the cow has not been identified, then press the *Identify Cow* button, enter the cow number on the keypad and confirm.

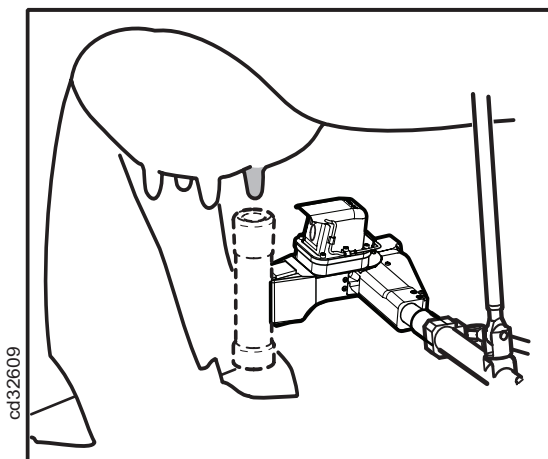
9. Press the *50g Feed* button to feed the cow.

It is important to adjust the manger position so that the cow is standing as far back as possible in the station. The rear plate must be resting against the rear legs of the cow.

10. Press the *Manger Position* button. This will display the Stall control window.



Stall control window



11. Adjust the manger position by pressing either the *Long Cow* or *Short Cow* button. The position of the manger will be saved in the database when you have completed the procedure.

12. Press the *Close Stall Control* button to close the Stall control window.

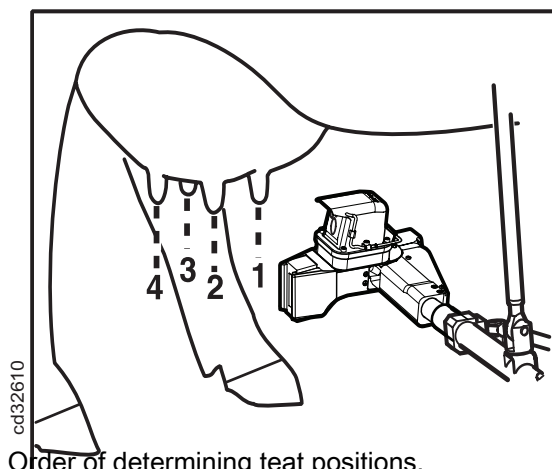
13. Display the Robot teaching window and press the *Teach All Teat Positions* button to start the procedure. This will move the arm to an initial position underneath the cow.

14. Hold the safety button on the joystick and keep it held during the procedure.

15. Press (and release) the confirm button *OK* on the joystick as the appearing pop-up window requests.

16. Follow the instructions on the touch screen:

- Move the arm carefully forward with the joystick so that the end effector is near the teat. Try to imagine a teatcup in the end effector. Make sure that the red laser beam is visible on the teat and especially near the tip of the teat.
- Press the Confirm button *OK* on the joystick. If it is ok the multi-purpose arm moves away from the cup position.
- Repeat the two previous sub-steps for the remaining teats. The order of determining the positions is shown in the picture.



Order of determining teat positions.
left-side-entry station.

The arm will be parked when the last position has been determined.

The teat positions for the cow are now saved in the VMS database.

The procedure can be cancelled at any time.

Note: If the cow has short teats, it is important to move the end effector close to the teat in order to obtain a good position.



Determining individual teat positions

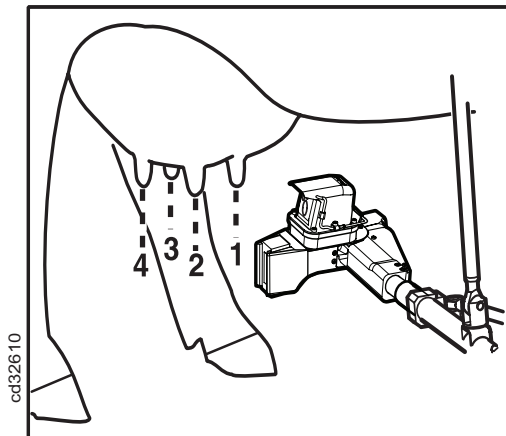
1. Follow the steps 1 to 9 in the previous section.

2. Press the *Teach Teat Pos.* button for the teat whose position you have decided to determine.

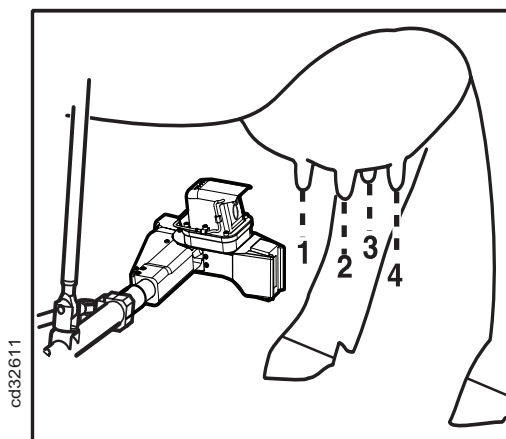
3. Follow the instructions on the touch screen and the sub-steps for step 11 on the previous page.

Note: Determining all teat positions at the same time is the recommended method.

If you determine the position of a rear teat, for example number 3, re-determining the position of the corresponding front teat is recommended, in this case number 1.



Cow in right-side-entry station.



Cow in left-side-entry station.



Automatic determining/determination of all teat positions

Cows returning from calving to a new lactation have often changed in udder shape. If this is the case, the position of each teat must be re-established before the cow can be successfully milked in the VMS again.

Note: *Automatic determining of teat positions is not suitable for new cows before they are thoroughly accustomed to the VMS and the multi-purpose arm. Even if they have had enough experience with the stall to tolerate manual determination with multi-purpose arm and joystick, unaccustomed cows will jump and move too much for a successful automatic determination.*

Note: *Automatic determining of teat positions only works for cows with four teats.*

Automatic determination of teat positions is enabled on a per cow basis in the the management software. For more information, see chapter "VMS cow settings" in the instruction book "VMSMgmt 2007".

Milking station in automatic mode

When a cow with milking permission enters the stall in automatic mode and automatic determination of teat positions is enabled for her, this will be performed without any cup in the end effector before teat cleaning or cup attachment. If successful, the new teat positions are saved in the VMS database and subsequently used. If less than four teats are identified within a maximum time of 3 minutes, no change is made in the VMS database.

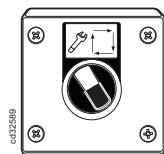
Milking station in manual mode

In manual mode, automatic determining of teat positions for a cow in the stall can be commanded from the touch screen. Make sure the cow is correctly identified.



DeLaval voluntary milking system VMS

Operation

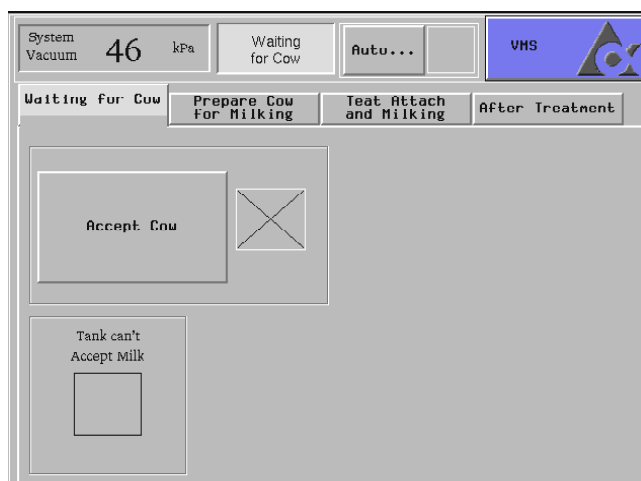


Service mode



Working mode

1. Set the service switch in working mode.
2. Let the cow enter the milking station.

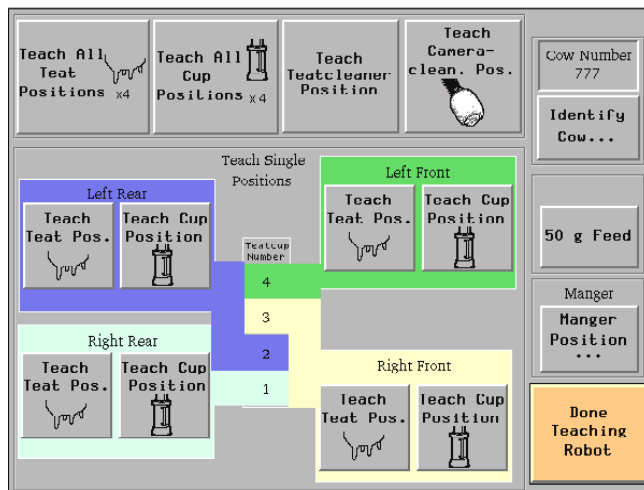


3. On the touch screen, press the *Waiting for cow* tab.

4. Press the *Accept Cow* button. Make sure that there is no cross beside the button.

5. When the cow has entered the station, allow some time for the cow to be identified.

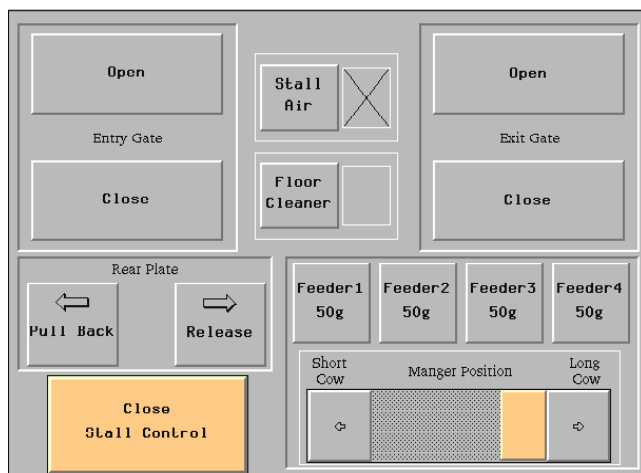
1. Set the service switch in service mode.



5. Press the *VMS > Robot Teaching* buttons.

6. Make sure that the cow has been identified. An identified cow indicated by the cow number, an unidentified by 0 (zero).

- If the cow has not been identified, then press the *Identify Cow* button, enter the cow number on the keypad and confirm.



7. Press the *50g feed* button to feed the cow.

It is important to adjust the manger position so that the cow is standing as far back as possible in the station. The rear plate must be resting against the rear legs of the cow.

8. Press the *Manger Position* button. This will display the Stall control window.

9. Adjust the manger position by pressing either the *Long Cow* or *Short Cow* button. The position of the manger will be saved in the database when you have completed the procedure.

10. Press the *Close Stall Control* button to close the Stall control window.

11. Press *Done teaching robot > Auto teach*. A pop-up window shows: *Set the service switch to work mode*.

12. Set the service switch to working mode.

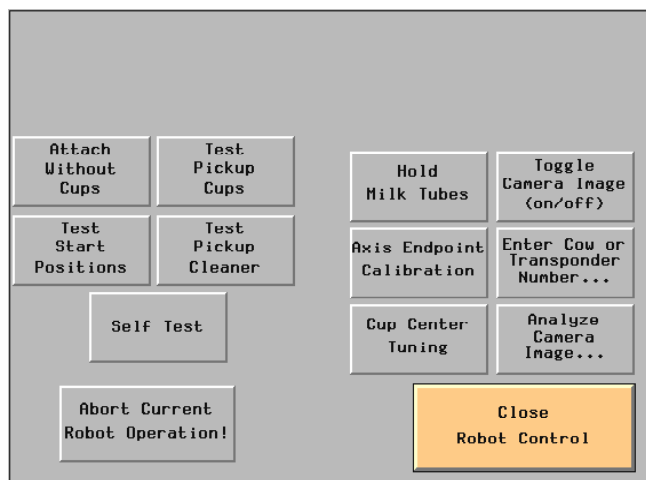
13. Automatic determination of all teat positions starts automatically and the new teat positions are saved in the VMS database and subsequently used.

14. Release the cow.

Verification of determined positions



Warning: Stay out of the working range of the multi-purpose arm at all times during these tests.



Robot control window

Note: Ensure that the station is in manual mode.

Note: To stop the multi-purpose arm during any of these tests, press the VMS > Robot Control > Abort Current Robot Operation buttons.

Note: These operations are performed with the safety switch in working mode.

To verify the determined positions, go to the Robot control window by pressing the VMS > Robot control buttons.

Verifying the positions of the teatcups

In this test, the arm moves to the magazine, picks up each teatcup and releases it.

- Press the *Test Pickup Cups* button.

Verifying the position of the teat preparation cup

In this test, the arm fetches the teat preparation cup, pulls it out, then releases it.

- Press the *Test pickup cleaner* button.

Verifying the teat positions

In this test, the arm moves to the teat positions of an identified cow.



Warning: One of the lasers is used during this test. Do not stare into the beam.



- Let a cow into the milking station.
- Display the Waiting for cow window.
- Press the *Accept Cow* button.
- Display the Prepare cow for milking window and check that the cow has been identified.
- If the cow was not identified, press the *Manual Identification* button and identify the cow manually.
- Display the Robot control window by pressing the *VMS > Robot Control* buttons.
- Press the *Test Start Positions* button to start the test.
- When the arm moves to the first position, check that the position is good enough for attachment, then press the Confirm button on the joystick.
- Repeat the previous step for the remaining positions.

Searching for teats

In this test, the arm searches for the teats of an identified cow to verify that it can find the teats. The arm performs the test without fetching the teatcups.



Warning: *The lasers are used during this test. Do not stare into the beams.*

- Carry out the steps in the previous test necessary for receiving and identifying the cow.
- In the Robot control window, press the *Attach without cups* button.



VMS cleaning

Operation

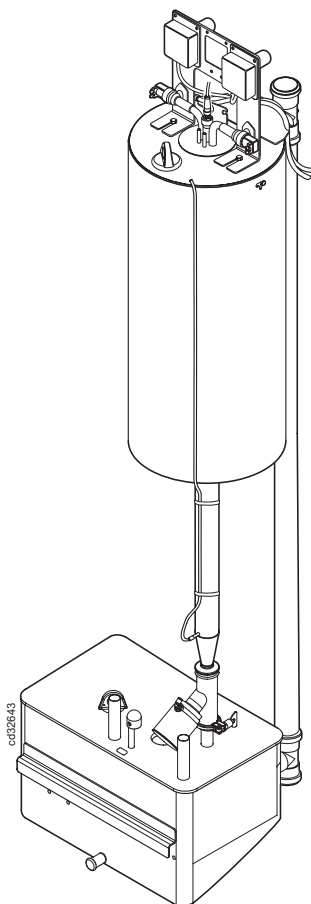
For information about system settings and options, see chapter "Milking station" in the instruction book "VMSMgmt 2007".

Always consult your DeLaval service engineer if you have questions about the cleaning unit or cleaning-in-place (CIP) in general.

Contents

This chapter contains the following sections:

- General advice for achieving good cleaning results
- Detergents and detergent dosing
- Maintenance and calibration
- Starting cleaning or rinsing from the touch screen
- Viewing the progress of a cleaning process



The cleaning unit

General advice for achieving good cleaning results

Water quality

Water has a great importance for the cleaning result. Knowing the following features is important:

- Hardness is related to the calcium and



magnesium concentration in the water. The DeLaval detergents are capable of giving good cleaning results when the water hardness is lower than 30 dH. If the hardness is higher than 30 dH, it has to be treated.

- High levels of iron and manganese will impair the cleaning result and should preferably be taken care of by a water treatment system.
- If the pH of the water is high, together with a high alkalinity, the acid cleanings will be less effective and the dosage of the acid concentration will need to be increased.
- The water should be almost free from bacteria. E-coli types should not be traceable at all. If so, changing the water resource should be taken into consideration.
- The water should be clean, clear, and should not have a poor smell.

Detergent consumption and concentration

Make sure that the supply of detergent is sufficient to carry out regular cleaning. However, do not buy large supplies since active components decompose with time.

Sufficient concentration of detergents must be used. At too low concentrations impurities will not be dissolved and rinsed out of the system.

See further under "Detergents and detergent dosing" below.

Water temperature

Water temperature must remain within the range 45-72 °C during the complete circulation phase. The first figure is the temperature of the return water at the end of the phase, the second figure the start temperature. A slightly higher start temperature will not impair cleaning results. A temperature lower than 45 °C of the return water will, however, cause problems. Fat will crystallise and create deposits within the piping system that will be difficult to



remove.

One way to solve a too low temperature of the return water may be to raise the start temperature somewhat. Another may be to insulate the piping of the system.

Optimal temperature of the pre-rinse water is 35-45 °C. In this range, milk residues will be rinsed out of the system. Temperatures above 50 °C will, on the other hand, cause the proteins in the milk to denature and precipitate as deposits within the system.

Hot water supply

Make sure there is enough hot water to clean all subsystems at the same time: milking station(s), storage tanks, etc.

Bear in mind that some hot water will be lost due to mixing it with the cold water in the boiler(s). If the boiler(s) does not produce enough hot water, a bigger boiler may be needed.

Always consult your DeLaval service engineer if you have questions water temperature, detergents, water temperature, water supply, etcetera.

Detergents and detergent dosing

Alkaline dominant cleaning scheme

A phosphated, alkaline detergent such as DeLaval Ultra can handle water hardness up to 30 dH. If the hardness is higher than this, water treatment is necessary.

The table below may serve as a guideline for an alkaline dominant cleaning strategy.

Note that cleaning too often with acid detergent will reduce the effectiveness of the cleaning strategy since the acid detergent, such as DeLaval Cidmax, is a descaler and not intended to remove proteins and fat. Omitting use of alkaline detergent will therefore cause a build-up of impurities within the system. As few as two consecutive cleanings with acid detergent instead of alkaline might make it necessary to increase the dosing of the alkaline



detergent with as much as 50% the ensuing alkaline cleaning.

Ensuring sufficient regularity of alkaline cleaning is especially important for VMS since the milking station make use of DeLaval milk meter MM25 equipped with conductivity-measuring electrodes. A phosphated, alkaline detergent such as DeLaval Ultra must be used in order to remove impurities on these electrodes, and consequently to ensure proper functioning of the milk meters.

Note: The table must be followed with flexibility since the conditions may change in different farms. After changing the detergent dose, the result should always be checked up to six weeks.

Hardness (dH)	Dosing (%), Ultra	Frequency of acidic cleaning (Cidmax)	Dosing (%), Cidmax
1-10	0.50	One every 7th cleaning occasion	0.50
10-20	0.75	One every 4th cleaning occasion	0.60
>20	1.00	One every 2nd cleaning occasion	0.80

Alternating acid and alkaline detergent

The parameter settings for the cleaning strategy that alternates between acid and alkaline detergent are described in chapter "Milking station" in the instruction book "VMSMgmt 2007".

Always consult your DeLaval service engineer before changing parameter settings. Some parameters may also need authorisation to be changed.

Note: Mixing of an alkaline chlorinated cleaning solution with an acid cleaning solution should be avoided; the solutions may react and produce poisonous gasses.



Shelf life of detergents

All chlorinated, alkaline liquid detergents have a limited shelf life. Ideally, these type of products should be consumed within six months from the manufacturing date. The reason for this is that the active chlorine components decompose with time, which reduces the detergent's ability to disinfect and dissolve proteins. Consider the following:

- Make sure detergents are consumed before the use-by date or within six months from the manufacturing date.
- Do not buy quantities that will last longer than three months. Avoid buying containers larger than 25 kilograms (20 litres).
- Do not store detergents at temperatures above 25 °C, for example in the machine room or other warm rooms/compartments. See the manufacturer's advice for additional notes about storage.

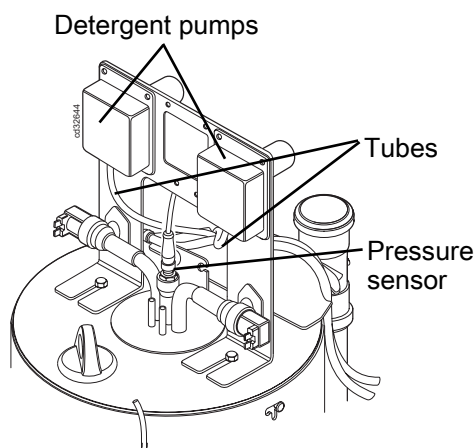
Dosing parameters

Note: Never change parameter settings without first consulting your DeLaval service engineer.

Maintenance and calibration

There is no need for calibration of the detergent pumps. A pressure sensor, placed on top of the sensor pipe, ensures correct dosing of detergents. The maintenance point below is important to sustain correct dosing of detergents. Note that the maintenance task should be performed by an authorised DeLaval service engineer.

- The tubes in the detergent pumps should be replaced at least two times a year.





Starting cleaning or rinsing from the touch screen

Starting cleaning and rinsing manually

Note: Any ongoing backflush process must first be finished before cleaning or rinsing can be started.

1. Ensure that the milking station is in manual mode.
2. Remove any cow that might be in the milking station.

Note: Both gates should be closed to prevent a cow from entering before the system cleaning has been started. Closing and opening gates is done in the Stall control window.

3. Press the tab *After Treatment* on the touch screen to display the After treatment window.

4. In the After treatment window, press the *Cleaning and Rinsing* button. This will open the Cleaning and rinsing window.

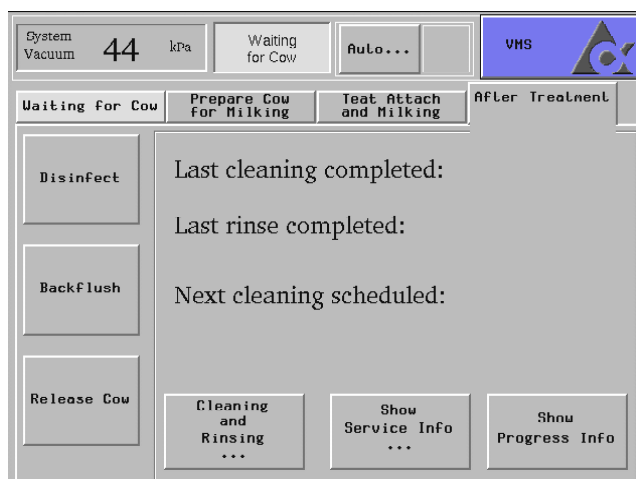
5. The settings for the six available cleaning programs are made by the service engineer in the management software. You can select one of these six cleaning programs. The selected program is the one you use when starting manual rinsing and cleaning from the touch screen.

If you selected the wrong type of cleaning/rinsing or changed your mind, press button Abort Cleaning/Rinsing to cancel the process. Take notice that when the cleaning is aborted, the system will perform a draining and drying cycle anyhow. This will take at least three minutes.

Rinsing is done with water only; system cleanings started manually from the touch screen are alkaline or acid. This is set by the service engineer.

If you selected a system cleaning, change filter sock in the milk filter unit when the cleaning has been completed.

Recommended interval for exchanging the



After treatment window

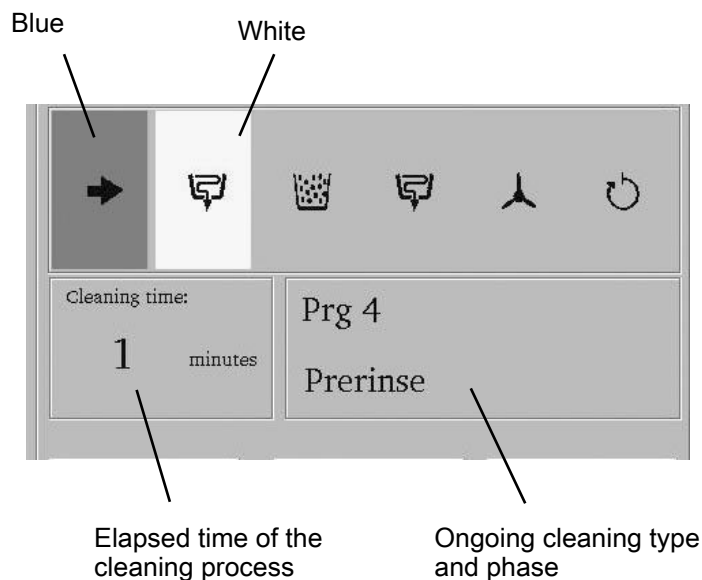


filter sock is three times a day. A new filter sock should always be inserted after a system cleaning.

Viewing the progress of a cleaning process

During a VMS cleaning session, each cleaning phase, for example, pre-rinse or circulation cleaning is displayed in the After treatment window. After starting a cleaning/rinsing process from the touch screen, view information about the cleaning process by pressing the *Close Cleaning and Rinsing* button.

Below is an example of a system cleaning.



Each cleaning phase is displayed at the top of the window. When the cleaning session starts, each phase changes colour progressively from left to right. Blue means that the cleaning phase has been performed, white means ongoing cleaning phase.

Ongoing cleaning phase is also displayed in the middle right corner of the touch screen. In this area it is also possible to see the cleaning type.



Elapsed time of the cleaning process is displayed in the middle left section.



DeLaval voluntary milking system VMS

Maintenance

Introduction

This chapter contains instructions on how to carry out maintenance on a regular basis.

Regular maintenance is vital to milk quality and system performance.

When carrying out maintenance, always use applicable manuals.

Note that the VMS system comprises DeLaval products that are used in other types of installations besides VMS. Consequently, these products; that is, compressor, vacuum pump and the refrigeration equipment have their own manuals or handbooks.

A maintenance schedule is provided at the end of this chapter. The schedule includes maintenance tasks that has to be carried out.

Maintenance routines for the milk sampler are covered in a separate chapter, see "Milk sampler; Maintenance".



Warning: Before carrying out any kind of maintenance, read the Safety precautions carefully. See the chapter "DeLaval voluntary milking system VMS; Safety precautions".

Daily checklist

The following checklist includes different components on a VMS system that has to be checked daily.

1. Overall performance
2. VMS management software
3. Vacuum



pump: DeLaval DVP-F, or VP 700

4. Atlas Copco SF4 Full-feature compressor

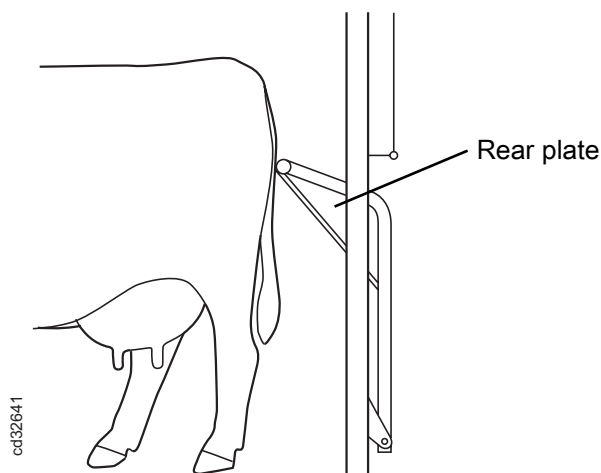
5. Cleaning detergent

Overall performance

Visit the barn and observe an automatic milking session from start to end. Examine the following to confirm that the milking station works properly:

Movements of the rear plate

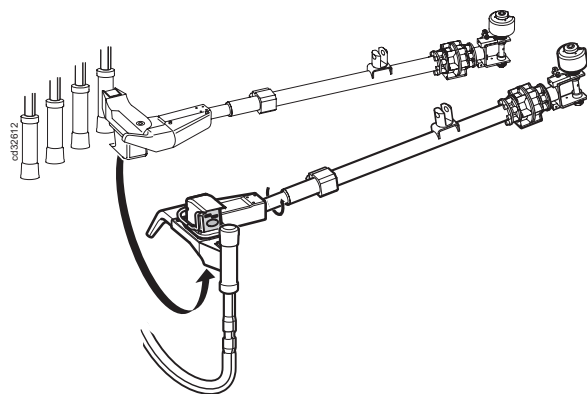
The plate should tilt forwards and rest against the back legs of the cow and be pulled back to the upright position when the cow has left the milking station.

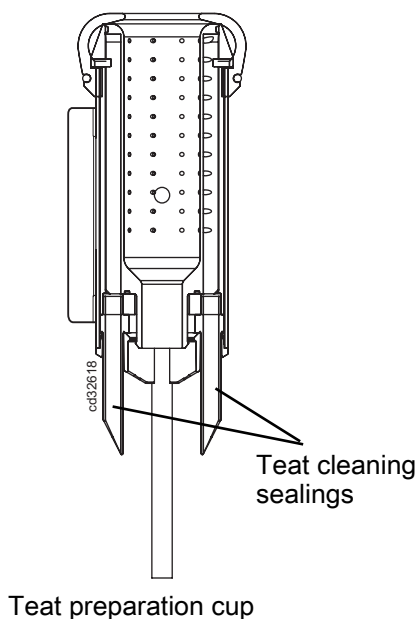


Multi-purpose arm

The arm should move and rotate smoothly and be able to fetch cups without difficulty. Re-determine the cup positions if necessary.

Proper functioning of the rear plate and multi-purpose arm will make it easier locating teats and contribute to more reliable milking process.





Teat preparation

Check that the vacuum is turned on immediately before attachment by listening to the change in sound from the cup. To maintain good udder health, check that teat cleaning is carried out without water escaping from the top or at the holes on the sides of the cup. If this occurs, the tube might be damaged or the teat is too long. Maximum teat length is 70 mm. Make sure that the wastewater and foremilk from the teat preparation are drained from the wastewater tank when the teat cleaning is completed. Also check the teat cleaning sealings concerning wear and leakage.

Function of disinfect spray

To maintain good udder health, check that all teats are disinfected properly. Refill disinfect liquid if necessary. (The liquid is kept in the front section of the milking station.)

Movements of the magazine between milking and cleaning/backflush position

To avoid stop alarms, check that the movements appear normal.

Backflush: Interior rinsing of teatcups and teat preparation cup

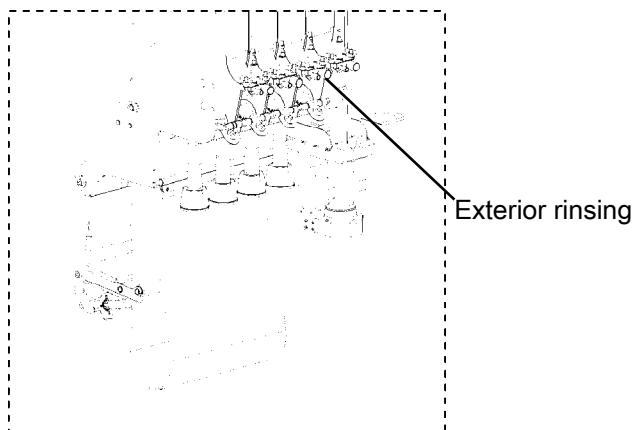
To prevent stop alarm as well as contamination between cows, confirm that the lid covers the teat preparation cup during the backflush.

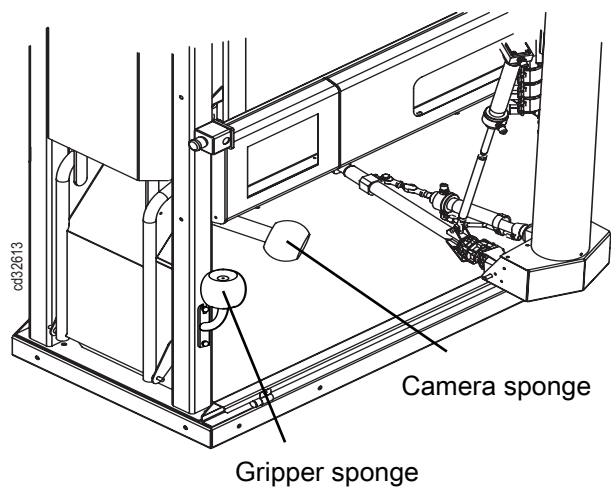
Cup shower (exterior rinsing of the teatcups)

Check that the teatcups are rinsed on both sides.

Liners and milk tubes

To maintain good udder health, check that the liners and milk tubes are free from puncture and other damage.





Camera sponge

To utilise the camera sufficiently, check that the camera sponge is clean, if not rinse it thoroughly.

Watch an automatic camera cleaning. If necessary, re-determine the position of the camera cleaner (sponge).

Gripper sponge

Check that the gripper sponge is clean, if not rinse it thoroughly.

Flushing of the floor by water

To avoid risk of contamination, check that the water jets have sufficient force.

Management software

In the management software (program in the PC), functions such as cow monitoring, status and reports should be checked daily. For further information about the functions, see instruction book "VMSMgmt 2007".

- Check the Status window to get information about milking sessions, actions that the milking station carries out and deviations, which may indicate that some part of the system is not working properly.
- Cow monitoring window monitors general health and the udder health of individual cows. Check the different indicators in the window:
 - Milk monitor
 - Incomplete milkings
 - Kick-off
 - Milking interval
- Check the following reports:
 - Attention reports that notify about issues such as, low feed consumption, insemination dates etc.
 - System reports



Maintenance

Vacuum pump

- Check that the vacuum level is 44 ± 1 kPa. Vacuum gauges are usually positioned in the machine room and at the milking station. The vacuum level is also displayed on the touch screen.

If necessary, see the service chapter in the manual that came with the product.

Atlas Copco SF4 Full-feature compressor

- Check that the air pressure is between 7-8 bar.
- Make sure that the ventilation (or heating) is sufficient to maintain ambient temperature between 10 and 30 °C.
- Check the dew point gauge.
- Drain the condensed water manually.

The compressor should never be exposed to temperatures below 0 (zero).

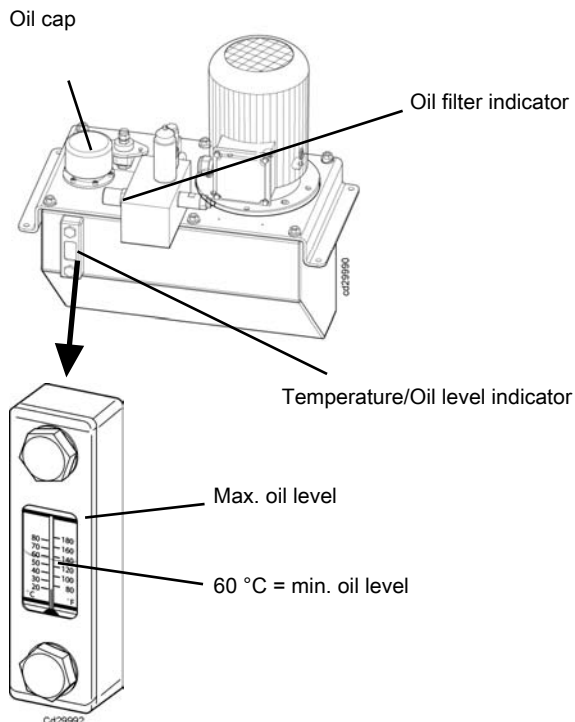
The ambient temperature of the compressor should not rise above 40 °C.



Warning: Do not perform service on the compressor without first consulting the handbook.



Hydraulic pump unit



Hydraulic pump unit

- Check the oil temperature of the hydraulic pump unit. Depending on the ambient temperature, normal temperature of the oil should be between 30-50 °C. If the temperature increases more than 60 °C, an alarm will be issued and the pump will stop.

The ambient temperature of the hydraulic pump unit should not rise above 40 °C.

- Check the oil level on the indicator. Oil level should not decrease below the minimum level. Minimum oil mark is located at the same level as 60 °C. If necessary, open the oil cap and fill the pump unit with oil.



Warning: The multi-purpose arm is driven by hydraulic oil. Avoid skin contact when handling oil. Repeated contact with the oil may cause severe skin injury. Keep away from children and animals.



Caution: Only use DeLaval hydraulic synthetic oil. Mixing this oil with hydraulic standard oil or any other type of oil may damage the system.



Caution: When filling the hydraulic pump unit with oil, ensure that no dirt or particles enter into the unit.



Cleaning detergent

- Make sure that the cleaning detergent used for system cleaning is not exhausted.
- Check that the cleaning detergent is being employed as it should be.

Daily maintenance

As a recommendation, the milking station should be cleaned three times a day to avoid contamination between the cows. Especially important items below are:

- Magazine, teatcups and milk tubes
- Teat preparation module
- Feeding module
- Stall and floor

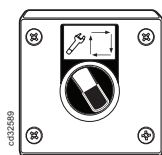
Cleaning equipment

- One or two brushes
- One or two buckets
- A piece of pneumatic hose (6 mm in diameter)
- A screwdriver with a flat blade
- Mild cleaning detergent
- Water hose

Preparations for working safely

Before cleaning the milking station, do the following:

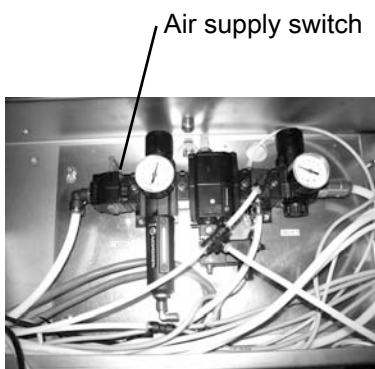
1. Put the milking station in manual mode and park the multi-purpose arm.
2. Deactivate the multi-purpose arm by setting the service switch to service mode.
3. Close both gates of the station to prevent cows from entering.



Service mode



Work mode



4. Shut the air to the stall (gates and feeding module) and lower arm with the air supply switch on the upper beam. The gates can be opened by hand when the air supply is shut.

For instructions, see the following sections in the chapter "DeLaval voluntary milking system VMS; Operation":

"Switching from automatic to manual mode".

"Deactivating the multi-purpose arm".

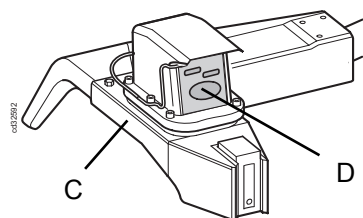
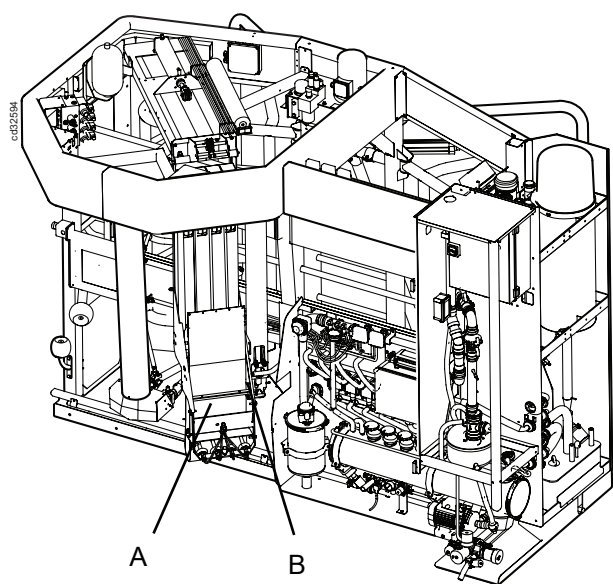
"Stall and feeding functions".

"Shutting off the compressed-air to the gates".

The following parts on the milking station should be cleaned daily.

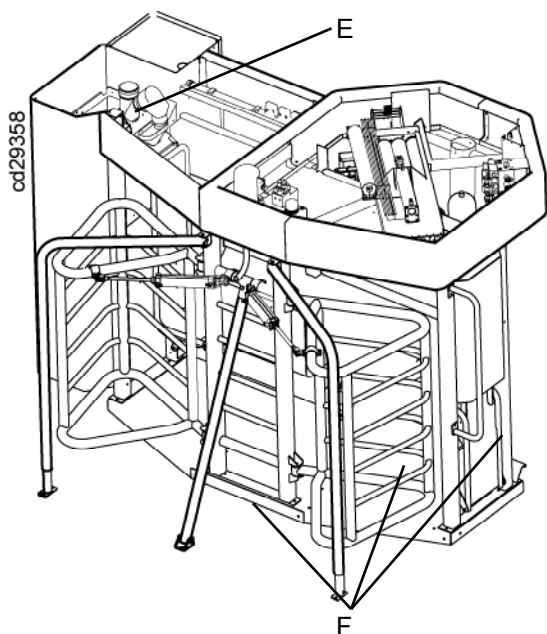
A. Magazine, teatcups and milk tubes

B. Teat preparation module



C. End effector

D. Camera window

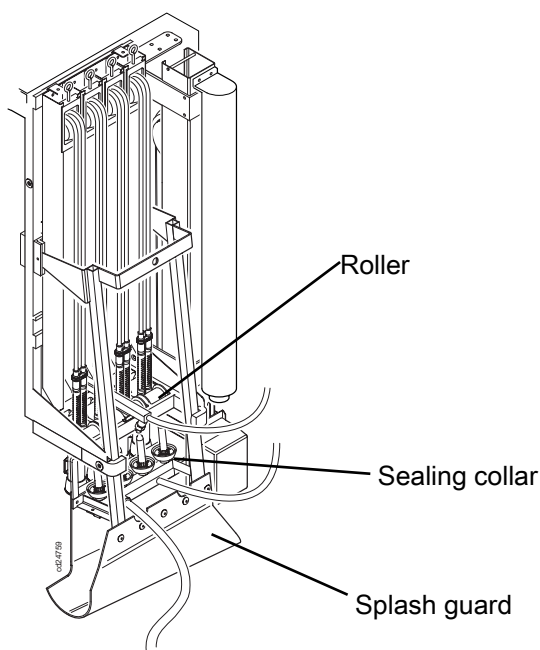


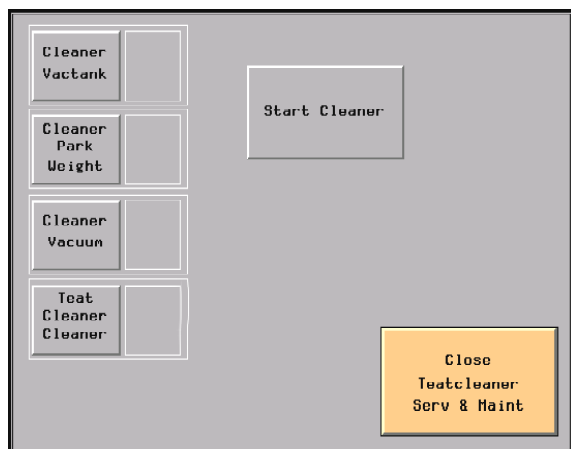
E. Feeding module

F. Stall and floor

Cleaning of magazine, teatcups and milk tubes

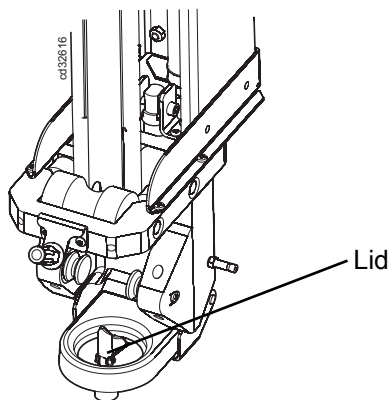
1. On the touch screen, press the *VMS*, then *Teatcup Magazine Service* button.
2. Press the *Release* button for each teatcup.
3. Clean the teatcups and the milk tubes using water, mild cleaning detergent, and a brush. Check the liners and tubes for punctures or other damage.
4. Use the water hose to remove dirt from rollers, sealing collars, nozzles and splash guard.
5. Flush the teatcups and milk tubes with water to remove the cleaning detergent.
6. Retract the teatcups back into the magazine by pressing the *Retract* button for each teatcup.
7. Check that the cords between the retraction cylinders and the pulleys are tight and not damaged or worn.
8. Press the *Done Testing Teatcups IO* button to close the window.





Cleaning of teat preparation cup

1. On the touch screen, press the *VMS*, then *Teatcleaner Service* button.
2. Press the button *Cleaner Park Weight* twice, then pull out the teat preparation cup.
3. Clean the teat preparation cup and its tube using water, mild cleaning detergent, and a brush. Check the tube for damage.
4. Flush with water to remove the cleaning detergent.



Teat preparation cup home position

5. Flush the home position, including the lid.
6. Retract the teat preparation cup by pressing *Cleaner Park Weight*.
7. Check that the cord between the retraction cylinder and the pulley is tight and not damaged or worn.
8. Press the *Close Teatcleaner Serv and Maint* button to close the window.

Cleaning of end effector



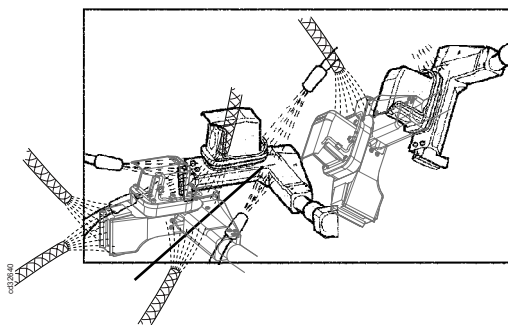
Warning: Never use fingers when cleaning the end effector.



Caution: Do not use high-pressure devices when cleaning the gripper. Penetrating water might destroy the gripper interior.



Maintenance



Cleaning of end effector

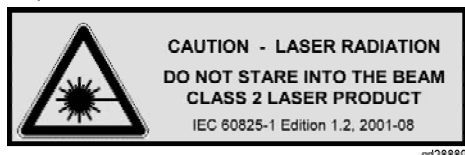
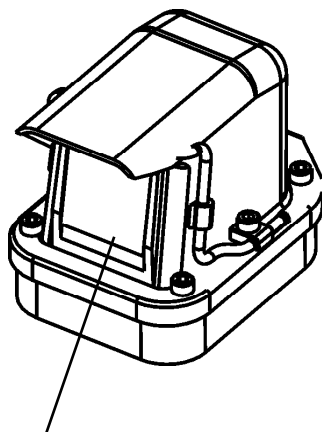
1. Clean the end effector with water, mild detergent, and a brush.
2. Adjust the nozzle on the water hose so that the jet of water is of moderate force.
3. Flush with water to remove the cleaning detergent.
4. Flush also at the joint on the end effector and through the holes behind the camera to remove dirt inside the end effector. Turn the end effector slightly while flushing behind the camera house to drain the water.

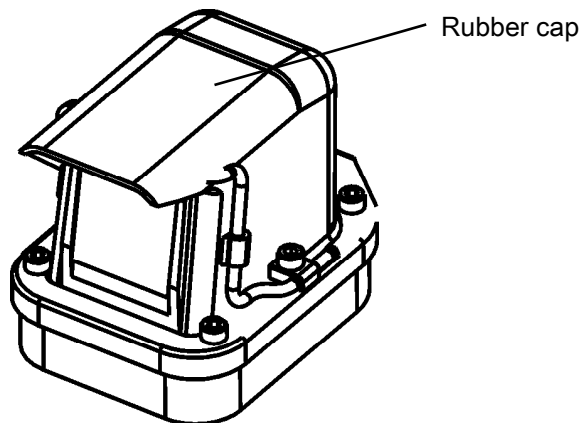
Cleaning of camera window

Always use soft and clean towels. Change the towels several times during the cleaning to avoid scratching the window with the dirt.

1. Flush the camera unit with water. Wait a moment to let the water dissolve the dirt.
2. Carefully remove the dissolved dirt with a damp and clean towel.
3. If the water did not dissolve all the dirt, apply a mixture of water and a mild cleaning detergent on the cover: for example, by using a squeeze-bottle. Take a new damp, clean towel and wipe the cover.
4. When the cover is clean, wipe it with a dry and clean towel.

Note: If the teat localisation performance deteriorates, check the camera window carefully. Perhaps additional maintenance below is required.





Additional maintenance depending on water quality

The camera is automatically cleaned with water during operation. Some water qualities might in special cases, produce a thin coating of lime or dirt on the front glass. If this occurs the camera window can only be cleaned with acidic detergents or with the help of a razor blade. See the following procedure.

Note: Acidic detergent could affect the silicone sealing of the camera.

Note: The aluminium cover on the camera unit discolours when in repeated contact with acid.

Note: Acidic solutions entering into the end effector will eventually damage the end effector internals.

Do not use detergent on the camera sponge.

The procedure below should not be used as daily routine, only when needed.



Caution: Do not use brushes, high-pressure devices and similar tools when cleaning the camera unit.



Warning: If an acidic detergent is used, make sure that the manufacturer's safety precautions are followed.



Warning: Acidic solutions are corrosive. Wear protective goggles and protective gloves.



Caution: Do not spray acidic solutions onto the camera front. This practice will expose the entire camera housing and the solution will also enter the end effector.

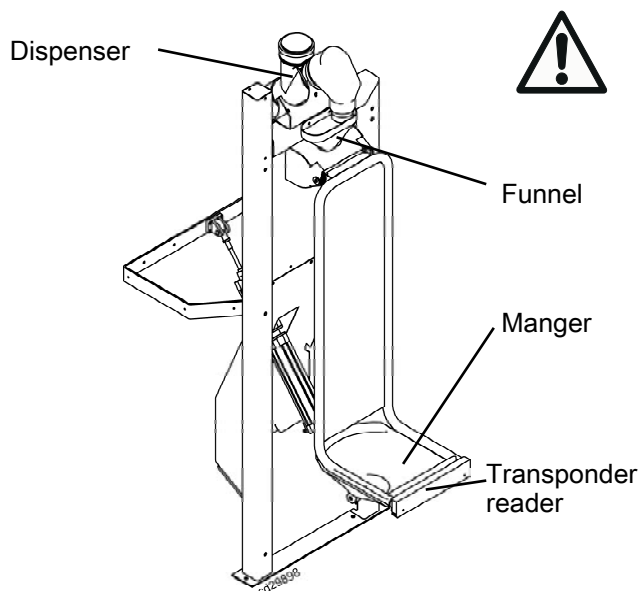
1. Rotate the arm so that the camera is upside down during the cleaning procedure. This is to protect the end effector.

2. Use a very small amount of acidic detergent in concentrated form on a soft cloth, and rub only the glass part and avoid touching the surrounding aluminium. Recommended type: *Cidmax*. DeLaval takes no responsibility for the use of other cleaning detergents.

3. Rinse the camera housing thoroughly to remove the detergent.

If the coating cannot be removed with acidic detergent, very carefully use a razor blade instead. Be careful not to scratch the glass or harm the silicone!

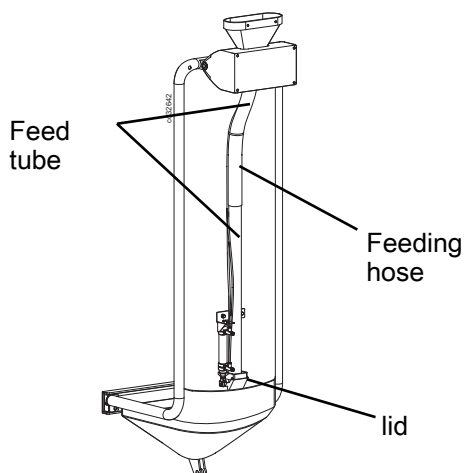
Cleaning of feeding module



Warning: Never put any part of your body between the rear plate and the rear gable, between the manger support and the front gable. You may become seriously injured.

Note: Use a special brush for the feeding module to avoid spreading bacteria.

1. Set the service switch in service mode.
2. Turn the dispenser to reach the funnel. If there are two dispensers, one of them must be loosened and removed.
3. Open the feed tube lid by pressing the following buttons on the touch screen: *VMS > Stall Control > Additional Stall Control > Open*



4. Flush water in the funnel, through the feed pipe and feed tube and down in the manger. Do not use high-pressure cleaner.

5. Use a brush in the funnel and manger if necessary. Clean the edges thoroughly. An unclean manger causes high bacteria growing and may make cows sick and reluctant to enter the station.

6. To prevent mould from growing and the feed stuff to clog together, dry blow the feed tube, feeding hose and lid with compressed air.

7. Dry the funnel and manger using a clean towel.

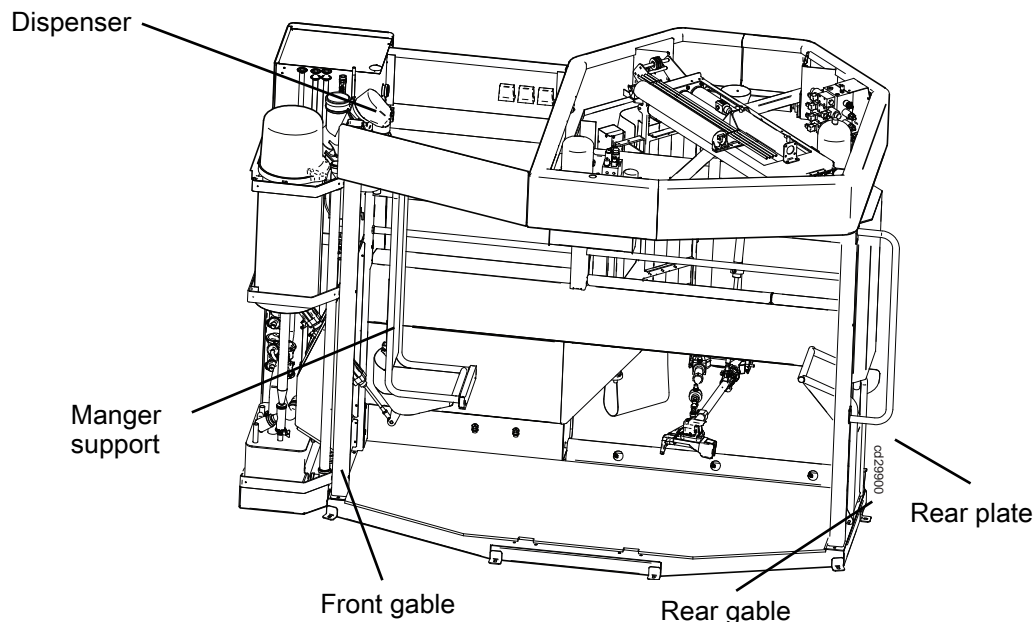
8. Put back the second dispenser (if any) and fasten it.

9. Close the feed tube lid by pressing the following buttons on the touch screen: *VMS > Stall Control > Additional Stall Control > Close*

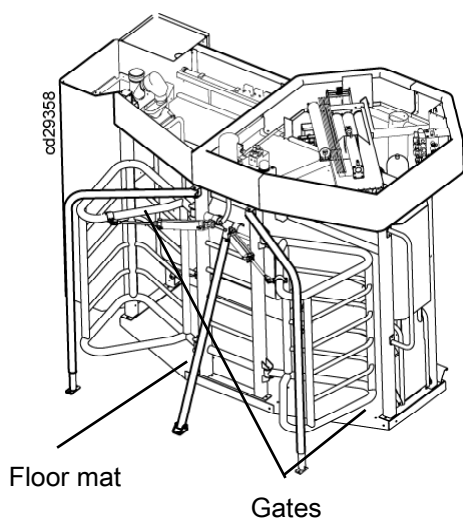
10. Set the service switch in operation mode.



Cleaning of stall and floor



Warning: Never put any part of your body between the rear plate and the rear gable, between the manger support and the front gable, or between the chute and dispenser. You may become seriously injured.



1. Clean all parts that have been in contact with the cows such as the gates, floor mats and the lower beam. Use water, mild cleaning detergent, and a brush.

2. Clean the rear plate by using a water hose or a brush if necessary.

Note: Use a special brush for the rear plate to avoid spreading bacteria.

3. Clean/flush the floor and floor mats in and around the milking station.



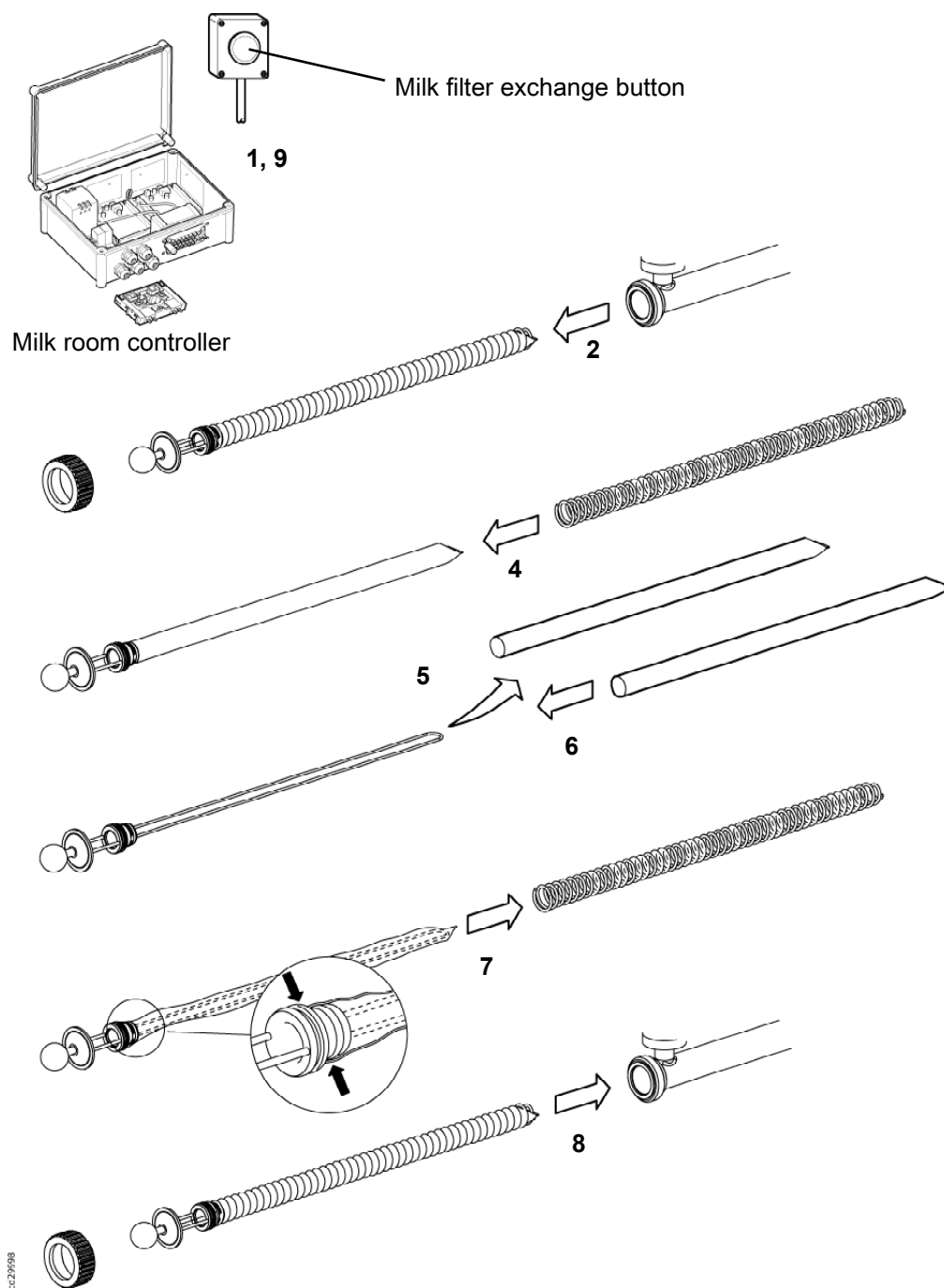
Change of filter sock

The filter sock should be changed after each VMS system cleaning. Recommended cleaning interval is 3 times per day.

See the figure below.

Preparing the milking station for exchange of milk filter unit is initiated by pressing a button connected to the MRC.

1. Press in the filter exchange button. The lamp in the button give a steady light if it is OK to change filter. If not the lamp flashes. The latter is the case if a milking station is pumping milk or is in a cleaning process. If so; wait until the process is completed. All milking stations is now first purging milk to tank and then closing the tank valve. The system is now prepared for filter exchange.
2. Remove the locking nut and pull the handle to remove the internal assembly.
3. Inspect the interior parts for cleanliness. Clean the unit if required.
4. Pull the handle to remove the guiding rod with filter from the spring.
5. Remove the old filter sock from the guiding rod.
6. Thread a new filter sock on the guiding rod and pull it up on the sleeve.
7. Insert the guiding rod with filter sock into the spring.
8. Insert the assembly into the filter unit and refit the locking nut.
9. Press the button again so it releases and comes out.



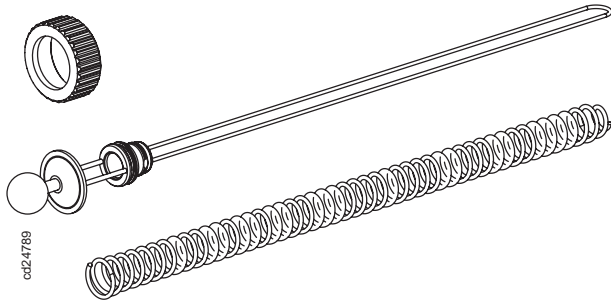


Weekly maintenance

Milk filter unit: cleaning interior parts

Remove and hand clean the following parts:

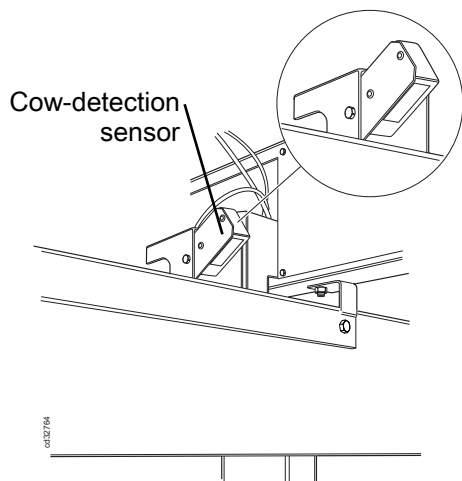
- Locking nut.
- Guiding rod with particular attention to the lid.
- Spring.



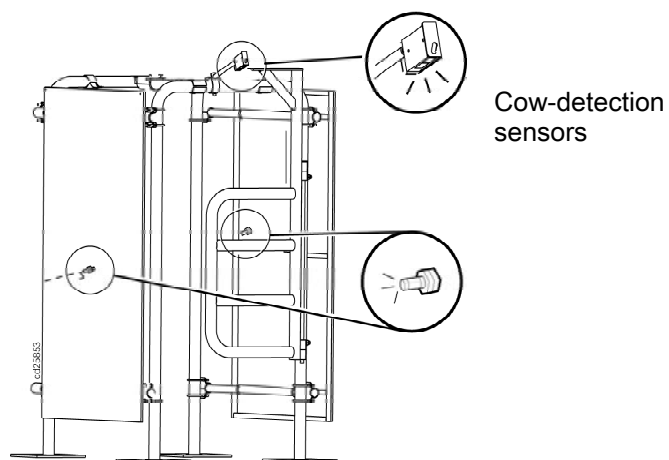


Cleaning of cow-detection sensors

- To avoid stop alarm, wipe the cow-detection sensor on top of the station carefully using a clean towel or cloth. Dust may deposit on the sensor and impair detection.

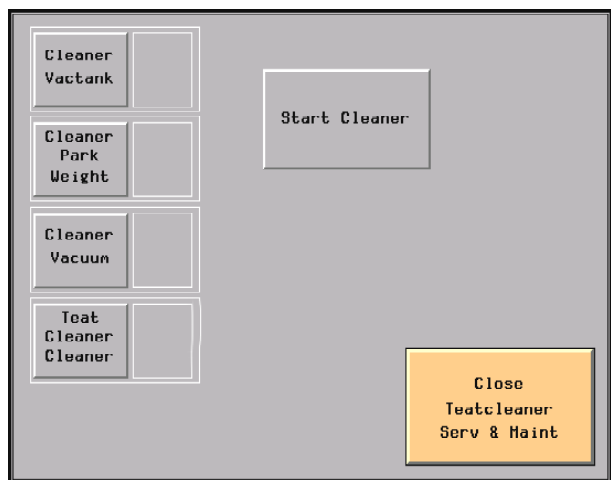


The cow-detection sensor on the upper beam



- If the system uses a smart selection gate, perform the same procedure for all three cow-detection sensors on the gate.

Smart selection gate



Check of teat preparation module

1. On the touch screen, first press the *VMS*, then *Teatcleaner Service* button.

2. Press the button *Cleaner Park Weight* twice, then pull out the teat preparation cup.

3. Press the button *Start Cleaner* to start the teat preparation.

4. Put a thumb inside the cup. Then check the following:

- That there is vacuum inside the cup. If the vacuum is very poor, the tube might be damaged.
- That water comes out of the four rows of nozzles inside the cup. The water alternates between two rows at a time with an interval of two times per second.
- That the water temperature is approximately 30 °C.

5. Rerun the process a number of times to allow the water temperature to stabilise.

6. When the check is complete, press the *Cleaner Park Weight* button to retract the teat preparation cup.

7. Press the *Close Teatcleaner Serv and Maint* button to close the window.

Check of Oil recirculation system (ORS)

If the system uses ORS, check the following:

- Check that the lubrication rate is 20-40 drops per minute in the Oil recirculation system (ORS).
- Check and clean the air filter.
- Check and clean the oil filter.

Note: For instructions, see the instruction book for the ORS.

- When the hydraulic pump unit is in operation, check that the oil filter indicator displays green. If the indicator displays red then the filter must be changed.

Note that if the temperature to the hydraulic pump unit is over the limits or oil level is too



low, this will issue an alarm and stop the pump unit. To start the pump unit after an alarm, see chapter "DeLaval voluntary milking system VMS; Operation".

Maintenance every third week

Change of liners

Preparations

1. Start a system cleaning (or make sure it has been carried out).
2. Release the teatcups.

Change time

- 500 hours or 2500 milking sessions.

Note that the maintenance of liners mostly depends on the number of milking sessions. Consequently, maintenance intervals may change depending on number of milking cows for a VMS system.

Type of wear

The reason of deterioration of liners is due to contact with milk, chemicals, hot water and steam. In addition, liners wear out during operational lifetime.

Consequences of failure to follow maintenance schedule

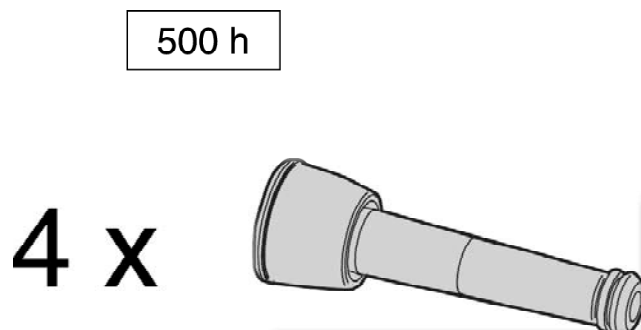
Overuse of liners and abuse of detergent leads to deterioration of the material properties. The first sign of this is that the liner sucks air (the mouthpiece lip is damaged).

Liner air-sucking leads to risk of deteriorated teat massage, which in turn can lead to deteriorated milking performance and negative influences on udder health.

Symptoms of defect part

Check or change the liners in case of prolonged milkings, raised bacteria counts, and air-sucking during milking.

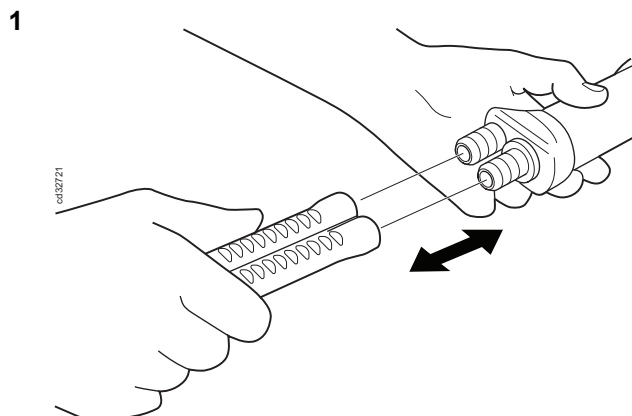
Note: Each teatcup is assigned a specific position in the magazine. Change one liner at a time or mark the teatcups according to position.



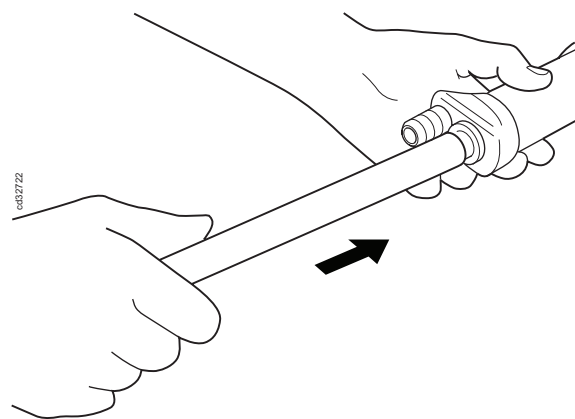
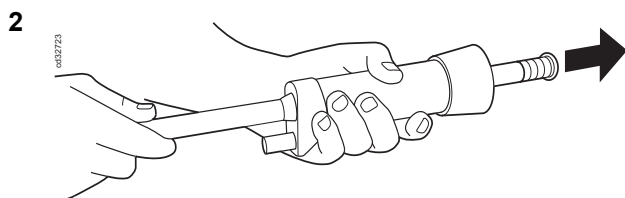


Removal

1. Remove the teatcup from the flexible tube.

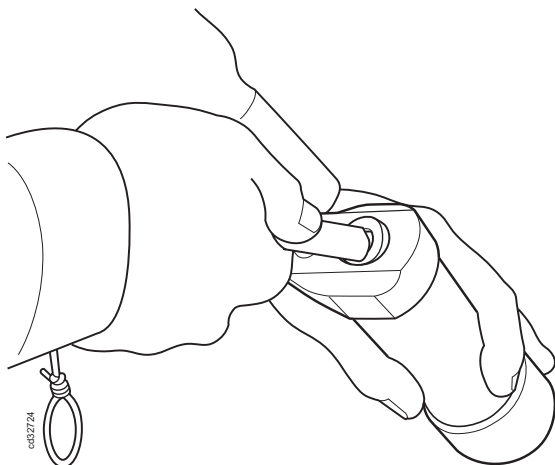


2. Use the pipe tool to remove the connector pipe.





3

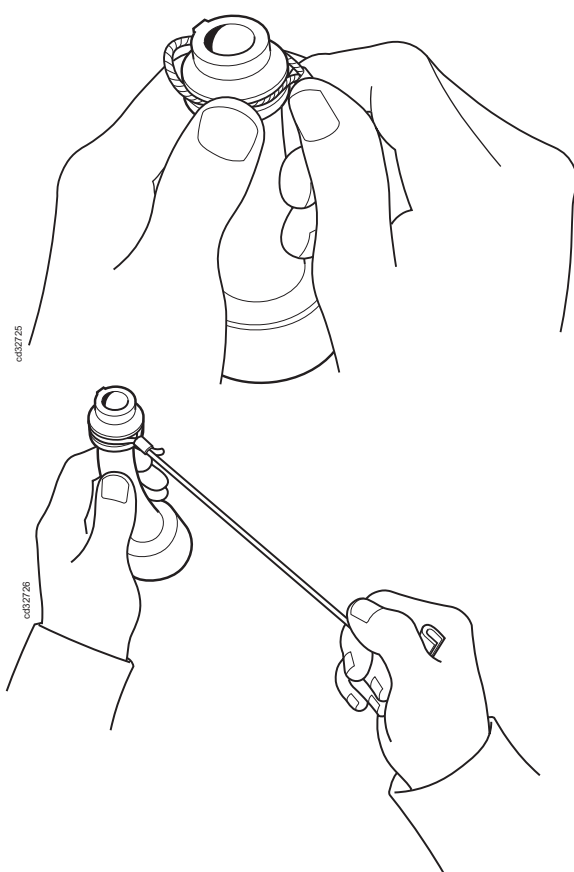


3. Remove the old liner using the assembly tool.

4. Always clean the teatcups to get rid of possible fat/dirt on the surface.

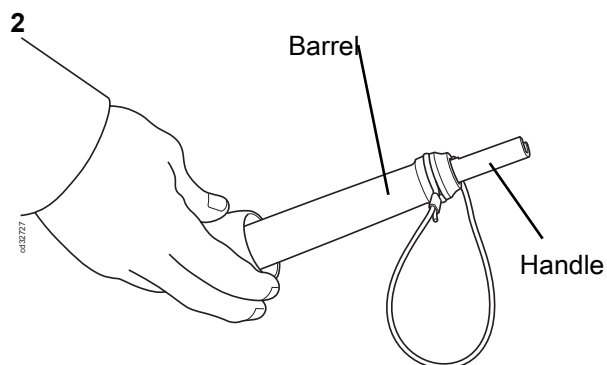
5. Check that the teatcup is free from sharp edges etc.

1

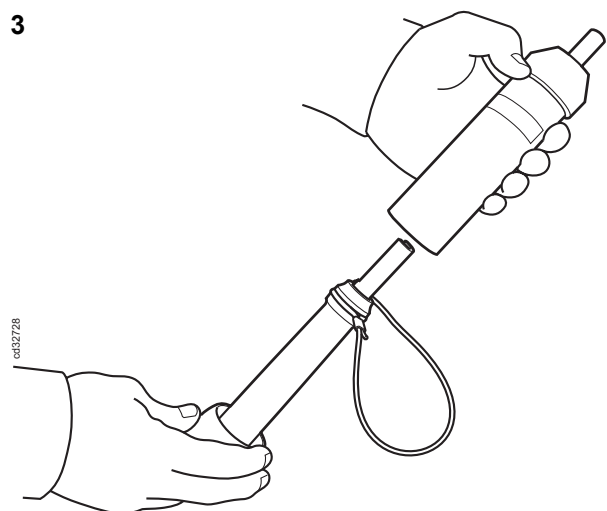


Installation

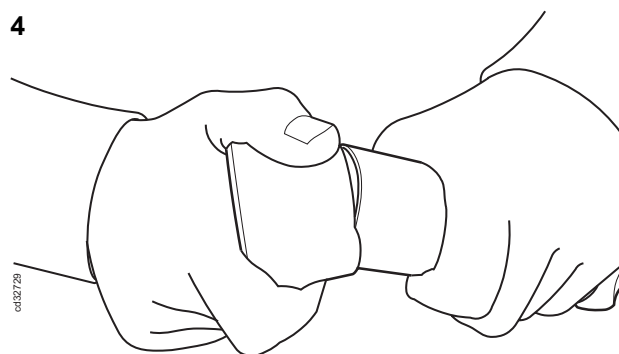
1. Attach the loop of the assembly tool onto the down end of the new liner.



2. Insert the handle of the assembly tool into the barrel of the liner.



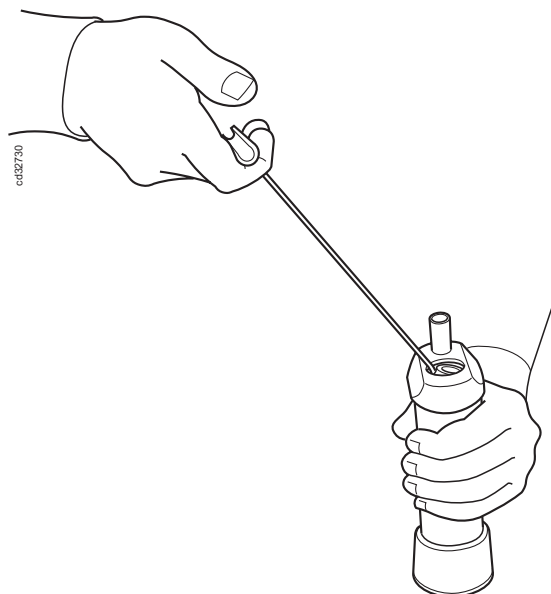
3. Insert the liner into the teatcup.



4. Fit the liner head onto the teatcup.



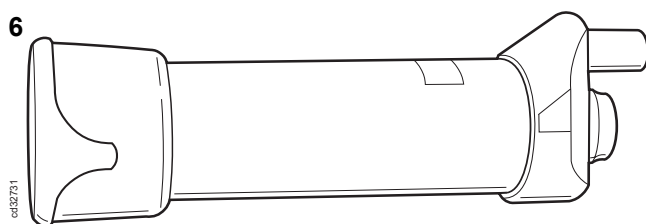
5



5. Remove the handle out of the liner and through the hole of the teatcup. Make sure that the metal rope lock is above the edge of the teatcup. Pull the handle smoothly but in one movement in an angle of 0 - 45 degrees until the liner is in the right position.

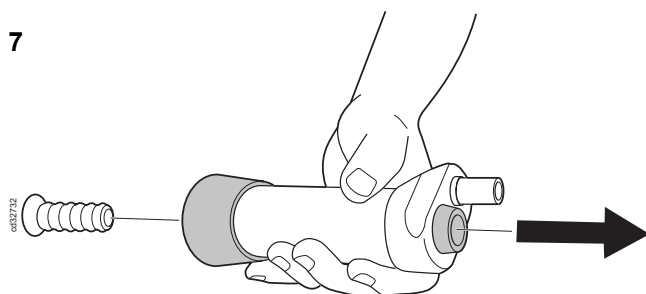
Note: Do not pull the handle straight up.

6



6. Check that the liner is installed as shown in the picture.

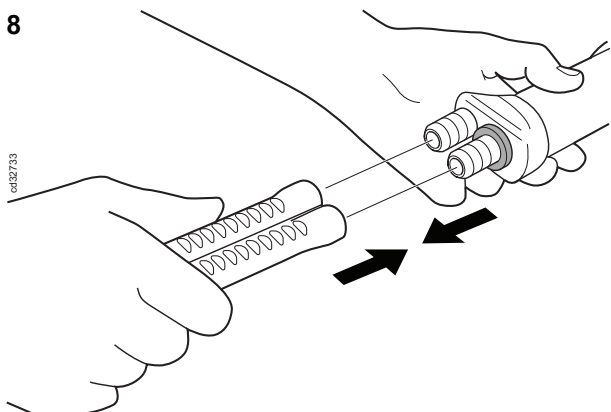
7



7. Use the pipe tool to insert the connector pipe.

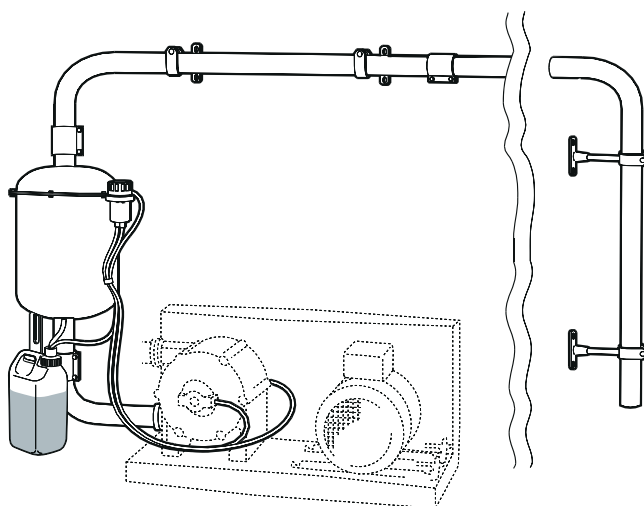


8



8. Attach the flexible double-tube to the teatcup. Ensure that the pulse tube and the milk tube are attached in the correct way.

9. Perform a cleaning with an acid detergent after installation to get rid of possible residues on the liner.



Check of Oil recirculation system (ORS)

The service includes filter-kit and oil.

If the VMS system uses ORS:

- Change the air filter.
- Change oil and oil filter.

Note: For instructions and troubleshooting, see the instruction book for ORS.

Service personnel should check that the ORS works properly at each visit.

Change time

- 600 hours

Type of wear

The reason of deterioration is due to mechanical operation and heat contact.

Consequences of failure to follow maintenance schedule

If old oil is mixed with new oil, dirt residues will coagulate. This will cause the oil to lubricate the vacuum pump poorly.

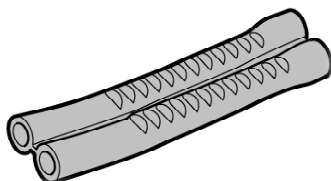
Monthly maintenance

Change of flexible double-tubes

The service includes 4 short tubes (combined pulse and milk tubes).



500 h



Preparations

1. Start a system cleaning (or make sure it has been carried out).
2. Release the teatcups.

Change time

- 700 hours
- Check the condition of the double-tubes at regular intervals. Change them if necessary.

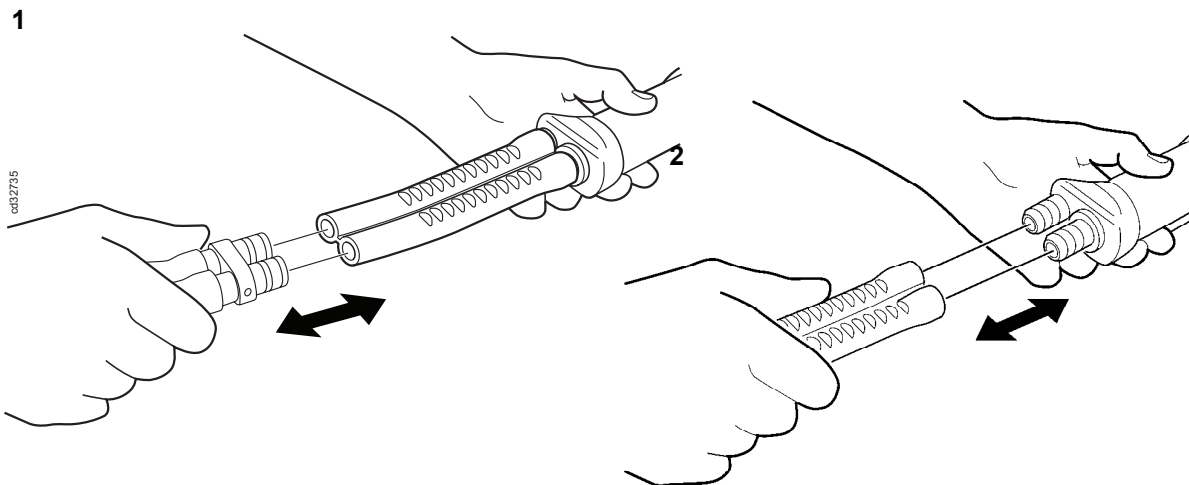
Type of wear

The reason of deterioration of tubes is due to contact with milk, chemicals, hot water and steam. In addition, liners wear out during operational lifetime.

Consequences of failure to follow maintenance schedule

Risk of collapsed tubes and punctures, especially around the nipple connections if the tubes are damaged during take-off. This leads to decreased vacuum, risk of bacterial growth and this results in poor milk quality.

Removing the flexible double-tubes

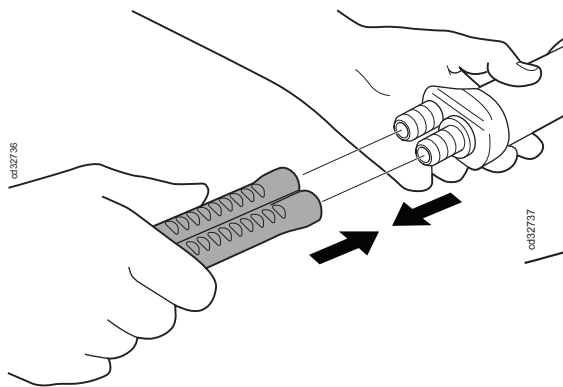




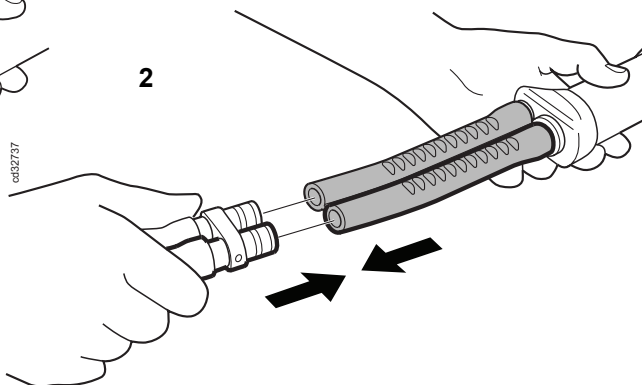
Attaching new flexible double-tubes

Note: Make sure that the pulse tube and the milk tube are attached in the correct way.

1



2



Check of multi-purpose arm

Check the rubber tubes

- Check the rubber tubes on the arm for tear and wear.
- Check the tubes and couplings for oil leakage.

Type of wear

The reason of deterioration is due to the mechanical operation.

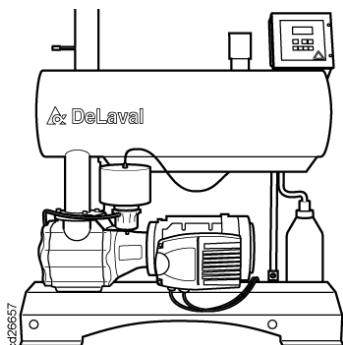
Check of Atlas Copco SF4 Full-feature compressor

- Check the air filter.

Consequences of failure to follow maintenance schedule

Inadequate function of the compressor will cause poor stall operation.

Note: For instructions, see the compressor handbook.



Vacuum pump: DeLaval DVP-F

Service should be carried out after the vacuum pump operation has reached to 1000 hours.

For further information, see the service chapter in the manual that came with the product.

Bi-monthly activities

Removing hair from udders

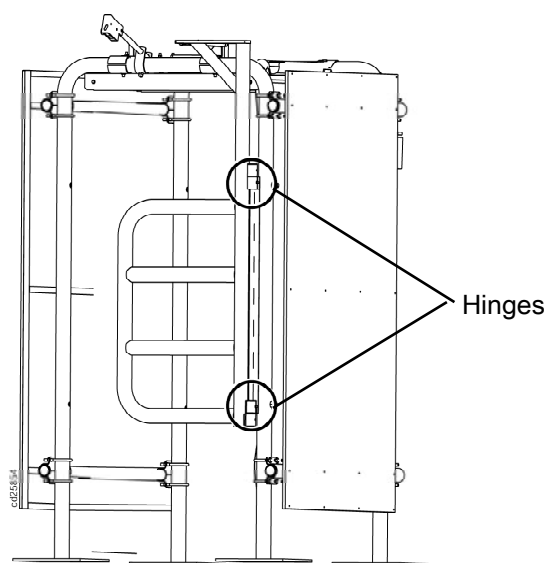
Straw can adhere to udders. This might make it difficult for the image-interpreting software to distinguish a teat from other objects. Shaved udders prevent these kind of problems.

Teats should always be kept free from hair.

Yearly maintenance

Change of hydraulic pump unit oil filter

Change of hydraulic pump unit oil filter must be done at least once a year or when the oil filter indicator is red. The hydraulic pump unit must be shut down before replacing the filter, see chapter "DeLaval Voluntary Milking System VMS; operation", section "Shutting down the hydraulic pump unit".

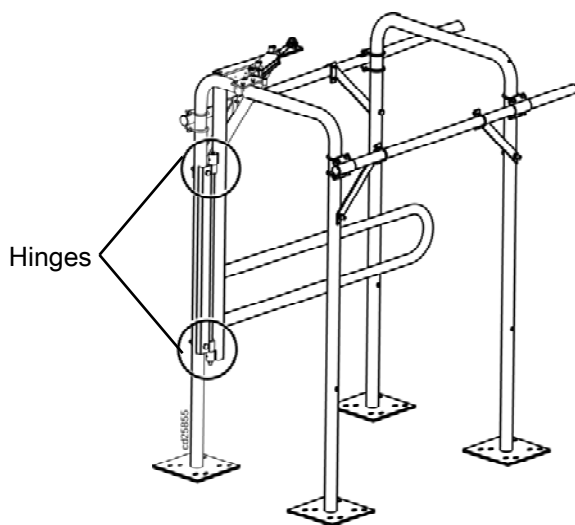


Smart selection gate

Lubrication of hinges on the gates

Smart selection gate

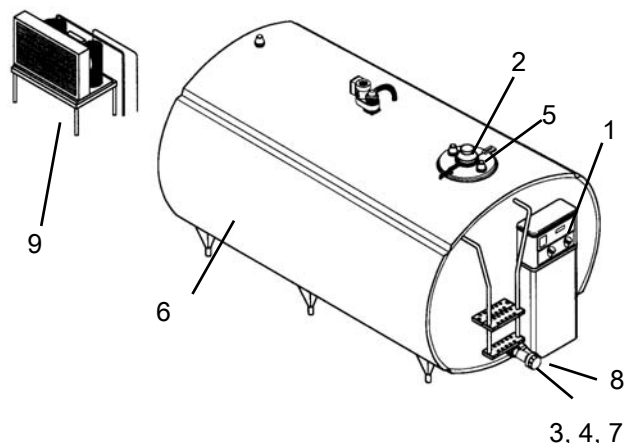
To ensure that the gate is opening and closing smoothly and the hinges are not being worn out, lubricate the hinges from the *grease nipples* once a year. If the gate has a big workload; that is, more than 300 passages per day, more frequent lubrication intervals may be necessary. Check the condition of the hinges once a month and lubricate if necessary.



Separation gate

Separation gate

If the system uses a separation gate, carry out the same procedure for hinges on the separation gate. See the figure.



Milk refrigeration

Maintenance of refrigeration equipment such as storage tanks or condensing units depends on the choice of products, which can be delivered by DeLaval or other suppliers. The maintenance schedule below refers to "Closed tanks, DX cooling tank with Hygenius".

If the system uses DeLaval Instant cooling, additional maintenance should be performed on "P30 Clip-on", the plate cooler on the receiver unit.

For instructions and further information, see the manual that came with the product.

Check point	Maintenance intervals (monthly)	Maintenance intervals (quarterly)	Maintenance intervals (yearly)
1. Clean the detergent container and the caps.	X		
2. Clean the air vent.	X		
3. Clean the grey cap and rubber plate double outlet.	X		
4. Clean the nut and blind liner double outlet.	X		
5. Clean the manhole ring.	X		
6. Clean the exterior of the tank.		X	
7. Clean the black cap double outlet.		X	
8. Clean the non-return valve.		X	
9. Clean the condensing unit.*			X



DeLaval voluntary milking system VMS

Maintenance



* The front of the condensing unit must be cleaned frequently to avoid blocking of the airflow. This must be done carefully with a soft brush.

Never use solvents on any part of the refrigeration equipment.

Maintenance schedule: a summary

Activity	Daily	Weekly	Every third week	Monthly	Bi-monthly	Yearly
Checklist:	X					
1. Overall performance						
2. VMS management software						
3. Vacuum pump (DVP-F or VP 700)						
4. Atlas Copco SF4 Full-feature compressor						
5. Hydraulic pump unit						
6. Cleaning detergent						
Cleaning of milking station	X					
Change of filter sock	X					
Milk filter unit: cleaning interior parts		X				
Cleaning of cow-detection sensors		X				
Check of teat preparation module		X				
Check of hydraulic pump unit oil filter indicator		X				
Check of air and oil filter, and lubrication rate in ORS		X				
Change of liners			X			
Change of air and oil filter, and oil in ORS			X			
Change of flexible double-tubes				X		
Check of multi-purpose arm				X		
Check of compressor				X		
Vacuum pump (DVP-F)				X		
Removing hair from udders					X	
Lubrication of hinges on the gates						X



DeLaval voluntary milking system VMS

Maintenance

Activity	Daily	Weekly	Every third week	Monthly	Bi-monthly	Yearly
Change of hydraulic pump unit oil filter						X

Note: The table above does not include the maintenance schedule of the refrigerator equipment. For the summary of the refrigerator equipment, see the section above.

Note: For ORS, vacuum pump (DVP-F or VP 700) and the compressor, applicable manuals must be used.

Note: Maintenance of vacuum pump depends on choice of product type. In other words, service is carried out in different intervals for vacuum pump DeLaval DVP-F and VP 700.



DeLaval voluntary milking system VMS

Maintenance



Milk sampler

Operation

About collecting milk samples

A sampling sequence normally takes 24 hours and should be stopped after performing a system cleaning. This way, the sampler will be cleaned after the sampling.

Before starting a system cleaning, putting the milking station into manual mode is recommended. This gives you the opportunity to disconnect the sampler before milking restarts. Consequently, milk residues in the milk sampler during storage or transportation will be avoided. When a system cleaning is inconvenient or impractical, see the section "Manual cleaning" in chapter "Milk sampler; Maintenance".

Reports about sampling sequences can be accessed in the management software. Sampling reports are located in *System reports > VMS cow reports > Milk sampling*. For more information about reports, see chapter "Reports" in the instruction book "VMSMgmt 2007".

Collecting milk samples

There are three main steps when collecting milk samples:

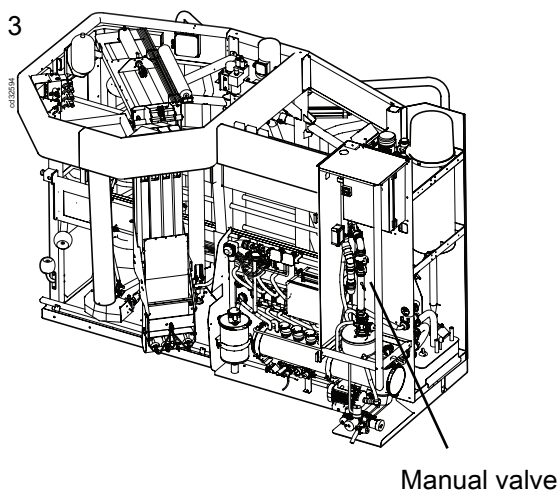
- Connecting the milk sampler
- Starting a sampling sequence
- Stopping a sampling sequence

Connecting the milk sampler

1. Stop the cow traffic through the milking station. Milking must not take place when steps 1 to 8 below are in progress.
2. Place the milk sampler in front of the milking station on an even surface.

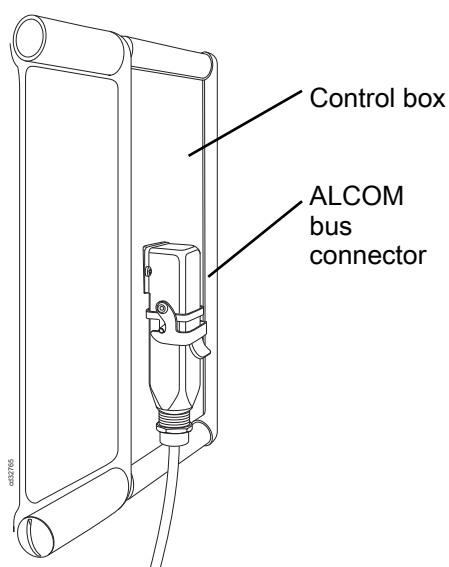


3

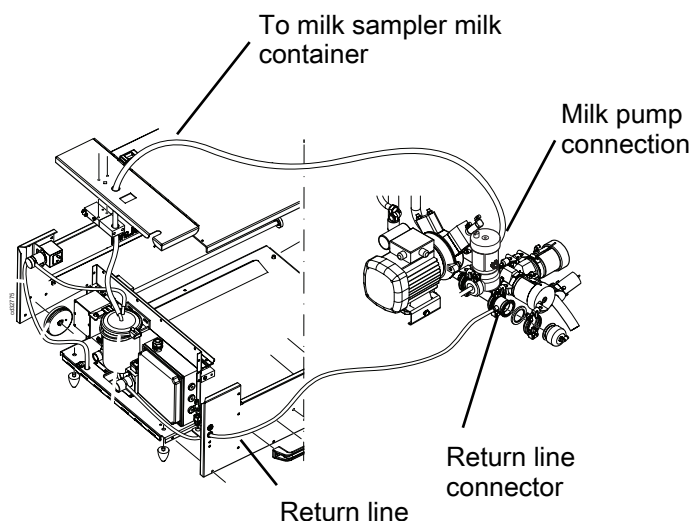


3. Shut off the vacuum to the receiver using the manual valve.

4. Attach the milk hose to the milk pump connection on the milk pump (see picture).



5. Connect the electrical cable to the ALCOM bus connector on the control box..



6. Remove the air-purge valve and mount the return line connector (see picture).

7. Connect the return line to the return line connection.

8. Turn on the vacuum to the receiver using the manual valve.

Starting a sampling sequence

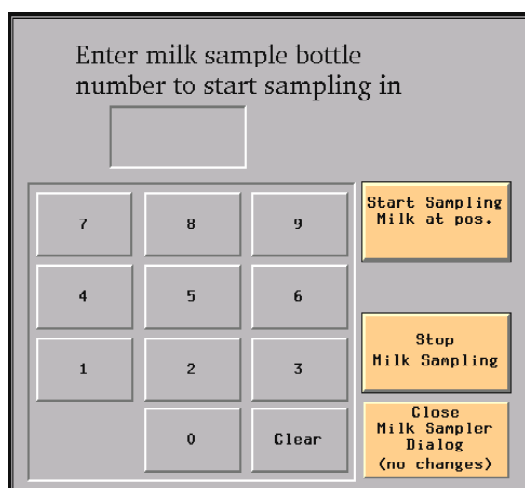
When the milk sampler has not been used more than three days it may need to be cleaned before being used again. That is why the sampling sequence is normally started just before a system cleaning.

Note: Make sure to check the settings for milk sampling in the management software before starting a sampling sequence. For further information, see chapter "Milking station" in the instruction book "VMSMgmt 2007".

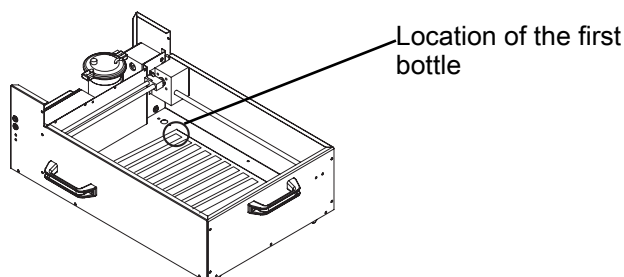
Sampling is performed by using the touch screen.

1. Press the VMS button in the top right corner to display the VMS menu.

2. Press the *Milk Sampler* button to display the Milk sampler window.



Milk sampler window



3. Select a sample bottle by typing the bottle's number on the Milk sampler window. Number one (1) is normally used as the first bottle. If, however, the sampling sequence will continue when all sample bottles has been filled, use the coming number after the last bottle number of the previous rack. In other words, if the sample tray has contained 130 bottles in the first place, you can continue the sampling sequence by typing the bottle number "131".

Use the *Clear* button if you type the wrong number.

4. Press the *Start Sampling Milk at pos* button to start the sampling.

Stopping a sampling sequence

A sampling sequence is stopped manually from the touch screen, after a system cleaning.

1. Put the milking station into manual mode and start a system cleaning. The runner then goes to the 0 (zero) point.

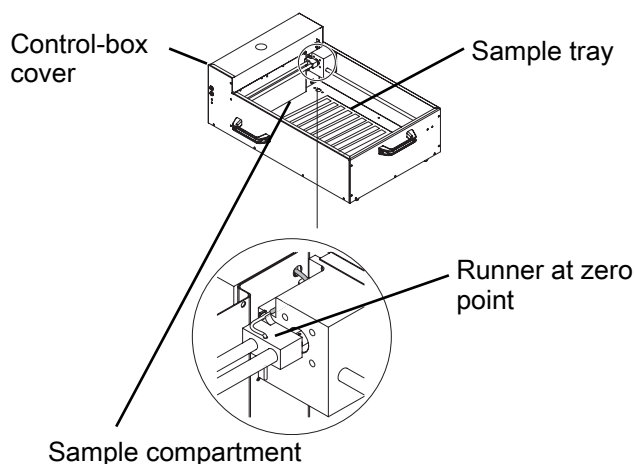
2. After the system cleaning, press the *Stop Milk Sampling* button on the Milk sampler window.

3. With the runner still in the 0 (zero) point position, disconnect the milk sampler from the milking station.

Note: *The sampler must be disconnected before milking restarts to avoid milk residues in the sampler during storage or transportation.*

4. Remove the sample tray and flush the sample compartment. To prevent water from damaging the electrical parts, close the control-box cover. Make sure that the runner is clean.

5. Check the silicone tubes for damage.





Milk sampler

Maintenance

About carrying out maintenance

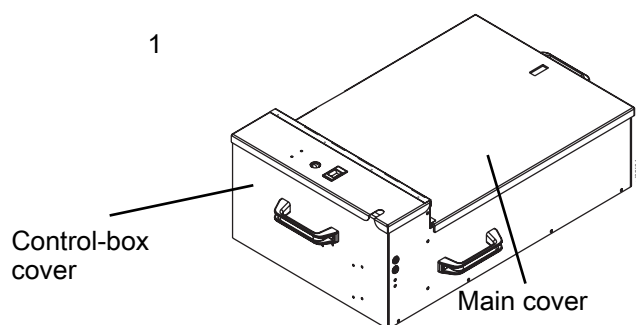
In normal circumstances, the milking station will carry out the cleaning process on the milk sampler during a system cleaning. Manual cleaning will only be performed when the milk sampler has not been cleaned by the VMS.

If any parts such as a silicone hose is been damaged or have deteriorated, additional maintenance will be needed.

Manual cleaning

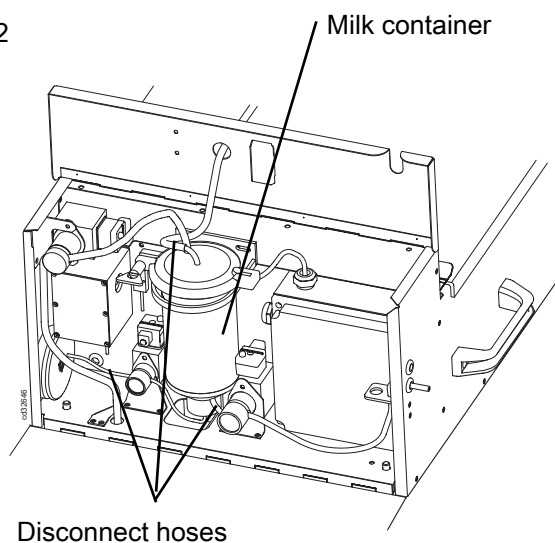
Tools: Syringe without needle.

1. Open the control-box cover and the main cover.





2



2. Disconnect all hoses from the milk container, then remove the container.

3. Use a syringe without a needle to clean the disconnected hoses. Fill the syringe with lukewarm water, press the tip of the syringe into one of the hoses and then inject the water through the hose. Repeat the same procedure for all hoses.

If there are any dirt or milk residues left in the hoses, remove the hoses and rinse them with lukewarm water, then wash them using a mild detergent, then rinse again with water to remove detergent.

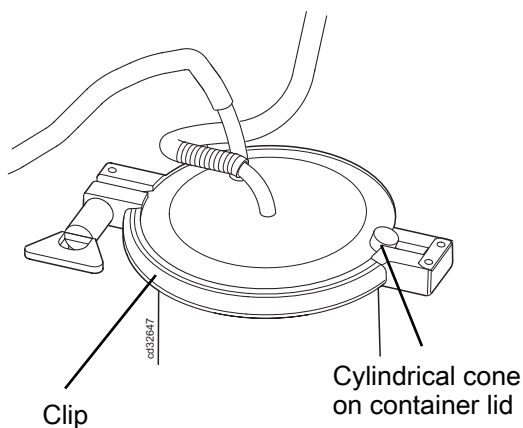
If the milk sampler has not been cleaned for a long time, milk residues may be impossible to remove, in which case the tubes should be replaced. See the additional maintenance below.

5. First disassemble the container, then rinse it with lukewarm water and clean with appropriate detergents. Finally, rinse again with water to remove detergent.

6. Reconnect the hoses onto the container.

Note: It is important not to shorten the hoses too much if they have been deteriorated.

7. Reassemble the container. Note that the cylindrical cones must face each other and be properly inserted in the clip.

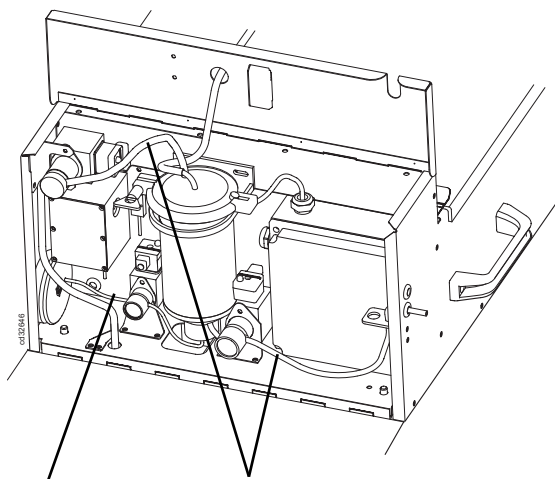




Additional maintenance

Changing hoses

The three hoses, as shown on the figure, must be changed if they have been deteriorated or can not be cleaned properly. Due to the tricky operation, only the hose changing on the tube wheel has been described.



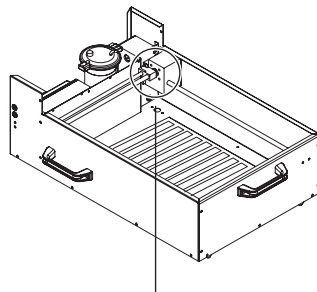
Silicone hose on the tube wheel

The other two hoses

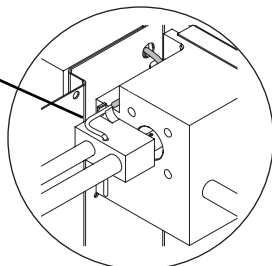
Changing the silicone hose on the tube wheel

1. Lift the sample tube that is inserted in the runner.

1

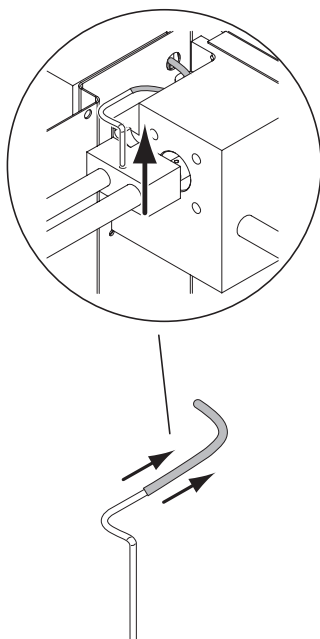


Sample tube



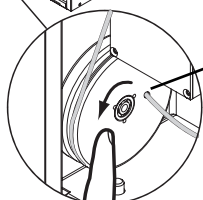
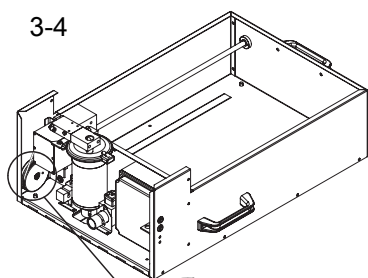


2



2. Remove the silicon hose from the sample tube and hold the silicone hose.

3-4



Remove the silicone hose from the hole.

3. Slowly rewind the silicone hose onto the tube wheel using a finger.

4. Pull the silicone hose and remove it from the hole.

Note: Keep finger on the tube wheel to prevent it revolving too fast. If you let the tube wheel rotate freely, the spring will be damaged and must then be replaced.

5. Return the wheel slowly to the start position.

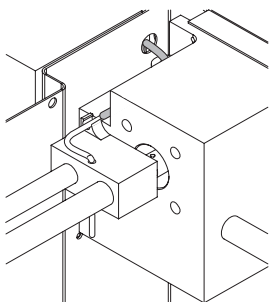
6. To fit a new silicone hose onto the tube wheel, turn the tube wheel 8 times clockwise.

7. Push the silicone hose through the hole in the wheel.

8. Allow the spring to rewind the silicone hose on to the wheel.

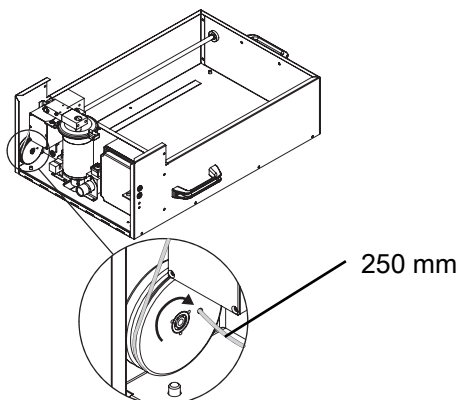


9



9. Reinsert the sample tube into the silicone hose.

10



10. Check that about 250 mm of the tube protrudes from the hole in the wheel.





DeLaval online cell counter OCC

Operation

Introduction

DeLaval online cell counter (OCC) is optional equipment to the VMS. OCC is integrated in the milking station and can perform continuous cell count. The range of cows to be measured can be set from the all cows (default setting) to one individual cow. The cell count data is shown in the management software (Cow Monitoring) and on the touch screen. Sick cows can be identified in an early state. OCC is based on the same technology as DeLaval Cell Counter (DCC).

Connections

The DeLaval online cell counter is connected to the following media and equipment:

- Sample milk from the milk pump outlet
- Electric power (12/24V) from the power box
- Warm water from the teat cleaner water supply
- ALCOM bus for data communication
- Drainage for water/milk mixture
- Waste container for harmful liquids
- Compressed air for overpressure in the OCC cabinet

User interface

The user interface consists of the following two parts:

- Touch screen
- Management software



Management software

The VMS management software is the user interface for the daily use of DeLaval online cell counter OCC, such as settings for cows to be measured, cell count thresholds and more. For more information, see chapter "VMS cow settings" in the instruction book "VMSMgmt 2007".

Touch screen

The touch screen is used for fault handling, maintenance, brief cell count data and historical data about the DeLaval online cell counter OCC.

Note that the DeLaval online cell counter OCC information on the touch screen is available only if DeLaval online cell counter OCC is activated in the management software.

On the touch screen, go to the OCC window by pressing, *VMS > Miscellaneous Service > Cell Counter*.

Commands	Components	Parameters	Status	Online/Offline Mode: Offline
Measure				
(1) PreSample				
(2) ManualSample Count: ? cells/ μ l				
Service				
(1) Shutdown				
(2) Waste is empty				
(3) Prime				
(4) Selftest				
Miscellaneous				
Abort				
DCC On				
Events 1 (1)				
[17:43:17] Mode is set to: Offline				
Clear				
Close				



DeLaval online cell counter OCC

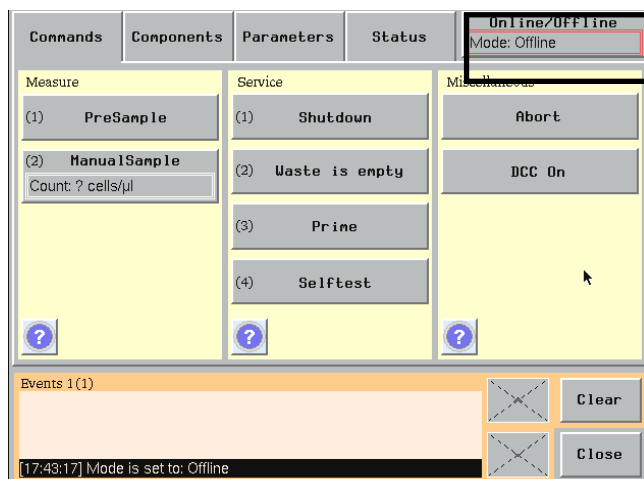
Maintenance

The maintenance is limited to replacement of liquid containers, flushing of drain hoses, combined with a visual check inside the DeLaval online cell counter OCC cabinet.

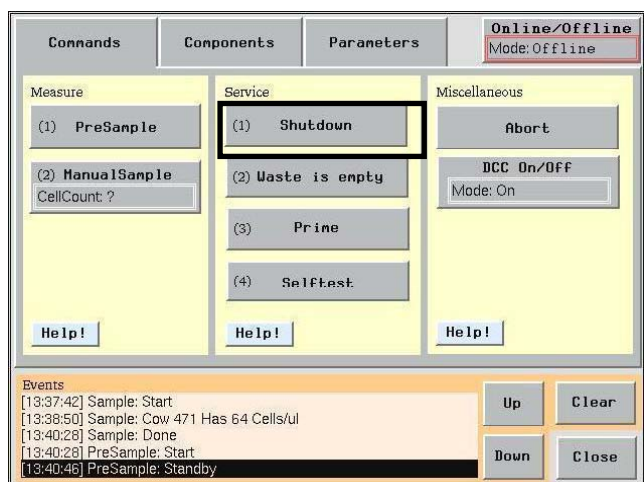
Do the following to replace an empty (reagent and detergent) or full (waste) container:

1. On the touch screen, go to the OCC window by pressing, *VMS > Miscellaneous Service > Cell Counter*.

2. Set the DeLaval online cell counter OCC to Off-line mode; (*Mode: Offline*).



The DeLaval online cell count OCC in manual mode

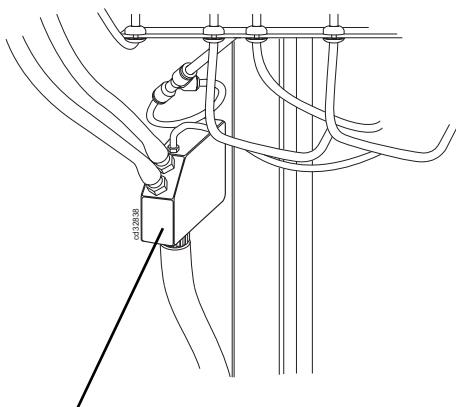


3. Press the (1) *Shutdown* button to start the process to empty the system. Remaining liquid in the pipes is pressed down to the containers.



Warning! The detergent liquid and the hypochloride are harmful liquids. Use protection gloves and eye protection glasses.

Note! The content of the waste container is harmful and must be taken to a collection point for environmentally harmful waste.



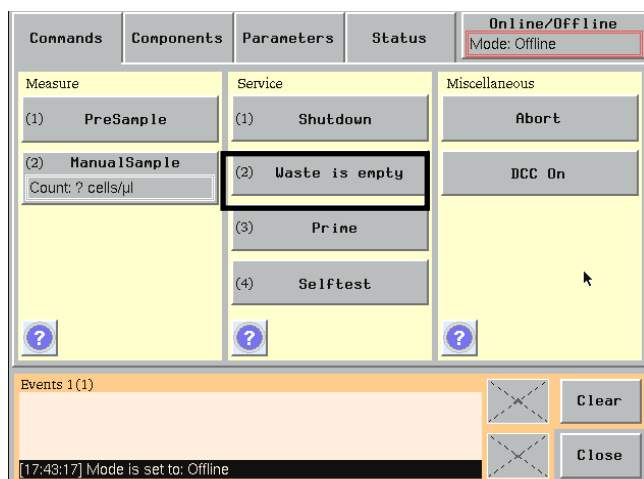
The drain connection piece

4. Replace the containers. The cabinet is uniquely designed to make the containers fit in the correct position.

5. Flush the big drain hose inside the cabinet and the drain connection piece with water. Also flush the drain funnel and drain hose beneath the cabinet.

6. Visual check; check that the plastic funnel is clean inside; if not open it (lift the small tube inside, twist funnel counter clockwise and tilt it out) and clean with water.

7. Make sure to close the door properly.



8. Press the (2) *Waste is empty* button to verify that the waste container is empty.

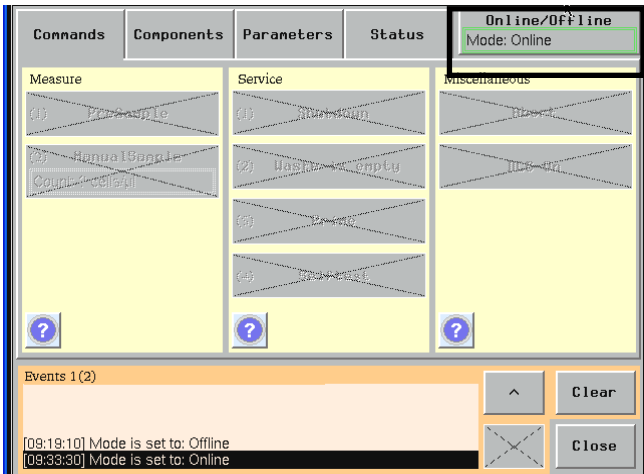


Commands	Components	Parameters	Status	Online/Offline
				Mode: Offline
Measure		Service		Miscellaneous
(1) PreSample		(1) Shutdown		Abort
(2) ManualSample Count: ? cells/ μ l		(2) Waste is empty		DCC On
		(3) Prime		
		(4) Selftest		
Events 1(1)				Clear
[17:43:17] Mode is set to: Offline				Close

9. Press the (3) *prime* to fill up the system with liquids.

Commands	Components	Parameters	Status	Online/Offline
				Mode: Offline
Measure		Service		Miscellaneous
(1) PreSample		(1) Shutdown		Abort
(2) ManualSample Count: ? cells/ μ l		(2) Waste is empty		DCC On
		(3) Prime		
		(4) Selftest		
Events 1(1)				Clear
[17:43:17] Mode is set to: Offline				Close

10. Press the (4) *Selftest* button to check the system status. If the result is OK, everything is ready. If not, go to chapter "DeLaval voluntary milking system VMS; Trouble shooting" to check alarms.



11. Press the *Mode: Online* button to set the DeLaval online cell count OCC to online mode.
12. The DeLaval online cell count OCC will now operate automatically.

The DeLaval online cell count OCC in manual mode



DeLaval voluntary milking system VMS

Troubleshooting

Note: This chapter is valid for VMS software version 2007.

Introduction

The ability to issue alarm messages is a natural feature in an all-around-the-clock, all-the-year-round, automatically operated system such as VMS. The alarms can be of different severity: some are issued merely to inform about a deviation in the normal operating process, while others might require some form of action from the operator.

The alarms can either be related to animal behaviour, for example a cow that refuses to leave the station, or to technical errors. In most cases, the system initiates a number of self-tests in order to try to correct the error before finally issuing the alarm.

All alarm messages are issued on the PC screen and the touch screen. Some are also transmitted as SMS (short text messages) and voice messages to telephones.

Recent or previous alarms can be viewed or printed from the management software.

Alarms

Error codes

Each alarm in the VMS system is assigned two error codes, major and minor. The major error code denotes the program that generated the alarm, while the minor code is a running number under each program. A specific alarm thus has a unique combination of major and minor code.



Troubleshooting

The following major error codes exist:

- 1 - Milking Station (Mumgr): main program in the milking station; handles its overall operation.
- 2 - Robot: program that handles the operation of the multi-purpose arm.
- 3 - Milking: program that handles the milking process.
- 4 - Cow traffic: programs that handles the gates of the milking station and the filter/separation gates.
- 5 - Milk transport: program that handles the transportation of milk from milking station to tank.
- 6 - VMS I/O-man: program that handles communication and data transmission within the milking station as well as components connected to it (except the PC).
- 7 - Cleaning unit: program that operates the plant cleaning unit.
- 9 - Programs that handle the data communication between the milking station and the PC.
- 12 - Milk refrigeration: programs that operate or communicate with milk tanks and cooling equipment. The VMS system can transfer and issue alarms from milk tanks of other brands than DeLaval, but might not be able specify them clearly.

Types of alarms

VMS alarm messages are classified into the following four groups:

- **Status message:** information about normal actions that take place during operation. These messages can be viewed in the status window of the management software, or in the event list on the touch screen.
- **Deviation:** minor errors that might impair operation slightly. Automatic correction will be reported in the status window of the management software or in the event list on the touch screen.
- **User notification:** errors that eventually



Troubleshooting

require manual action, but for the time being allow the system to keep working in automatic mode. These messages are sent via telephone (voice or SMS) to persons included in the Alarm receiver list in the management software.

- **Stop alarms:** errors that put humans, animals, milk quality or equipment at risk. System is stopped immediately. However, in most cases a number of re-attempts or self-tests are carried out to try to resolve the error. If successful, the alarm is issued as a deviation. If unsuccessful, the alarm is issued as a stop alarm.

Meaning and actions

The column named "Alarm text" in the tables below show the message whenever an alarm is issued. In some cases, an alarm text shows numbers or figures that are generated by unique circumstances (for example, temperature, milk yield etc.) In this document, we have used ... (three dots) instead of the real figures.



DeLaval voluntary milking system VMS

Troubleshooting

Milking Station (Mumgr) - major code 1

M	m	Alarm text	Type	Meaning	Action
1	1	Robot connected	Status message	Robot program is activated.	None required.
1	2	Milking connected	Status message	Milking program is activated.	None required.
1	3	Cowtraffic connected	Status message	Cow traffic program is activated.	None required.
1	4	Milktransport connected	Status message	Milk transport program is activated.	None required.
1	5	Vmsioman connected	Status message	MS communication and data transfer program is activated.	None required.
1	6	Vmsserver connected	Status message	PC communication and data transfer programs are activated.	None required.
1	7	Time for rinse	Status message	Time for rinse.	None required.
1	9	Recovery done OK	Status message	Self test was successful.	None required.
1	10	Gate ctrl connected	Status message	Gate controller is activated	None required.
1	11	Got configuration	Status message	The milking station has received configuration data from the PC.	None required.
1	12	Parking cups	Status message	The teatcups have been parked and the vacuum pump has been switched off.	None required.
1	13	Activating cups	Status message	The teatcups are retracted into the magazine and the vacuum pump is switched on.	None required.
1	15	Cow trapped	User notification	A cow has been trapped in the milking station in accordance with operator settings in the PC. If the station is not put in manual mode within 10 minutes, the cow will be released.	Optional (depends on the reason for applying this function to the cow).
1	16	Autocalibration done OK	Status message	Autocalibration of the multi-purpose arm (robot) was successful.	None.
1	100	Robot disconnected	Stop alarm	Robot program is deactivated. Program error or MS computer problem.	Restart the milking station. If the problem persists, contact service engineer.
1	101	Milking disconnected	Stop alarm	Milking program is deactivated. Program error or MS computer problem.	Restart the milking station. If the problem persists, contact service engineer.
1	102	Cowtraffic disconnected	Stop alarm	Cow traffic program is deactivated. Program error or MS computer problem.	Restart the milking station. If the problem persists, contact service engineer.
1	103	Milktransport disconnected	Stop alarm	Milk transport program is deactivated. Program error or MS computer problem.	Restart the milking station. If the problem persists, contact service engineer.



DeLaval voluntary milking system VMS

Troubleshooting

M	m	Alarm text	Type	Meaning	Action
1	104	Vmsioman disconnected	Stop alarm	MS communication and data transfer program is deactivated. Program error or MS computer problem.	Restart the milking station. If the problem persists, contact service engineer.
1	105	Vmsserver disconnected	Stop alarm	PC communication and data transfer programs have been deactivated; there is no communication between the milking station and the PC.	Restart the PC, or wait until it has been restarted automatically. Make sure the milking station enters automatic mode again. (When the communication has been re-established, the milking station will try to start operating in automatic mode again if it was in this mode when the programs failed.) Automatic restart of the milking station may take place.
1	106	Invalid configuration	Stop alarm	The milking station has received an invalid configuration.	Contact service engineer. Service engineer only: reload configuration data.
1	107	Several milkings failed	User notification	Several cows have passed the milking station without being properly milked on all teats. When this has occurred X times (X can be set in the management software, milking station on milking tab) a User notification will be sent. The milking station will continue working in automatic mode. However, when the counter reaches the double value (X+X), the system will stop and enter manual mode.	Check why the cows have not been properly milked. The following causes increase the counter: failure of identification, failure of teat preparation, failure of teatcup attachment (successful reattachment decreases the counter), problem concerning the vacuum level in a teatcup, exceptionally high or low milk yield, a self-test while a cow is in the station.
1	108	Cow too long in stall	User notification	The cow has remained in the milking station for more than 30 minutes.	The cow will be released after 30 minutes. Press the "Save Log files" button on the touch screen ("Miscellaneous Service" window) and inform the service engineer.
1	109	Gate ctrl disconnected	Stop alarm	VMS gates program is deactivated.	Restart the milking station. If the problem persists, contact service engineer.
1	110	Unknown cow with transponder ...	User notification	The cow may not be registered in the database, or the reading from the antenna may be wrong. Another reason may be a damaged transponder.	Make sure the cow is registered in the database and that she is classified as a VMS cow. If the problem persists, contact service engineer.



M	m	Alarm text	Type	Meaning	Action
1	111	Cow not identified	Deviation	The cow has not been identified within the preset time and will be released.	If identification fails for all cows, contact service engineer. Service engineer only: The time the system tries to identify a cow can be changed in the management software (VMS Config). If the cow(s) for which the identification failed are known, check the transponder(s): Remove the transponder from the cow, press "Accept cow" on the touch screen, activate the photocell until the entrance gate is closed, then put the transponder close to the transponder. The cow number associated with transponder should now be shown on the touch screen. If this alarm appears several times a week, make sure that the transponder collars are loose enough for the transponders to hang vertically from the neck of the cows. Otherwise, the transponder reader might have difficulty in reading the transponder number.
1	112	Unexpected high yield	Deviation	More milk (50%) than expected has been obtained from a quarter.	Check the corresponding air-inlet is not clogged. If the problem persists, contact service engineer.
1	114	Mumgr disconnected	Stop alarm	The main program in the milking station is deactivated.	Restart the milking station. If the problem persists, contact service engineer.
1	115	Unexpected low yield	Deviation	Less than 40% of the expected yield has been obtained from a quarter.	Check the cow.
1	117	High MS temperature(-...)	User notification	Temperature in the system is above 60 degrees centigrade. The alarm will call the farmer but system will remain in auto mode. Temperature must go below 60 and up again to trigger a new alarm.	Turn on or increase the flow of cooling air to the electrical cubicle.
1	119	Not cleaned after divert	Stop alarm	A rinse or cleaning should have been carried out after the last milking, but was not. The selected milk type for the cow is probably "Divert milk" after which normally should follow a cleaning procedure. (This milk type is used, for example, when a cow receives some kind of medical treatment.)	Start a rinse or cleaning manually.
1	120	Autocalibration fails status ...	Deviation	Autocalibration of the robot has failed. Additional information: 20 = Problem with Balance or PRBS calibration. 21 = Problem with performance. 30 = Calibration cancelled by operator. (Previous calibration data will be used.)	No action is necessary if the robot performs well. Inform service engineer if the robot is not working well.
1	121	Guardmaster block MS	User notification	US market only. Guardmaster has been activated and is blocking movement of robot arm and magazine.	Clear blocking by entering pin code at Guardmaster. This will allow normal operation of milking station
1	122	Guardmaster allow MS	Status message	US market only. Guardmaster has granted normal operation of milking station.	None



M	m	Alarm text	Type	Meaning	Action
1	200	External alarm to milking station	User Notification	Some external device connected to milking station has generated an alarm.	This is an option. Action is depending on what device has generated the alarm.



Multi-purpose arm - major code 2

M	m	Alarm text	Type	Meaning	Action
2	11	Cup attached to teat	Status message	One teatcup has successfully been attached to a teat. The message includes the cow number, cup number, and on which teat the cup was attached to.	None required.
2	12	Cup reattached to teat	Status message	One teatcup has been reattached, for example after a kick-off or after an earlier unsuccessful attachment. The message includes the cow number, cup number, and on which teat the cup was reattached to.	None required.
2	13	Mixed and corrected: Cup attached to teat.	Deviation	The system has discovered that the robot has attached some teatcups incorrectly, and has compensated by correcting the yield registrations. (There will be one message for each teat.)	None required if the problem occurs occasionally. If this problem occurs frequently, it indicates poor attachment performance. Make sure the cow fulfills the DeLaval udder criteria. The following measures can also be taken: - Reteach the start positions. - Keep the udders free from long hair. - Make sure the camera cover is clean. - As a last resort, try one of the attachment strategies; see chapter "VMS cow settings" in the instruction book "VMSMgmt 2007".
2	14	Teat cleaned and premilked	Status message	Teat preparation has been carried out on one teat. The message includes the cow number and on which teat teat preparation was carried out.	None required.
2	17	OCC value is above %...f!	Deviation	See alarm text.	Check the cows that caused the notification. Depending on the strategy at the farm the thresholds can be changed. Lowering the thresholds will increase the diversion/notifications while increasing the threshold will decrease the number of diversions/notifications. The thresholds are changed in Animal>VMS Cow>Automatic diversion.
2	18	Milk is diverted automatically, due to MDi level	Deviation	See alarm text.	Check the cows that caused the notification. Depending on the strategy at the farm the thresholds can be changed. Lowering the thresholds will increase the diversion/notifications while increasing the threshold will decrease the number of diversions/notifications. The thresholds are changed in Animal>VMS Cow>Automatic diversion.
2	19	MDi level in milk is over %...f!	Deviation	See alarm text.	Check the cows that caused the notification. Depending on the strategy at the farm the thresholds can be changed. Lowering the thresholds will increase the diversion/notifications while increasing the threshold will decrease the number of diversions/notifications. The thresholds are changed in Animal>VMS Cow>Automatic diversion.



M	m	Alarm text	Type	Meaning	Action
2	41	Please set X CentreLaser =... Y CentreLaser =...	Status message	Applies to cup-centre tuning (touch screen button "Cup Center Tuning" in Robot Control window).	Information to service engineer only.
2	42	Tune Cup center done! (Updating database)	Status message	See Major code 2, Minor code 41 above.	
2	51	Teat not found for milking	Deviation	The robot failed to attach a teatcup. The message includes the cow number, cup number, and for which teat the attachment failed.	A) If you are present at the milking station, wait until the robot has tried to reattach the teatcup. If the robot does not succeed in attaching the cup, the milking will be classified as "Incomplete". This means that the cow will be allowed to return for a new milking in a short while. B) To avoid a milking being classified as Incomplete, do the following: - Wait until the robot is supporting the milk tubes. - Then use the "Start milking" buttons on the touch screen to attach the missing cup(s) by hand. Note: never move teatcups without using the stop/start buttons. If milkings are classified as Incomplete frequently, follow the advice for "Mixed and corrected: Cup attached to teat" above (major code 2, minor code 13).
2	52	Teat not found at reattach	Deviation	The teat was not found during reattachment. The message includes the cow number, cup number, and for which teat the reattachment was unsuccessful.	Follow the instructions under B for "Teat not found for milking" above (Major code 2, Minor code 51).
2	53	Teat position not working (too low)	Deviation	The start position for this teat is too close to the ground. The message includes the cow number and which teat that has a start position too close to the ground. Robot will proceed with next teat.	Reteach the start position for the teat. It is possible that the VMS cannot handle this cow due to the udder/teat being too close to the ground. Check that the cow fulfils the DeLaval udder criteria.
2	55	No camera objects seen during attempt to find teat	Deviation	While searching for teats, the locations software could not find any objects at all in the camera picture. This is not normal operating performance.	If this rarely ever occurs, then no action is required. If it occurs frequently, check that the lasers are working and that the lower arm can rotate around its axis. If either of these fail, notify the service engineer. Warning: Do not stare into the laser beams.
					Service engineer only: Check that the lasers are working. - If the arm has not rotated properly, the camera might be pointing to the floor. - Check for dirt, damage or scratches on the camera window. - Clean the camera window if necessary.



M	m	Alarm text	Type	Meaning	Action
2	56	Robot encoder lost pulses, axes (X...Y...Z:....)	Deviation	After an Axis End point Calibration (which, for example, is done at start-up), one or more encoder values deviated from the expected values. This might be due a problem with the encoders. The message/alarm text includes the axes (X, Y, Z) and their status: "1" means that there is a problem on this axis (the encoder has lost pulses), "0" means that the encoder on this axis is working properly.	If this rarely ever occurs, then no action is needed. If this occurs more often, notify service engineer.
2	57	Teat not found for cleaning	Deviation	The arm was unsuccessful in cleaning a teat. The message includes the cow number and which teat that was not found. Frequent failures of teat preparation may affect the milk hygiene and udder health negatively.	No action required. However, the teat(s) may be cleaned and foremilked manually. If teat preparation frequently fails, see the advice for "Mixed and corrected: Cup attached to teat" above (Major code 2, Minor code 13).
2	81	Robot operation aborted	Deviation	The current action of the robot was stopped. Normally, this is the result of pressing the button "Abort current robot operation" on the touch screen. (This button is accessible by pressing the "Auto..." button on top of the screen.) However, in some situations the robot may actually be stopped and parked automatically. This is the case in the following situations: - In automatic mode when no cow enters the station for a certain time. - In manual mode when a milking is finished.	None required, but the stopped action can be started again.
2	82	Unknown robot test number.	Deviation	Only applies when using the test fuctions of the touch screen. A number that has no meaning has been entered.	Information for service engineer.
2	85	Cannot milk a non-existing teat	Deviation	Internal error, should never occur. The system has received conflicting instructions: the robot has been ordered to attach cups to a teat which is marked as nonexistent.	Press the "Save Logfiles" button on the touch screen as soon as possible after the error occurred ("Miscellaneous Service" window). Notify the service engineer. Service engineer only: Notify the Help desk in Tumba. Existing teats are specified for each cow in the management software.
2	91	Tune cup center: No center object	Deviation	See Major code 2, Minor code 41 above.	
2	92	Tune cup center: More than one center object	Deviation	See Major code 2. Minor code 41 above.	



M	m	Alarm text	Type	Meaning	Action
2	101	Axis end point calibration needed	Stop alarm	You have ordered the robot to carry out an action without the position sensors being calibrated. Note: This should never occur in automatic mode.	<ul style="list-style-type: none"> - Run an "Axis End point Calibration" from the touch screen. ("Robot Control" window) - Try the action again.
2	102	Axis end point calibration failed	Stop alarm	Axis End point calibration failed: it did not finish within reasonable time. Note: If the calibration fails for another reason than being too slow, this will be issued by another error message. Alarm major code 2, minor code 133 will normally occur before alarm 102 is issued. See below.	<ul style="list-style-type: none"> - Run an "Axis End point Calibration" from the touch screen. (Robot Control window) Note: It is very important that the robot is not obstructed during the calibration. - If the error occurs again, press the "Save Logfiles" button on the touch screen (Misc Serv & Maint window). Then notify service engineer. Service engineer only: Call the Help desk in Tumba. The error should never occur. Developers should be notified if it happens (possible software error).
2	103	Robot failed to start, axes (X:....Y:....Z:....)	Stop alarm	The robot failed to start. This error might occur if the hydraulic pressure is insufficient and there is no error indication on the hydraulic power box.	<ul style="list-style-type: none"> - If the self-test fails and the system is stopped, check if something is obstructing the robot or if it is stuck. - Then try to start again. - If the problem persists, contact the service engineer.
				The robot will make up to three attempts to resume operation if the system was in automatic mode when the error occurred. If the attempts fail, a self-test is performed while the cow is still in the station. If the self-test is successful, operation will continue.	Service engineer only: <ul style="list-style-type: none"> - Check the hydraulic pressure. - Carry out a "Home Calibration".
2	104	Cannot reach position, axes (X:....Y:....Z:....)	Stop alarm	Too long time elapsed for the robot to reach the specified position (more than 7 seconds). The message includes the axes (X, Y, Z) and their status: "1" means that there is a problem with this axis, "0" means that this axis is OK. This message might be due to something obstructing the robot (for example, a cow has put a leg in a unexpected position) or a problem with the axis control. The system will, or will try to, park the arm.	<ul style="list-style-type: none"> - If this rarely ever occurs, try the desired action once again. Check for obstacles preventing the robot from moving. - If this occurs frequently, contact service engineer.
				The robot will make up to three attempts to resume operation if the system was in automatic mode when the error occurred. If the attempts fail, a self-test is performed while the cow is still in the station. If the self-test is successful, operation will continue.	
2	105	Robot moved too fast, axes (X:....Y:....Z:....)	Stop alarm	The safety function terminated the operation of the robot because it moved faster than is allowed. The message includes the axes (X, Y, Z) and their status: "1" means that there is a problem with this axis, "0" means that this axis is OK.	<ul style="list-style-type: none"> - If this rarely ever occurs, try the desired action once again. Check for obstacles preventing the robot from moving. - If this occurs frequently, contact service engineer.



M	m	Alarm text	Type	Meaning	Action
				The robot will make up to three attempts to resume operation if the system was in automatic mode when the error occurred. If the attempts fail, a self-test is performed while the cow is still in the station. If the self-test is successful, operation will continue.	
2	107	Air button is pressed	Stop alarm	Robot operation was attempted while the touch-screen button "Robot air lock" was enabled (indicated by a cross beside the button). Note that the reference to "air" is incorrect. The name refers to previous models of VMS that used compressed air to move the arm; the air-lock button prevented the arm from moving. The principle function is the same in hydraulic systems.	Disable the "Robot air lock" button; do as described below. Warning: Keep out of the arm's working area when disabling the lock button. - On the touch screen, open the Robot Service window. - Press the "Robot air lock" button. Make sure there is no cross beside the button. If appropriate measures have been taken and the problem persists, contact the service engineer.
2	111	Demanded position is beyond limit, axes (X:....Y:....Z:....)	Stop alarm	The robot could not reach the specified position because the position is located outside its working range. The message includes the axes (X, Y, Z) and their status: "1" means that there is a problem with this axis, "0" means that this axis is OK. This should never occur if the configuration of the robot is correct.	- If this rarely ever occurs, try the desired action once again. - If the problem persists, contact service engineer.
				The system will perform a self-test while the cow remains inside the station. If the self-test is successful, operation continues. Otherwise, the system will be stopped and this alarm issued.	Service engineer only: This could either be due to a software problem, or that the geometry of the robot is incorrect. In the latter case, the robot has to be re-calibrated. Call the Help desk for advice.
2	113	Camera is not responding	Stop alarm	Too long time elapsed for the camera to deliver a picture (for example, when searching for teats).	- Run a self-test (Robot Control window on touch screen), or Test Misc no 20 (Robot Service window on touch screen), which is faster. If no alarm is issued, then the camera has recovered. - If the problem persists, call service engineer.
				The robot will make up to three attempts to resume operation if the system was in automatic mode when the error occurred. If the attempts fail, a self-test is performed while the cow is still in the station. If the self-test is successful, operation will continue.	Service engineer only: - Check the connections in the connection box (junction between upper and lower arm). Poor connection is the usual reason for this alarm. - Besides poor connection, the camera unit itself might be damaged (internal connection failure, etc.). For further information, see VMS Service news no. 64.



M	m	Alarm text	Type	Meaning	Action
2	114	Joystick is not working	Stop alarm (in manual mode only)	The joystick delivers unexpected values. Note: This will occur if a teaching procedure is started without the joystick connected, or if any joystick button is kept pressed when a teaching procedure is started.	- Make sure the joystick is connected properly. - Restart the teaching procedure. - If the alarm is issued again, restart the milking station and make another try.
					Service engineer only: - Check or, if necessary, replace the joystick. - Check that the voltage supply to ALCOM I/O board is 24V. If the voltage is incorrect that will affect ALCOM I/O board.
2	115	Teatcup ... not detected in gripper	Stop alarm	This error can be caused by either one of the following two events (1 or 2): 1) While attempting to fetch a teatcup, the gripper on the multi-purpose arm fails to detect the cup in its claws. The arm will attempt to fetch the cup twice, the magazine release and retract the cup and the arm make yet another attempt. The multi-purpose arm will then attempt to fetch the remaining teatcups in the same manner. In automatic mode, the system will perform a self-test while the cow remains in the station: if the test is successful, the system will continue operating; if not, the system will be stopped.	A) - If this rarely ever occurs, then try desired action once again. B) - If this occurs often, make sure the arm is in the correct position when fetching the cups. Follow the steps below. Warning: Stay out of the arm's operating range during the calibration and the test below. - Put the station in manual mode. - Carry out an Axis End point Calibration: on the touch screen, open the Robot Control window, then press the button "Axis End point Calibration". - Verify that the arm can fetch the teatcups by pressing the button "Test Pickup Cups" (in the Robot Control Window on the touch screen). Check that the gripper is tilted to correct positions. If not call service engineer; otherwise, continue with the next step. For magnetic gripper: the contact surface between gripper and teat cup might be dirty. Clean if necessary.
				2) The multi-purpose arm detects that it has dropped the cup while attempting to locate a teat. The alarm will in this case be issued as a Deviation. The cup will be retracted into the magazine and the arm make additional attempts before the system issues "Teat not found...", major code 2, minor code 51 or 52. The system will in this case continue operating in automatic mode.	- If the arm does not succeed in fetching the cups or the performance is slow, then redetermine the cup positions: open the Robot Teaching window, then press the "Teach all cup positions" button and follow the instructions on the screen. - Carry out the test by pressing the "Test Pickup Cups" again. - If the arm still fails or the performance is slow, contact the service engineer.



M	m	Alarm text	Type	Meaning	Action
					<p>Service engineer only:</p> <ul style="list-style-type: none"> - Put the station in manual mode. - Check that the tilt function/sensor is working: on the touch screen, open the "Robot Service" window, then press the "Tilt" button. Check that the movements of the gripper corresponds to your actions (Out = away from you, In = towards to you). - Check that the "Cup in gripper" sensor is working, for example by putting a screwdriver close to the sensor. Check that the sensor indicator on the screen (Cup in gripper) corresponds to your actions. - If the Cup in gripper sensor is not working, then it may be disabled in the management software (VMS Config). This may solve the problem. <p>Note: Disabling the Cup in gripper is a temporary measure. The sensor should be repaired and enabled as soon as possible.</p>
2	116	Gripper is not empty	Stop alarm	The robot has released a cup but still detects an object in the gripper. The robot will be parked.	<ul style="list-style-type: none"> - Check if something has got stuck in the gripper, then try the desired action once again. - If the problem persists, call service engineer.
				The system will perform a self-test while the cow remains inside the station. If the self-test is successful, operation continues. Otherwise, the system will be stopped and this alarm issued.	<p>Service engineer only:</p> <ul style="list-style-type: none"> - Put the station in manual mode. - On the touch screen, open the "Robot Service" window. - Check that the item in gripper function/sensor is working, for example by putting a screwdriver close to the sensor. Check that the sensor indicator on the screen (Item in gripper) corresponds to your actions. - If the Item in gripper sensor is not working, then it may be disabled in VMS Config. This may solve the problem. <p>Note: Disabling the item in gripper sensor is a temporary measure. The sensor should be repaired and enabled as soon as possible.</p>
2	123	Robot needs air to stall	Stop alarm	The tilt or grip movement failed because the compressed air to the milking station has probably been switched off. Compressed air is used by the gates, the feeding module, the rear plate and the tilt and grip functions.	<p>This error should never occur in automatic mode.</p> <p>Press the "Save Logfiles" button on the touch screen as soon as possible after the error occurred ("Miscellaneous Service" window). Notify the service engineer.</p> <p>Service engineer only:</p> <p>If the main air supply to the station has been switched off (main valve in the upper beam has been closed), then switch it on again.</p> <ul style="list-style-type: none"> - If the air has not been switched off, call Help desk in Tumba.



M	m	Alarm text	Type	Meaning	Action
2	124	Vacuum not detected in cup	Deviation	<p>The robot received information that there was no vacuum in the teatcup during an attempt to attach the cup to a teat. The message includes the cow number, cup number, and which teat the attempt concerned.</p> <p>The alarm is issued after three attempts to locate the teat. After these attempts, the cup will be retracted into the magazine and the arm make one more attempt to attach the cup. If this attempt also fails the milking session will be classified as incomplete.</p>	<ul style="list-style-type: none"> - If this occurs seldom, then no action is required. A possible cause may be that the cup had already been attached when the vacuum was turned on. Since the vacuum sensor reads the difference in air flow before and after attachment, it interprets this as a failure of vacuum supply. - If the self-test in automatic mode fails, restart the milking station. If this does not solve the problem, contact service engineer.
				<p>In automatic mode, a self-test will be performed after the cow has left the station.</p> <p>If this error occurs for several consecutive milking sessions, the systems will issue the alarm "Several milkings failed" (major code 1, minor code 107).</p>	<p>Service engineer only:</p> <ul style="list-style-type: none"> - Check the vacuum sensor(s) (S485, S486, S487, S488 in the lower beam).
2	126	Rear sensor failure (... mm)	Stop alarm	<p>The position of the rear plate, read by the rear sensor, is invalid. For safety reasons, the robot will be parked.</p> <p>The message includes the displacement of the rear plate in mm.</p>	<ul style="list-style-type: none"> - If this rarely occurs, then try the desired action once again. - If this error occurs frequently, contact the service engineer.
				<p>The system will perform a self-test while the cow remains inside the station. If the self-test is successful, operation continues. Otherwise, the system will be stopped and this alarm issued.</p>	<p>Service engineer only; calibrate the rear sensor.</p> <ul style="list-style-type: none"> - On the touch screen, press "VMS" > "Test VMS". - On the keypad that appears on the screen, type "VMS". - Press "Service Test". - Press "Pneumatics" and scroll until you find "Rear plate valve". - Make sure the rear plate can move freely. - Press the "Rear plate valve" button. - Press "Calibrate" and wait until the calibration is complete, the restart the milking station. - If the calibration does not solve the problem, then check or replace the rear sensor.
2	127	No robot motion when expected, axes (X:... Y:... Z:...)	Stop alarm	<p>The safety function stopped the robot because the position sensors (encoders) reported unexpected values.</p> <p>The message includes the axes (X,Y,Z) and their status: "1" means that there is a problem with this axis, "0" means that this axis is OK. Note: When the position sensors are not working, the speed-detecting safety functions do not work either.</p>	<ul style="list-style-type: none"> - If the self-test fails, contact service engineer. <p>Warning: The robot can behave violently when a position sensor is broken. Be very careful.</p>



M	m	Alarm text	Type	Meaning	Action
				The robot will make up to three attempts to resume operation if the system was in automatic mode when the error occurred. If the attempts fail, a self-test will be performed after the cow has left the station. If the self-test is successful, operation will continue.	
2	130	Cup attach not detected	Status message	<p>The robot was able to locate the teat and read the vacuum in the cup, but did not detect the change in vacuum level as the teat entered the teatcup. Message includes cow no., cup no. and teat (LF, LR, etc.). The alarm is issued after three attach attempts.</p> <p>The arm will continue to attempt to attach the teatcup for one minute. If the attempts fail, the milking session will be labelled incomplete. If this error occurs for several consecutive milking sessions, the systems will issue the alarm "Several milkings failed" (major code 1, minor code 107).</p>	<p>Contact service engineer.</p> <p>Possible causes, service engineers only:</p> <ul style="list-style-type: none"> - Too large value of "Vacuum level for attach" in the management software (VMS Config). - Vacuum supply to lower beam accidentally turned off. If main vacuum supply is on, this error will occur and not "Vacuum not detected in cup" (major code 2, minor code 124). - Teat is not entering cup properly. Teatcup centre tuning is needed, or teat is too thin. - Other vacuum supply or vacuum sensor problem.
2	131	Robot fatal error 16, axes (X:...Y:...Z:...). Axis endpoint calibration is needed.	Stop alarm	<p>The safety function stopped the robot because readings from the position sensor(s) are out of range. The message includes the axes (X.Y,Z) and their status: "1" means that there is a problem with this axis, "0" means that this axis is OK.</p> <p>An axis endpoint calibration must be performed.</p>	- If the self-test fails, contact service engineer.
				The system will perform a self-test while the cow remains inside the station. If the self-test is successful, operation will continue. Otherwise, the system will be stopped and this alarm issued. An Axis endpoint calibration is included in the self-test, which means that the self-test normally succeeds.	
2	132	Possible HW error. Check filter card, encoders and proportional valves.	Stop alarm	The robot was stopped because an error was detected by a filter card. The error concerns either one of the position sensors (encoders) or the control signal to one of the proportional valves.	- If the self-test fails, contact service engineer.
				The robot will make up to three attempts to resume operation if the system was in automatic mode when the error occurred. If the attempts fail, a self-test is performed while the cow is still in the station. If the self-test is successful, operation will continue.	Service engineer only: Check filter card, encoders and proportional valves. As long as the filter card detects the error, it will be impossible to run the robot.



M	m	Alarm text	Type	Meaning	Action
2	133	Axis Endpoint Calibration failed, axes (X:... Y:... Z: ...)	Stop alarm	The robot failed to move properly during the first part of the Axis end point calibration. This error might occur if the hydraulic pressure is insufficient and there is no error indication on the hydraulic power box.	<ul style="list-style-type: none"> - Check if something is obstructing the robot or if it is stuck. Then try to start the calibration again. - If the problem persists, contact service engineer.
					Service engineer only: -Check the hydraulic pressure. See also "Cannot reach position - Hydraulic" (major code 2, minor code 139).
2	136	Internal axis controller error	Stop alarm	Internal error. Should never occur.	<ul style="list-style-type: none"> - If the self-test fails, contact service engineer.
				The robot will make up to three attempts to resume operation if the system was in automatic mode when the error occurred. If the attempts fail, a self-test is performed while the cow is still in the station. If the self-test is successful, operation will continue.	
2	137	Teat cleaner not detected in gripper	Stop alarm	This error can be caused by either one of the following two events (1 or 2): 1) While attempting to fetch the teat preparation cup, the gripper on the multi-purpose arm fails to detect the cup in its claws. The arm will attempt to fetch the cup twice, then park. In automatic mode, the system will perform a self-test while the cow remains in the station: if the test is successful, the system will continue operating; if not, the stop alarm will be issued.	See major code 2, minor code 115 above. Note: When verifying that the arm can fetch the teat preparation cup, use the button "Test Pickup Cleaner" instead of "Test Pickup Cups". Also, use the button "Teach Teatcleaner position" when redetermining the cup's position. For magnetic gripper: the contact surface between gripper and teat cup might be dirty. Clean if necessary.
				2) The multi-purpose arm detects that it has dropped the teat preparation cup while attempting to locate a teat. The alarm will in this case be issued as a Deviation. The arm will make additional attempts before the system issues "Teat not found for cleaning", major code 2, minor code 57. The system will in this case continue operating in automatic mode.	
2	138	Disinfection device not detected in gripper	User notification	While attempting to fetch the disinfection tool, the gripper fails to detect the tool in its claws, or the gripper detects that it has dropped the tool before disinfection has taken place. The arm will attempt to fetch the tool twice. The arm will park if unsuccessful.	See major code 2, minor code 115 above. Note: Redetermining the disinfection tool's position is done by using "Test misc" no. 27 on the touch screen. (Window "Robot Service".)



M	m	Alarm text	Type	Meaning	Action
2	139	Cannot reach position - Hydraulic box indicates error	Stop alarm	The arm cannot reach specified positions and the hydraulic power box indicates that there is an error. The pump unit has been switched off and the hydraulic pressure is thus reduced. The system will try to clear the alarm and resume operation. If this fails, any ongoing milking session will be completed, the cow released and a self-test performed. Automatic operation will be resumed if the test is successful; otherwise the stop alarm is issued.	Notify service engineer. Service engineer only: - Check that the hydraulic power unit is switched on. - Check oil level and oil temperature. Any error concerning level and temperature is indicated by the red lamps. - If oil level and oil temperature is sufficient/below limit, press the reset buttons to restart the unit. - If no fault can be found on the unit but the alarm is issued anyway, it indicates that the communication with the hydraulic power unit is not working properly. Possible causes might be (depending on the wiring setup) the DVP vacuum pump, the option box or the ALCOM bus.
2	140	Hydraulic pump - too high oil temperature	Stop alarm	Oil temperature has exceeded 60 deg C.	Check oil temperature on the analogue thermometer. If it shows OK value, wait until the oil temperature is lower than 55 degrees. It is important here the ambient temperature is as low as possible. If the true oil temperature appears to be much lower than 60 degrees the digital temperature sensor is possibly broken. It is then possible to disable the sensor in VmsConfig until the sensor is exchanged. NOTE! The sensor will automatically be enabled daily at 12.00.
2	141	Hydraulic pump - too low oil level	Stop alarm	Too little hydraulic oil.	Check the oil level in the monitor glass. If the level is low, fill oil. If the oil level is OK, the sensor may be broken. It is then possible to disable the sensor in VmsConfig until the sensor is exchanged.
2	142	Hydraulic pump - too high oil pressure	Stop alarm	Abnormally high pressure detected.	The sensor is probably broken.
2	143	Hydraulic pump - too low oil pressure	Deviation	Abnormally low pressure detected.	If the robot has "moving- problems", for example cannot reach position, a service technician possibly need to find the reason. Possibilities are: pump error, motor or unloading valve.
2	144	Hydraulic pump - temperature sensor failure	Stop alarm	Temperature sensor is broken. Or the cable or contact...	Check the electrical connection to the sensor. Possibly change sensor. Until that the sensor can be disabled in VmsConfig.
2	145	Hydraulic pump - pressure sensor failure	Stop alarm	Pressure sensor is broken. Or the cable or contact...	Check the electrical connection to the sensor. Possibly change sensor. Until that the sensor can be disabled in VmsConfig.
2	146	Hydraulic pump - too low oil temperature	Stop alarm	Measured oil temperature was lower than 5 deg C when the system wanted to start the pump. The oil has probably too high viscosity.	Check oil temperature on the analogue thermometer. If it shows OK value, wait until the oil temperature is higher than 5 degrees. If the sensor is broken, it is possible to disable the sensor in VmsConfig until the sensor is exchanged. NOTE! The sensor will automatically be enabled daily at 12.00. If cold ambient temperature, maybe enable boost mode.



M	m	Alarm text	Type	Meaning	Action
2	147	Hydraulic pump - too long time in idle load	Deviation	The measured pressure cannot reach 34 bar when the pump loads after parking the arm.	Check the pressure on the touch screen. The pressure should vary between 29 and 34 bar during teat cleaning, attach and disinfect (here we have arm movements). If the error is repeated often, contact service. Check the unloading valve.
2	148	Hydraulic pump - too low pressure in boost mode	Deviation	Cannot reach 40 bar in boost mode (limit is 36 bar).	Check the hydraulic pressure on the touch screen. Check the unloading valve. Call service.
2	149	Hydraulic pump - SW internal error	Stop alarm	Bug	Should never occur. But if it does, restart the milking station.
2	150	Hydraulic pump - both pressure and temp sensor disabled	Stop alarm	Should not be possible	Enable one of the sensors in VmsConfig.
2	151	Hydraulic pump - too long time in manual mode without doing any manual work	Stop alarm	See Alarm text	Leave manual mode of the hydraulic pump control.
2	203	Robot is busy, command ignored	Status message	This should never occur in automatic mode unless the operator has tried to carry out a forbidden operation. In manual mode, this error may occur when an operation is tried but the robot is already performing some other operation.	Provided that the station is in automatic mode and that no manual operation was attempted when the error occurred, press the "Save Logfiles" button on the touch screen ("Miscellaneous Service" window). Then notify service engineer. Service engineer only: Call helpdesk.
2	204	AxisController not connected	Stop alarm	Internal error, should never occur. The software for the axis control has failed operating.	Restart the milking station. If the problem persists, press the "Save Logfiles" button on the touch screen as soon as possible after the error has occurred ("Miscellaneous Service" window). Notify service engineer. Service engineer only: Notify Help desk in Tumba.
2	205	AxisController is not properly configured	Stop alarm	The parameters for the axis control are invalid. Normally, this error should never occur. Possible causes: - Parameters in the database are invalid. - The parameters in the database were not successfully sent to the arm (however, this is an internal error and should never occur). The robot must be re-calibrated.	Contact service engineer. B) Service engineer only: - Carry out an "Axis Controller calibration" and a "Home calibration" (see VMS service news no. 32). - If the calibration does not solve the problem, contact Help desk in Tumba.



M	m	Alarm text	Type	Meaning	Action
2	206	Robot is not properly configured	Stop alarm	The parameters for the software operating the arm are invalid. Normally, this error should never occur. A possible cause might be that the parameters in the database were not successfully transferred to the milking station (however, this is an internal error and should never occur).	Restart the milking station. If the problem persists, contact service engineer.
2	207	Invalid teat positions, not taught?	User notification	The cow has invalid start positions (teat positions). The cow may be new to the system. The message includes the cow number. If this occurs in automatic mode, the cow will be released and the station continue with the next cow.	Determine ("teach") the start positions for the cow.
2	208	Invalid teatcup positions, not taught?	Stop alarm	The robot cannot fetch the teatcups because one or more of the cup positions are invalid.	Determine ("teach") the positions of the teatcups.
2	209	Invalid cleaner position, not taught?	Stop alarm	The robot cannot fetch the teat preparation cup because its position is invalid.	Determine ("teach") the position of the teat preparation cup.
2	210	Invalid hold milktubes position	Stop alarm	The robot cannot support the milk tubes because the holding position is invalid. In automatic mode, the cow is milked and released before the alarm is issued.	Contact service engineer. Service engineer only: - Park the robot. - Start the management software (VMS Config) and adjust the holding position.
2	213	Robot self test failed	Stop alarm	Some problem for the robot arm to perform selftest.	Start another selftest and try to see if something is stopping the arm. If not possible to solve, call serviceman.



Milking - major code 3

M	m	Alarm text	Type	Meaning	Action
3	1	Vacuum ref cup ...=...	Status message	Vacuum reference-value for one teatcup.	None required.
3	2	Min yield = ... only got ...	Status message	The milk flow has gone below the limit, and take-off should take place, but the cow has not given the preset % of expected milkyield, so the system will extend the postmilking time by 30 sec, in order to allow the milkflow to raise again. System don't extend time if expected yield is less than 500 g.	Only information. The cow can be sick, the milk flow can be uneven or the milkyield recording can be wrong.
3	100	Kick off (Exp Yield ..., Yield ...) Kick off	Status message	The teat cup has been kicked off. The system will make a selftest, taking vacuum reference again after the milking	None required. Only information.
3	101	No yield from flomaster	Status message	No milk yield recording from the DeLaval milk meter MM15. The ALCOM communication with the milk meter does not work.	Restart the milking station. If the fault persists, contact service engineer. B) Service engineer only: As a temporary measure, the milk meter can be put out of use (in the management software > VMS Config, select "Do not use it" at "Use Flomaster"). The total milk yield will then be the sum of the yields from the four DeLaval milk meter MM25. Try to find the reason behind the error.
3	102	No yield from freeflow ...	Deviation/S-top alarm	There is no milk yield recording from one of the four DeLaval milk meter MM25. The ALCOM communication with the milk meter does not work. The system will try to establish the communication with the milk meter five times. If there is still no response from the milk meter, a status message will be issued. After ten attempts to establish the communication and there is still no response, the system is stopped and a stop alarm is issued.	Restart the milking station. If the problem persists, contact service engineer. The error is probably caused by a fault on the ALCOM bus or in the milk meter.
3	103	Bad vacuum ref cup ...=...	Stop alarm	Incorrect vacuum reference-value for one teatcup. The value should be in the range 65 - 200.	Restart the milking station. New vacuum reference-values are taken for each teatcup during the start-up. If the problem persists, contact service engineer.
3	105	Too high flow ... from cup ...	Stop alarm	The milk flow recorded for one quarter is exceedingly high. The milk flow exceeds 10 kg per minute.	Restart the milking station. If the problem persists, contact service engineer. There is probably something wrong with the DeLaval milk meter MM25 or an air-inlet.
3	106	Too high yield ... from cup ...	Stop alarm	The milk yield from one teat is exceeding an unreasonably high value. Milk yield exceed 40 kg for one teat.	Check air inlet and milkmeter. In case the fault remains contact the service technician. Probably something wrong with milkmeter or air inlet



M	m	Alarm text	Type	Meaning	Action
3	107	Air inlet blocked	User notification	One of the DeLaval milk meter MM25 has sent a message to the milking software that an air-inlet may be blocked.	Check the air-inlet.
3	108	Invalid Milksampler config	Stop alarm	Some parameters concerning the milk sampler are invalid.	Contact service engineer. Service engineer only: The values specifying the sample tray may be incorrect. The sample tray in the milk sampler differs some from country to country. A list of parameters for the different trays should be delivered with the milk sampler. The parameters are entered in the management software (VMS Config).
3	114	Milkmeter ... conductivity ... out of range (... - ...)	Deviation	The milk meter provides physiologically unreasonable conductivity values. Values below 3000 might indicate deposits on the conductivity-measuring electrodes, while values above 10000 may point to a faulty milk meter.	Always carry out the following general steps when the milk meters cause alarms: - Check that the active-air inlets can admit air (see procedure in instruction book, chapter "maintenance"). - Start a system cleaning to remove possible deposits on the milk meter's electrodes. - If the problem persists, call service engineer.
					Service engineer only: - Check that nothing obstructs the passage through the milk meter. - Check the power supply to the milk meter.
3	115	Conductivity differ (...) too much (...) between meters	Deviation	The values from one milk meter differ significantly from the others. It is not specified which meter it is that differs from the others, only that the difference exist.	It is not specified which meter it is that differs from the others, only that the difference exist.
3	116	Milkmeter ... conductivity (...) differ (...) from other meters	Deviation	One of the milk meters give values that differ significantly from the ones provided yesterday. The alarm is issued if the difference appears for only one milk meter.	See the general steps for alarm major code 3, minor code 114 above.
3	117	Milking self test failed	Stop alarm	Selftest from milking system failed. Vacuum level indicate bad vacuum in some milktube.	Make sure system has vacuum. Call service technician if problem remains.
3	118	FF meter %...f is having problems measuring blood	Deviation	The average value of blood is too high (over 600 ppm).	Check the air inlets and run a system cleaning. If that doesn't solve the problem, check if something is stuck inside the meter. If the problems persists call service engineer.
3	119	Many milkings with high blood value	Deviation	There are more then 10 milkings in a row with a blood level above 800 ppm.	Check the air inlets and run a system cleaning. If that doesn't solve the problem, check if something is stuck inside the meter. If the problems persists call service engineer.



M	m	Alarm text	Type	Meaning	Action
3	120	OCC: To high pressure	Deviation	At some stage in the process of measure cells the pressure is to high, this indicates some kind of blockage in the system.	Run prime and self test from the touch screen. If this does not help you need to manually check the hoses and valves to find the blockage. If it still does not work - call for service engineer.
3	121	OCC: To low pressure	Deviation	At some stage in the process of measure cells the pressure is to low, this indicates some kind of blockage in the system.	Run prime and self test from the touch screen. If this does not help you need to manually check the hoses and valves to find the blockage.
3	122	OCC: Time out due to Alcom communication problem	Deviation	Somewhere in the measure process an Alcom message was lost and the process could not continue.	Run prime and self test from the touch screen. If this does not help disconnect/connect the power to the OCC.
3	123	OCC: To low temperature	Deviation	The temperature in the cabinet is close to zero or below. The liquids can freeze and the system can be harmed.	If possible run a shutdown from the touch screen and don't use the OCC until it is warmer again. You can disable the OCC in the management software.
3	124	OCC: Liquid leakage in cabinet	Deviation	There is some liquid in the bottom of the cabinet	Try to see were the leakage is. When the problem is fixed, unscrew the cup under the cabinet. Empty the liquid and clean all parts. Run a prime and self test from the touch screen.
3	125	OCC: The waist container is full	Deviation	The waist container is full	Replace the waist container and press the "Waste is empty" button on the touch screen. Run a self test.
3	126	OCC: Pressure sensor broken or leakage/stop in some hose.	Deviation	The pressure sensor seems not working.	Run prime and self test from the touch screen. If it still does not work - call for service engineer. Press the Milk valve manually to release any pressure in the system. Read the pressure from the touch screen (should be around 1 to 1.2 bar). Make sure all valves are closed. Move the syringe pump a small distance and read the pressure again. Is there any pressure difference? If not try to disconnect/connect power to the OCC. If it still does not work, replace the pressure sensor.
3	127	OCC: The cuvette is dirty	User notification	The cuvette is to dirty	Run prime and self test from the touch screen. If this does not help you need to manually check the hoses and valves to find the blockage. If it still does not work - call for service engineer.
3	128	OCC: Out of reagent or leakage/stop in hose or valve failure	Deviation	The OCC can't detect any reagent.	Is there any reagent left in the bottle? Try prime and self test. If this does not help, check hoses and valves manually.
3	129	OCC: Out of hypochlorite or leakage/stop in hose or valve failure	Deviation	The OCC can't detect any hypochlorite.	Is there any hypochlorite left in the bottle? Try prime and self test. If this does not help, check hoses and valves manually.



M	m	Alarm text	Type	Meaning	Action
3	130	OCC: No water in funnel or leakage/stop in hose or valve failure	Deviation	The OCC can't detect any water	Is the water to the OCC turned on (is the teat cleaner getting water?). Try press the water button in the cabinet - is there any water coming into the funnel? Try run a self test from the touch screen. If this does not help, check hoses and valves manually.
3	131	OCC: No milk in funnel or leakage/stop in hose or valve failure	Deviation	The OCC can't detect any milk.	Maybe this cow has yield very little milk, then there might not be enough in the funnel to perform a measure. If this is not the case check hoses and valves manually.
3	132	OCC: No answer from the DCC	Deviation	The DCC does not answer on the Alcom bus	Run prime and self test from the touch screen. Restart MS. If it still does not work - call service engineer. Is it powered on? Try "DCC on/off" from the touch screen, and then just try to read some parameter to check that it has come to live. If this does not help disconnect/connect the power to the DCC module.
3	133	OCC: The DCC can't count the cells, some parameter setting is wrong	Deviation	Some parameter in the DCC is wrong so that the DCC can not perform a cell count.	Run prime and self test from the touch screen. Go through the parameter list from the touch screen to see if some parameter is set to an abnormal value (default values should be available from helpdesk?)
3	134	OCC: Can't clean the cuvette, it is too dirty	Deviation	The cuvette is too dirty too many times in a row	Run prime and self test from the touch screen. If this does not help you need to manually check the hoses and valves to find the blockage. If it still does not work - call for service engineer.
3	135	OCC: Can't recover, service needed!	User notification	The OCC has tried to run two self test without any luck. It can't recover from the faults.	Run prime and self test from the touch screen. Manually check the OCC. Is the waste bottle empty? Is there any reagent/hypochlorite in the bottle? Is the water ok? Replace hoses if needed. Check all valves (from touch screen). Try disconnect/connect power to the OCC. Run prime and self test from touch screen.
3	136	OCC: Can't get milk into funnel	User notification	There is not enough milk in funnel.	None required.



Cow traffic - major code 4

M	m	Alarm text	Type	Meaning	Action
4	1	Cow has left the stall	User notification	Information that things are running again. The cow has left the stall, and the exit gate has been closed after a previous "Failed to release cow. Cow still in stall" or "Failed to close stall. Cow still in the stall" event.	None required.
4	100	Failed to close gate while closing stall	User notification	The system could not close the entrance or exit gate when trying to perform a "close stall" or "release and close" operation. This has occurred despite several retries and "tricks" to outsmart the cows that obstruct the gate(s). The gate that did not close properly has been left open, and the system has been halted to obtain a safe state.	Remove any obstructing cows from the milking station's entrance and exit gates and put the station in automatic mode. If this problem occurs often (several times a week), make sure that the entrance and exit gate close fast enough. It should not take more than 3 seconds between the events "start closing entrance/exit gate" and "entrance/exit gate is fully closed". If the gates close too slowly, the cows will lose their respect for the gates and hence start blocking them. If the closing of the gates takes more than 3 seconds, let a service engineer adjust the speed of the gates.
					Service engineer only: - Adjust the speed of the gates. Note: The gates are properly configured when leaving the factory. Please do not change these settings during the installation. - If the adjustment does not solve the problem, press the "Save Logfiles" button on the touch screen ("Miscellaneous Service" window) as soon as possible after the error. Call Helpdesk for advice.
4	101	Failed to accept cow	User notification	The system could not properly receive a cow into the station. This has occurred despite several retries and "tricks" to outsmart the cows that obstruct the gate(s). The entrance gate (or in rare cases, the exit gate) has been left open and the system has been halted to obtain a safe state.	See "Failed to close gate while closing stall", major code 4, minor code 100 above. If this problem occurs extremely often (every cow or similar), the "entrance gate is closed" sensor might be out of operation. In this case, contact service engineer.
4	102	Failed close gate while releasing cow	User notification	The system failed to close the exit gate while releasing a cow. This has occurred despite several retries and "tricks" to outsmart the cows that obstruct the gate. The system has opened the gate and halted its operation to obtain a safe state.	See "Failed to close gate while closing stall", major code 4, minor code 100 above. If this problem occurs extremely often (every cow or similar), the "exit gate is closed" sensor might be out of operation. In this case, contact service engineer.



M	m	Alarm text	Type	Meaning	Action
4	104	Error ... on gate ...	User notification	Nonspecific gate-error message. (Error code to be defined) In general, errors of this kind means that a gate has - after several retries - failed to complete an operation in a safe way and had to "commit suicide" (air off) to obtain a safe state.	Restart the milking station that controls the gate which caused the error.
4	105	Failed to release cow. Cow still in stall	User notification	A notification from the cow-traffic system that a cow has stayed too long inside the station after the exit gate has been opened. The system will continue to wait for the cow to leave the station, and the complete its operation.	Most probably, this is due to a cow that refuses to leave the station. Either ignore the message and wait until the cow leaves by herself, or visit the barn to make her leave the station. If this message appears several times, the cow traffic might be blocked for some reason: a cow outside the milking station, a broken one way gate, etc. Visit the barn and remove the obstacle. If this message appears repeatedly and there is no cow inside the station, the "cow inside station" sensor might be defective. Contact service engineer.
					Service engineer only: Make sure the "cow inside station" sensor is not exposed to intermittent strong sunlight or others sources of disturbing light reflected on surfaces in the barn.
4	106	Failed to close stall. Cow still in stall	User notification	A notification from the cow-traffic system that the cow has stayed too long inside the station after a "Close stall" or "Release and close" operation has started. The system will continue to wait for the cow to leave the station, and the complete its operation.	See "Failed to release cow. Cow still in stall", major code 4, minor code 105 above.
4	107	Selection gate ...: Failed to close gate. Gate put into manual mode	User notification	Several attempts have been made to close the selection gate, but without success. The gate was then simulated to be out of operation to allow cows to clear away from the gate. More attempts to close the gate were made, but the gate still failed to close and was opened and put into manual mode.	Visit the gate and check that no cow or other object prevents the gate from closing. If this is not the case, press the AUTO button on the keypad twice to put the gate in automatic mode again. If the alarm is issued frequently, either of the following two might be the cause: - Air pressure to gate is insufficient, - Communication with the ALCOM I/O board is unstable. If the alarm is issued constantly, the gate-closed sensor on the cylinder might be damaged.
4	108	Separation gate....: Failed to reach designated direction. Gate still in automatic mode	User notification	The separation gate has after several attempts failed to reach the end position of the specified direction. The gate has stopped trying to reach the end position, but is still in automatic mode.	If this alarm is issued only occasionally, it is probably because a cow has not moved away from the gate. To be on the safe side, visit the gate to ensure that no cow is injured or is blocking the gate.



M	m	Alarm text	Type	Meaning	Action
4	109	Failed to close floor flush valve	User notification	The floor-flush-valve sensor indicates that the floor flush valve was not properly closed.	If it is probable that the sensor sends the correct value, check that the valve is not stuck in the open position. If water is constantly flushed, shut down the milking station.
4	110	Cow released due to failure to accept a cow	Status message	The system has failed to close the entrance gate even after several retries. To handle the situation the system releases the cow currently inside the stall before making another attempt to accept a cow.	None required.
4	111	Cow accepted successfully	User notification	The cow traffic system made a successful "accept cow" operation after having made an unsuccessful "accept cow" operation.	None required.
4	112	Gate ... entrance photocell has been blocked for ... hours	Deviation	The entrance photocell of a Smart Selection gate has been blocked for an abnormally long time. That probably means that something is wrong with the photocell (displaced, covered with manure, input signal over ALCOM has ceased, etc.).	<ul style="list-style-type: none">- Try to make the photocell work by wiping away dirt from the photocell eyes.- Use a long stick or similar to ensure that there is a straight line of sight between the photocell eyes. If not, adjust the direction of the photocell eyes. The connections inside the EP box on the gate might be faulty. Contact service engineer.
4	113	Gate ... exit photocell probably detects the door instead of cows	Deviation	The exit photocell of the Smart Selection gate probably detects the gate door as it swings to its open position. This will have a negative impact on the cow traffic through the gate since it makes it more difficult for cows to pass the gate.	Adjust the position of the exit photocell of the Smart Selection gate. Open the gate door with the joystick, and verify that the exit photocell is not affected by the gate door.



Milk transport - major code 5

M	m	Alarm text	Type	Meaning	Action
5	1	Washing step	Status message	Shows the current cleaning phase in the cleaning unit.	None required.
5	2	Startin milkpump	Status message	The milk pump has been started.	None required.
5	3	Stopping milkpump	Status message	The milk pump has been stopped.	None required.
5	4	Milktp busy (...). Ignored request (...)	Status message	This message appears if you request milk transport while VMS is in a cleaning phase.	Do not interfere with the cleaning process.
5	5	Tanke state idle	Status message	Tank emptying is not taking place.	None required.
5	6	Tank state wait to empty	Status message	The tank-emptying button has been pressed, but the emptying of the tank has not yet started since the milking station is still busy.	None required.
5	7	Tank state Cleaning	Status message	The tank cleaning is taking place. The gates of the Milking Station has been closed. Most likley, the cleaning of the station is also taking place.	None required.
5	8	Tank state Purging	Status message	The transport line is blown with compressed-air to convey the milk to the tank. This takes place before the tank emptying.	None required.
5	9	Tank state Emptying	Status message	The tank is being emptied.	None required.
5	10	Milk trucks has arrived	Status message	The tank-emptying button has been pressed.	None required.
5	11	Milk tank is empty	Status message	The milk tank is empty.	None required.
5	12	Milk tank is cleaned	Status message	The milk tank is cleaned.	None required.
5	13	Tank can accept milk	Status message	Tank is removing the signal "can not accept milk". This allows the system to start accepting cows for milking.	None required.
5	14	Filter change requested	Status message	Filter change button is set in position "change filter"	None required.
5	15	Filter change granted	Status message	Milking station has accepted change of filter to be done.	None required.
5	16	Filter change denied	Status message	Milking station has denied change of filter	None required.
5	17	Filter change completed	Status message	Milking station has received information that change of filter is completed.	None required.



M	m	Alarm text	Type	Meaning	Action
5	101	Endunit not empty	Stop alarm	The receiver (end unit) is not empty. This check is performed after a cleaning or rinse of the system to confirm that receiver does not contain cleaning water.	Make sure there is no cleaning water in the system before you start milking. If the cleaning was stopped in an abnormal way, carry out another cleaning or rinse to be on the safe side.
5	102	Tank valve in wrong position	Stop alarm	The milk valve or the cleaning valve (or both valves) at the tank is in the wrong position. Possible causes may be insufficient air pressure, clogged air valves or faulty sensors. Technical explanation: the valves' sensors, connected to Cx on board A70 inside the milk-room-controller box, do not give the expected signals.	- Check the positions of the valves and sensors.
5	103	Cleaning not completed	Stop alarm	The milking station has been stopped during a cleaning. When the Milking Station is started again, this message appears.	Check if a cleaning can be started and completed. Check the valves and the cleaning unit. Make sure there is no water in system before you start milking. Note: If you do not know in which step the cleaning was when it stopped, then run the complete cleaning once again to prevent bacteria or cleaning detergent from contaminating the milk.
5	104	Cannot accept milk to tank	Deviation/Stop alarm	Tank alarm. Milk cannot be conveyed to the tank. The VMS system will issue a Deviation as soon as it receives the alarm from the tank. If the tank still cannot receive milk after 30 minutes have passed, the VMS system will issue a stop alarm. (The time limit can be changed in the management software > VMS Config). Note: if the alarm involves some problem with the cooling functionality in addition to the fact that the tank cannot receive milk, the alarm is immediately issued as a stop alarm.	Check which alarm the tank is sending, then see the manuals for the cooling equipment on what actions to take.
5	105	Cooling alarm	User notification	Tank alarm, cooling error.	Check the cooling of the tank.
5	106	Timeout emptying tank	Stop alarm	The tank emptying has not been finished within 30 minutes. A possible reason is that the tank cleaning has not been started. The time limit can be changed in the management software > VMS Config.	Check why the tank emptying has not been finished.
5	107	Timeout tankcleaning	Stop alarm	The tank cleaning has not been finished within 60 minutes. The time limit can be changed in the management software > VMS Config.	Check why the tank cleaning has not been finished.



M	m	Alarm text	Type	Meaning	Action
5	108	Bad system vacuum... kPa ref... kPa	May give stop call after recovery	The system vacuum to the milking station is deviating too much from the setpoint values (set in PC). Checked under milking only.	Check the system vacuum or calibrate the sensors. Check setpoint value in PC. If sensor is broken, calibrate so it shows correct vacuum. If setpoint is 0 the system will not check the vacuum level.
					Service engineer only: - Start the management software and check that "System vacuum level" is set to 44 kPa. - If the problem persists, calibrate the vacuum sensor. Do as follows: - Attach a calibrated meter to the outlet on the control box in the lower beam. - On the touch screen, press "VMS" > "Test VMS". - On the keypad that appears on the screen, type "VMS". - Press "Service Test". - Press "Lower beam" (for "Lower beam 2") and scroll until you find "Sense vacuum level". - Press the "Sense vacuum level" button. - Press "Calibrate" and follow the instructions on the screen. - When the calibration is complete, restart the milking station.
5	109	Good milk valve in wrong position	Stop alarm	The valve for "good milk" (consumable milk) is not in the requested position.	Check the function of the sensor and its LEDs (Light Emitting Diode).
5	110	Dump milk valve in wrong position	Stop alarm	The valve for "bad milk" (non-consumable milk) is not in the requested position. "Good milk" (consumable milk) might be pumped to drain.	Check the function and the sensor and its LEDs (Light Emitting Diode).
5	112	Endunit indicates empty Error	Stop alarm	Problems when emptying the receiver (end unit). System has milked more than 2 kg and is about to empty the receiver, but the level sensors inform the system that the receiver is already empty.	Check the receiver and its level sensors (endunit level).
5	113	Timeout emptying endunit - check filter valve	Stop alarm	The level sensors are indicating that the receiver is not empty even though the milk pump has been running for 60 seconds.	In particular, make sure that the valve at the milk filter is open. Check the level sensors (endunit level). Check the milk pump and the motor overload protection. Check if any valves are closed that should be open.
5	114	Teatcleaner tank full	Deviation	A sensor in the wastewater tank (teatcleaner tank) indicates that the tank is full. The tank should not be full during normal operation. The system tries to empty the tank.	Check the wastewater tank (teatcleaner tank). If the problem persists, contact service engineer.
5	115	Milk diverted	Deviation	Milk was diverted.	None required.
5	116	Cleaning aborted	Deviation	A cleaning process has been manually cancelled.	A cleaning process should not be interrupted. Restart the cleaning process to prevent bacteria or cleaning detergent from contaminating the milk.



M	m	Alarm text	Type	Meaning	Action
5	117	Temperature teat cleaner...	User notification	If teat cleaning water is above 42 degrees Celsius. @@The current teat cleaning will be aborted.	If the sensor indicates a rise in temperature above the limit: - Check the water temperature. - Check the temperature sensor. (A teat cleaning can be started manually from the touch screen). Temporary solutions: The teat cleaning function can be disabled for each cow in (PC setting). Note, however, that this might affect the milk quality. In addition, this measure is not fool proof. The cause of the high water temperature must be investigated and the problem resolved. The sensor can also be removed. The system will then generate the message "Teatcleaner temp sensor malfunction" (major code 5, minor code 119). See below.
5	118	Teatcleaner too hot...	User notification	The temperature of the water for the teat cleaner has exceeded 42deg. System will stop immediately. Note: There is a risk for milk contamination if teat cleaning is not used.	See "Temperature teat cleaner" (major code 5, Minor code 117) above.
5	119	Teatcleaner temp sensor malfunction	User notification	The system receives information that the teat cleaning water is below zero degrees Celsius. The temperature sensor is damaged or not installed.	Check the water temperature. If installed, check the temperature sensor.
5	120	Scheduled cleaning NOT done	Deviation	The system was in manual mode when a scheduled cleaning was set to take place. (Scheduled cleanings take place only in automatic mode.)	Start the cleaning.
5	121	Communication lost with milkroom controller	Stop alarm	The milking station has lost communication with the milk room controller (node E50 on the ALCOM bus). Possible cause may be that the bus is drawn incorrectly.	- Check that the ALCOM bus is not broken or disconnected. - Check that the bus drawn correctly between the two units.
5	122	Teatcup not tight to jetter	Deviation	There is air leakage between one or several of the liners' mouthpiece lips and the sealing collars, impairing the system's ability to draw water from the cleaning unit. The vacuum level/air flow is detected by the shut-off valves. If leakage is detected, the system makes three attempts to reposition the teatcups. If this fails, the alarm message will be issued. This alarm message will not stop the cleaning process, but there is a risk that the air leakage will cause the cleaning unit to issue a timeout alarm (major code 7, minor code 4). The timeout alarm will halt the system.	- Check the length and condition of the milk tubes. Make sure that the teatcups can be released onto the jetters and their sealing collars easily.



M	m	Alarm text	Type	Meaning	Action
5	126	Did not get water from RA-unit within... minutes	Stop alarm	Water that should be delivered from "ReceiveAll" equipment did not become available within time. ReceiveAll is optional, only used at some installations. Cleaning will be aborted automatically.	Try to find out why water was not available. Call serviceman if problem remains.
5	127	Both low and high sensor in receiver active	Stop alarm	Level sensor in receiver indicated both high and low level at the same time.	Call service technician if several alarms. Sensor should be checked.
5	128	Timeout changing milk filter	Stop alarm	If change of milk filter was started but not completed within time this alarm will be given.	Make sure the filter change operation is completed.
5	129	Milk diverted due to MDi, dest %...f	Notification	See alarm text.	Check the cows that caused the notification. Depending on the strategy at the farm the thresholds can be changed. Lowering the thresholds will increase the diversion/notifications while increasing the threshold will decrease the number of diversions/notifications. The thresholds are changed in Animal>VMS Cow>Automatic diversion.
5	200	Timeout filling detergent number %...f	User notification	The configured amount of detergent was not pumped to charging vessel within time. Cleaning is continued anyhow.	Make sure that there is detergent in the container. Check that the hoses are connected to the pump. If the problem remains call a serviceman.
5	201	Timeout filling water in step %...f, substep %...f	Stop alarm	Charge vessel was not filled within time. Note! If the charge vessel was not empty when starting to fill water this alarm could be generated at start of filling.	Check water pressure, check filters or strainers in the waterline! Check the water valves! Make sure that the charge vessel is empty before being refilled. Check the level sensor. If the problem remains call a serviceman.
5	202	Timeout emptying water in step %Of, substep %Of	Stop alarm	The water level in receiver does not affect the upper level indicator (EndUnitHighLevel is not reached), when sucking water from washing trough into receiver.	Check vacuum system, check connections between all 5 teat cups and their jettors. (Did you receive "teat cup not tight to jetter" message?) If "EndUnitHighLevel" is positioned too high, this alarm could be generated. If the problem remains call a serviceman.
5	203	Too low temp at filling %T.0%.Of min %T.0%.Of	Deviation	Water temperature at filling charge vessel is too low.	Note this temperature check is only done when using hot water. Check boiler, check set point setting in cleaner configuration. Check temperature sensor. If the problem remains call a serviceman.
5	204	Too low temp after circulation %T...%.Of min %T...%.Of	Deviation	The return water temperature is measured at end of circulation cleaning. If this temperature is below limit set in cleaner configuration the alarm will be generated.	Check same at alarm 5:203. If the installation has long not insulated transport lines the temperature fall could be too big. Check for residual pre-rinse water (purge problem).
5	205	Invalid cleaning config.	Stop alarm	Cleaning procedure will not start.	Call for service engineer.





Communication and data transmission between the milking station and peripheral units (VMS I/O-man) - major code 6

M	m	Alarm text	Type	Meaning	Action
6	1	AlcomIO board reset node ... bus ...	Deviation	One of the ALCOM I/O boards has been reset. The system will repond by activating all ALCOM I/O boards.	If problem occurs frequently, contact service engineer.
6	100	Shortcircuit on alcomio node ...	Stop alarm	One of the ALCOM I/O boards has an output that takes too much current, which could be a caused by a short-circuit. The board will automatically protect itself by setting all I/O to input until it has been reset.	Restart the milking station. If the problem persists, contact service engineer.
6	101	Alcom write error ... node ... sub	Deviation	An transmission error has occurred on the ALCOM bus.	If problem occurs frequently, contact service engineer.
6	102	Alcom message invalid node ...	Deviation	The received ALCOM message was incorrect.	If problem occurs frequently, contact service engineer.
6	103	Bad format on alcom message	Deviation	ALCOM message is in an invalid format.	If problem occurs frequently, contact service engineer.
6	104	Vmsio interrupt (...)	Stop alarm	The VMS I/O board has generated an unexpected interrupt.	If problem occurs frequently, contact service engineer.
6	105	Invalid alcom bus number ...	Stop alarm	Software error.	If problem occurs frequently, contact service engineer.
6	106	Lost token on alcomio node	Deviation	Communication error on the ALCOM bus.	If problem occurs frequently, contact service engineer.
6	107	Vmslo board generated reset!!	Deviation/Stop alarm	Reset on VMS I/O board, either because someone pressed the reset button or because of electrical disturbances. Note: a single reset will generate a Deviation only.	Restart the milking station. If the problem occurs frequently, contact service engineer.
6	108	VmsIO pic has wrong version !!	Stop alarm	Microprocessor on VMS I/O board has wrong program version.	Contact service engineer. Service engineer only: Change microprocessor or reprogram it.
6	109	Vmslo board wrong version is ... !!	Stop alarm	Wrong version of FPGA on VMS I/O board.	Contact service engineer. Service engineer only: This can only happen if the VMS I/O board has been changed to the wrong type. Replace IC103 from the removed board and place it on the installed board.
6	110	Unexpected sensor status node ... Of sub ... Of	User notification	Some sensors in the Milk sampler indicate a problem in moving the runner to the correct sample position.	Check the Milk sampler and make sure that the runner can move smoothly.
6	111	I/O blocked	User notification	Some actuator has been blocked by some signal.	This is only for information.



Data communication between milking station and PC - major code 9

M	m	Alarm text	Type	Meaning	Action
9	1	AMD- Check Cow!	Deviation	The last milking of the cow showed abnormal milk values for one or some of the quarters. In technical terms, this means that the milk meter data for the cow is outside the predefined range. The cow might be or become ill, for example mastitis. Feed and water consumption might not be normal.	Check the health status of the cow. Keep her under observation for a few days. If she is healthy and not becoming ill, "reset" her in the management software (Cow Monitoring).
9	2	Milking Station is disconnected	Stop alarm	The PC lost contact with the milking station.	Restart the milking station. If the problem persists, contact service engineer. Service engineer only: check the connections.
9	3	Vms server is disconnected	Stop alarm	The programs that manage the communication between the PC and milking station have stopped running, or their execution are severely impaired. The PC will try to restart automatically when this occurs. If communication is established successfully, the system will continue operating in automatic mode.	Restart the PC. If the problem remains, contact service engineer.
9	4	Vms server is stopped	Stop alarm	See alarm "Vms server is disconnected" above (major code 9, minor code 3).	Restart the PC. If the problem remains, contact service engineer.
9	6	Milking station has been idle for ... minutes	User notification	No significant operation has taken place in the milking station for x minutes. The station has been in the same state for x minutes. The number of minutes the milking station must be idle before the alarm is issued (x) can be set in the management software.	Visit the barn and find the reason for the inactivity.
9	7	Milking Station is stopped	Stop alarm	The PC lost contact with the milking station.	Restart the milking station. If the problem persists, contact service engineer. Service engineer only: check the connections.
9	8	MS and Serve have different versions, ... and ...	Stop alarm	The actual version of the software running in the milking station and the one specified in the management software (VMS Config) differs.	Contact service engineer. Service engineer only: - Enter the actual version of the software running in the milking station.



M	m	Alarm text	Type	Meaning	Action
9	11	Milk is diverted automatically, due to elevated conductivity	User notification	DeLaval milk meter(s) MM25 indicates increased conductivity values for the milk. The milk has been diverted to drain/milk divert unit. The values exceed the level set in the management software. Conductivity is measured in microsiemens per centimetre. The destination of the milk is also set in the management software.	Check health status of animal.
9	12	Milk is diverted automatically, due to blood level	User notification	DeLaval milk meter(s) MM25 indicates blood in the milk. The milk has been diverted to drain/milk divert unit. The concentration exceeds the level set in the management software. Concentration of blood is measured in ppm, parts per million. The destination of the milk is also set in the management software.	Check health status of animal.
9	14	Can not send out alarms. Check communication equipment!	User notification	Alarms cannot be transmitted via the modem.	Check the modem, cable and telephone line. Restart the PC.
9	15	Blood level in milk is over ... ppm!	User notification	DeLaval milk meter(s) MM25 indicates blood in the milk from one or several quarters. The milk may or may not have been diverted. The action depends on the concentration level set in the management software. Concentration of blood is measured in ppm, parts per million.	Check health status of animal.
9	16	Can not connect to milking station	Stop alarm	The PC cannot establish communication with the milking station.	Check that the milking station has been started. Check the ethernet cable and its connection points.



Milk refrigeration - major code 12

M	m	Alarm text	Type	Meaning	Action
12	0	Cooling recovered OK		Cooling system is working correctly	None required
12	1	ICS Low cleaning water temperature	User notification	Tank alarm. Possible causes: a. The temperature of the water from the hot-water supply is too low. b. The amount of hot water in the water mixture is insufficient. c. Parameter P30 is set to an unrealistic value (standard 40 °C). d. The sieves in the water supply below the Pre-box are clogged.	Find the causes of the alarm and correct the error.
12	2	ICS Detergent tank is empty	User notification	Tank alarm. Possible causes: a. One of the detergent containers are empty. b. Detergent is not able to flow into the system.	a) Replace the container. If the problem persists, contact service engineer. b) Service engineer only: check the cleaning-agent circuit.
12	3	ICS Drain fail. Can not empty the buffer tank	User notification	Tank alarm. Possible causes: a. Pump does not run. b. Drain or milk valve does not open. c. Level controller is broken.	Contact service engineer. Service engineer only: a) Check the output-board signal. Check the wiring to the contactor and the pump. Check the overload protector. Check the output-board fuse. b) Check if air pressure is available. Check signals to pilot valves. Check pilot valves. (Use P90 or the manual service key to check individual valves) c) Check for water or milk in the receiver tank. If yes, proceed with a or b. If no, check level control board. (use P91 - 1 low level, P91 - 2 high level).
12	4	ICS No water supply during cleaning	Stop alarm	Tank alarm. Possible causes: a. Water valve broken. b. Water tap closed. c. Water system frozen.	a) Check the water valves (use P90). b) Check the tap. c) Defrost the system.
12	5	ICS Checksum error in parameter memory	User notification	Tank alarm. A power failure has corrupted the parameter memory.	Use P83 -1 to reset the complete system. Parameters with other settings than the default values must be set again. If necessary, contact service engineer.
12	6	ICS Checksum error in program memory	User notification	Tank alarm. Error in the EPROM.	Contact service engineer. Service engineer only: change the EPROM.



M	m	Alarm text	Type	Meaning	Action
12	7	ICS Tank is filled up completely alarm level reached	Stop alarm	Tank alarm. The receiver tank is completely filled up with milk or water. Depending on the mode of the tank system, there are two possible causes for the alarm. The tank system is in collecting mode and the time between emptying and cleaning of the storage tank has been too long. The receiver tank can not store more milk. The tank system is in cooling mode and, for some reason, the milk cannot be pumped from the receiver tank to the storage tank.	- Stop the automatic milking system until the storage tank can collect milk again. (If AL7 can be removed the system is free to function again) - Check the power supply. If the problem persists, contact service engineer. Service engineer only: - Check output board signal. Check wiring to contactor and pump. Check overload protector. Check the output board fuse. - Check if air pressure is available. Check signals to pilot valves. Check pilot valves. (Use P90 or the manual service key to check individual valves.) - Check level control (Use P91 – 1 low level, P91 2 high level) Cleaning mode: unpredictable. Check cleaning.
12	8	ICS Too long time no cleaning	User notification	Tank alarm. The start cleaning signal is not transmitted by the milking station or is not received by the Hygienius R125	Contact service engineer. Service engineer only: Check if the milking station transmits the start cleaning signal. Check if the signal is received by the Hygienius R125 with use of P91 – 8.
12	9	ICS Valve in wrong position	Stop alarm	Tank alarm. The signal from one of the proximity switches fails.	Contact service engineer. Service engineer only: - Check the position of the milk valve. If closed P91 – 4 must be 1. - Check the position of the drain valve. If closed P91 – 5 must be 1. - Check the position of the pick-up valve. If closed P91 – 6 must be 1. If one of above fails replace the proximity switch. If not, check the pilot valves and pressurised air supply. A valve must be in the wrong position for the desired operation.
12	10	ICS CPU Watch-dog reset	Stop alarm	Tank alarm. The microprocessor has been restarted by the internal protector. If this has happened only once, it might have been caused by intermittent power supply.	If the problem persists, contact service engineer. Service engineer only: Replace the CPU-board.
12	11	ICS Milk temperature too high	User notification	Tank alarm. Milk temperature stays over value of P1.	Check that the waterchillers works properly. Check that the restriction valve is closed.
12	12	ICS Milk too long in buffer tank	Stop alarm	Tank alarm. The milk has been stored too long time in the receiver tank. The interval can be set in P8 (default 180 min).	Check the tank system for failures. If the problem persists, contact service engineer.
12	13	ICS Has been power failure	User notification	Tank alarm. Possible causes: a. A power failure longer than 2 hours while milk was being stored in the receiver tank. b. A power failure longer than 10 minutes while the cleaning was running. (The cleaning have been stopped.)	a) Check the total time the system has been out of order. If too long time has elapsed, pump the milk to drain and perform a cleaning manually. b) Restart the cleaning manually.



M	m	Alarm text	Type	Meaning	Action
12	14	ICS Too low milk temperature	User notification	Tank alarm. Chilled water is too cold, the platecooler could freeze.	Check the temperature of the chilled water. Check the thermostat.
12	15	ICS Tank alarm at no Hygienius tank	User notification	Tank alarm. Failure at storage tank.	See the manual for the storage tank on what actions to take.
12	16	ICS Temperature sensor broken	User notification	Tank alarm. The resistance of the temperature sensor is out of the normal range.	Contact service engineer. Service engineer only: Check for wrong connection. If the connection is correct, replace sensor.
12	21	FCC Low cleaning water temperature	User notification	Tank alarm. End temperature of the cleaning water is below the temperature set in P30. Possible causes: a. The temperature of the water from the hot-water supply is too low. b. The amount of hot water in the water mixture is insufficient. c. Parameter P30 is set to an unrealistic value (standard 40°C). d. The sieves in the water supply below the Pre-box are clogged.	Find the cause of the alarm and correct the error.
12	22	FCC Detergent tank is empty	User notification	Tank alarm. Possible causes: a. One of the detergent containers are empty. b. Detergent is not able to flow into the system.	a) Replace the container. If the problem persists, contact service engineer. b) Service engineer only: check the cleaning-agent circuit.
12	23	FCC Overheat	User notification	Tank alarm. Water temperature exceeds 80°C. a. Relevant parameters may have incorrect values. b. Contactor may not be working properly.	a. Check the parameters P29 and P81. b. Check the contactor.
12	24	FCC Time out water filling	Stop alarm	Possible causes: a. Water valve broken. b. Water tap closed. c. Water system frozen.	a) Check the water valves (use P90). b) Check tap. c) Defrost the system.
12	25	FCC Checksum error in parameter memory	User notification	Tank alarm. A power failure has corrupted the parameter memory.	Use P83 –1 to reset the complete system. Parameters with other settings than the default values must be set again. If necessary, contact service engineer.
12	26	FCC Checksum error in program memory	User notification	Tank alarm. Error in the EPROM.	Contact service engineer. Service engineer only: change the EPROM.
12	27	FCC Tank is not empty after cleaning	Stop alarm	Tank alarm. The tank has not been emptied after the cleaning.	Drain the tank manually.



M	m	Alarm text	Type	Meaning	Action
12	28	FCC Possible mixing of detergents	User notification	Tank alarm. The alarm is issued when an attempt is made (manually or automatically) to dose detergent when dosing is already done with another type of detergent.	<ul style="list-style-type: none"> - Stop the cleaning. - Rinse the system manually. - Drain the water out of the system. - Restart the cleaning.
12	29	FCC Power failure during cleaning	Stop alarm	Tank alarm. Power failure for more than 30 seconds during cleaning.	<ul style="list-style-type: none"> - Remove the remaining water from the tank manually. - Restart the cleaning.
12	30	FCC Outlet valve closed during cleaning	Stop alarm	Tank alarm. The pick-up valve is in the wrong position.	<ul style="list-style-type: none"> - Check the pick-up valve. - Check the electrical connection. - Check the compressed-air supply.
12	31	FCC CPU Watch-dog reset	User notification	Tank alarm. The microprocessor has been restarted by the internal protector. If this has happened only once, it might have been caused by intermittent power supply. It has been restarted automatically.	Check if the adjusted values of the parameters are still correct (that they have not been reverted to the default values).
12	32	FCC Timeout during cleaning, pump not running	Stop alarm	Tank alarm. The buffer tank have not been emptied. The pump has not been running.	<ul style="list-style-type: none"> - Check Level detection, P91-1 and P91-2. - Check the fuse for the pump motor.
12	33	FCC Milk temperature too low	User notification	Tank alarm. The temperature of the milk has dropped below 1.5°C.	<ul style="list-style-type: none"> - Switch off the main switch. - Check the solenoid valve in the refrigeration circuit. - Check the adjustment thermostat. - Check the connection of the sensor.
12	34	FCC Too long cooling time	User notification	Tank alarm. The cooling interval is longer than the adjusted value (parameter value).	<ul style="list-style-type: none"> - Check the cooling system. - Check P12.
12	35	FCC Power failure during cooling	User notification	Tank alarm. Power failure for more than 3 hours. Temperature of milk in storage tank has been higher than 10°C during this time.	<ul style="list-style-type: none"> - Check the milk quality. - Decide to drain or to cool the milk.
12	36	FCC Temperature sensor broken	User notification	The signal from the milk-temperature is out of range.	Contact service engineer. Service engineer only: <ul style="list-style-type: none"> - Check for wrong connection. - If the connection is correct, replace sensor.
12	37	FCC Cooling not started within time	User notification	Tank alarm. The cooling has been switched off longer than the time set in P2 (default 210 min).	Check the cooling equipment and the setting in P2.
12	38	FCC Agitator not running when expected	User notification	Tank alarm. The agitator shaft is not rotating, Note: the alarm is sent if a agitator sensor is installed, P53.	Check the agitator system, fuse, motor, shaft a sensor.
12	39	FCC Too long time no hot cleaning	User notification	Tank alarm. Intervals between cleanings exceeds 10 hours. P67	Check the milk quality and decide if the milk must be discarded or if it can be collected.



M	m	Alarm text	Type	Meaning	Action
12	40	FCC Pickup alarm. Milk suspect. Milk must be checked before pickup	User notification	Tank alarm. Too high temperature for too long time, or a power failure. Temp/time 10/10: P17 Temp/time 16/6: P18 Temp/time 28/5: P19 Power failure for 5 hours.	Check the milk quality and decide if the milk must be discarded or if it can be collected.
12	70	There is a severe alarm on the milk tank	Stop alarm	Any possible tank error that carry some significance. Note: alarm is not issued for DeLaval tanks and buffer tank systems. Technical explanation: the alarm is issued if terminal B4 is inactive while terminal B5 is active, both on board A70 inside the milk room controller box.	<ul style="list-style-type: none"> - Check the tank for possible causes. - If no alarm is displayed on the tank, check the bus connection between the tank and the milk room controller. If the problem persists, contact service engineer.
					Service engineer only: - If the problem cannot be solved, disconnect terminal B5. This makes the tank unable to send alarms. - Another possibility is to use the "Override tank alarm" option in the management software.
12	71	There is an alarm on the milk tank	Stop alarm	Any possible tank error that carry some significance. Note: alarm is not issued for DeLaval tanks. Technical explanation: the alarm is issued if terminals B4 and B5 are active, both on board A70 inside the milk room controller box.	See alarm major code 12, minor code 70 above.
12	72	There is an electrical fault in the milkroom controller	Stop alarm	Short circuit on board A70 inside the milk room controller. Possible cause is incorrect cabling.	Service engineer only: - Check the cabling of the system. One of the LEDs on the board should be flashing fast. Check the component connected to this output. - Restart the board via Telnet ("resetalcomnode E70"). - If the problem cannot be solved, disconnect the power supply to the board (P2) and use the "Override tank alarm" option in the management software.
12	73	The outlet valve is stuck in open position	Stop alarm	Possible cause may be an error related to the pilot valve inside the milk room controller box. If the error occurs, the most likely occasion is directly after tank cleaning. Note that if the outlet valve (pick-up valve) is open during milking, the milk will be discharged onto the floor. Technical explanation: the sensor for the pick-up valve is connected to terminal B6 on board A70 inside the milk room controller box. The sensor should give a signal when the pick-up valve is closed. In this case, the signal did not arrive (B6 inactive).	<ul style="list-style-type: none"> - Check the pick-up valve and its sensor. Service engineer only: - If the problem cannot be solved, connect a jumper on terminal B6 on board A70, or use the "Override tank alarm" option in the management software.



M	m	Alarm text	Type	Meaning	Action
12	74	Power supply problem in the milkroom	Stop alarm	The milk room controller failed to recognise that the tank was in milking mode, able to receive milk, during power-up of the VMS system. Technical explanation: terminal B4 on board A70 inside the milk room controller is inactive during power-up of the VMS system. B4 must receive the "tank can accept milk" signal (LED lit) before the milking station is allowed to deliver milk to the tank.	- Take the steps and measures necessary to make the tank ready to accept milk delivery. If it is necessary to override the alarm, use the "Override tank alarm" option in VMSMgmt.
12	77	Outletvalve on buffer is not closed	Stop alarm	Possible cause may be an error related to the pilot valve inside the milk room controller box. If the error occurs, the most likely occasion is directly after tank cleaning. Note that if the outlet valve is open during milking, the milk will be discharged onto the floor. Technical explanation: the sensor for the buffer-tank outlet valve is connected to terminal B4 on board A70 inside the milk room controller box. The sensor should give a signal when the pick-up valve is closed. In this case, the signal did not arrive (B4 inactive).	- Check the outlet valve and its sensor on the buffer tank. Service engineer only: - If the problem cannot be solved, connect a jumper on terminal B4 on board A70, or use the "Override tank alarm" option in the management software.
12	78	There is an alarm from buffer tank	User notification	Any possible tank error that carry some significance.	- Check the tank system for possible causes. - If no alarm is displayed on the tank system, check the bus connection between the system and the milk room controller. - If no alarm is displayed on the tank system, check the bus connection between the system and the milk room controller.
					Service engineer only: - If the problem cannot be solved, disconnect terminal B5 on board A70 inside the milk room controller box. This makes the tank unable to send alarms. - Another possibility is to use the "Override tank alarm" option in the management software.
12	79	Buffer tank overflow warning	User notification	Overflow limit of buffer tank has been reached. Overflow limit is by default set to 1500 litres.	- Pump the contents of the buffer tank into the main storage tank.
12	80	Buffer tank is full	Stop alarm	Maximum capacity of buffer tank has been reached. Maximum capacity is by default set to 2000 litres.	- Pump the contents of the buffer tank into the main storage tank.
12	81	Receive All notification			
12	82	Receive All alarm			



M	m	Alarm text	Type	Meaning	Action
12	83	Warning the tanker is almost full			
12	84	Error the tanker is full			
12	255	Communication lost with tank	Stop alarm	Tank alarm. The ALCOM communication with the tank does not work. The tank controller cannot adjust the cooling based on the milk volume delivered to the tank. The tank can not send alarms to the milking station.	Check that the tank equipment has power. To continue milking without communication with the tank, use the "Override alarm" in the management software. Contact service engineer. Service engineer only: restore the ALCOM communication.



DeLaval voluntary milking system VMS

Troubleshooting

Vacuum pump - major code 13

M	m	Alarm text	Type	Meaning	Action
13	125	VP out of oil	Stop alarm	Alarm issued by DeLaval vacuum pump DVP - Oil Level Alarm. The oil level sensor in the lubricator has indicated little or no oil for 24 consecutive hours. The variable speed drive is stopped.	Refill the lubricator with oil. Reset the oil level alarm.
13	205	VP vacuum over the setpoint	User notification	Alarm issued by DeLaval vacuum pump DVP - High Vacuum. The vacuum has been above the desired vacuum (Setpoint Manual or Setpoint Milk) more than allowed (Over Vacuum Max) for more than 40 seconds.	Check that the vacuum regulator operates properly.
13	210	VP MVR or system leakage fault	User notification	Alarm issued by DeLaval vacuum pump DVP - Low reserve. The variable speed drive has been operated above 95% of the maximum speed regulation range for more than the accepted time (Low Reserve Max). The fault is cleared automatically when the variable speed drive has operated at 95% or below for more than a preset time (OK Reserve Min).	Check for leakages. Check that the vacuum regulator is adjusted properly.
13	240	VP no vacuum on high speed	User notification	Alarm issued by DeLaval vacuum pump DVP - No Vacuum. The vacuum pump runs at near maximum or maximum speed, but can nevertheless not provide more than a fraction of the desired vacuum. Probably a major leakage.	Check valves and the vacuum piping.
13	245	VP low oil level	User notification	Alarm issued by DeLaval vacuum pump DVP - Oil Level Warning. The oil level sensor in the lubricator indicates that little or no oil remains. The warning will be cleared once the oil level is above the minimum.	Refill the lubricator with oil.
13	250	VP time for major service	User notification	Alarm issued by DeLaval vacuum pump DVP - MajorServ. Warning. A major service of the vacuum pump DVP is due. Required every 8000 hours.	Contact a DeLaval service engineer to schedule a service visit.
13	251	VP time for minor service	User notification	Alarm issued by DeLaval vacuum pump DVP - MinorServ. Warning. A minor service of the vacuum pump DVP is due. Required every 1000 hours.	See the DVP manual for instructions.

