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Lely Industries N.V. Dairy Equipment

ASTRONAUT A3 Milking Robot

Operator Manual

D-A001.0703EN

English Original

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LIST OF INCLUDED AMENDMENTS

No:	Issue Date (yy/mm)	Chapter(s)	Remarks
1	07/03	7, 8, 9	Update of the Maintenance and Test and Adjustment procedures for the Operator Manual D-H001.0609.

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PREFACE

Manual Contents

This manual contains the updated information necessary to do operator maintenance on an ASTRONAUT A3 Milking Robot. This manual update contains the following chapters:

- Chapter 6, Operating Instructions
- Chapter 7, Maintenance
- Chapter 8, Test and Adjustment.

Chapter 6 (Operating Instructions) is added for reference purposes for chapters 7 and 8 only and does not replace chapter 6 of the current Operator Manual.

Chapter 7 of this update replaces both chapters 7 (Preventive Maintenance) and 8 (Corrective Maintenance) of the current Operator Manual (D-H001.0609).

Chapter 8 of this update replaces chapter 9 (Test and Adjustment) of the current Operator Manual (D-H001.0609). Therefore chapter 9 as a chapter number expires.

Study and understand this information thoroughly before you do maintenance on the milking robot. Failure to do so could result in personal injury or damage to equipment. Please consult your local Lely service provider if you do not understand the information in this manual, or if you need additional information.

Refer to the ASTRONAUT A3 Milking Robot Operator Manual for all operating procedures.

All information in this manual has been compiled with care. Lely shall not be liable for errors or faults in this manual. The recommendations are meant to serve as guidelines. All instructions, pictures and specifications in this manual are based on the latest information that was available at the time of publication. Your milking robot system may comprise improvements, features or options that are not covered in this manual.



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6. OPERATING INSTRUCTIONS

6.1 Start the System

1. Select Tab [**System**].
2. In the field *Robot operation*, select [**Restart**].
3. Wait for a maximum of 10 seconds, then make sure:
 1. The following pop-up windows appear:
 - *Choose startup mode*
 - *Calibration robotarm.*
 2. The status of the components BS, ICS, MMS, MQC, MS, RCS, TAS and TS is *Init*.
4. If both the pop-up windows appear and the status of the components is correct, calibrate the robot arm. Refer to Calibrate the Robot Arm (page 6-1).
5. If both the pop-up windows do not appear:
 1. Select:
 - [**Shutdown**]
 - [**Reset all**].
 2. Wait for 10 seconds and make sure the status of the components BS, ICS, MMS, MQC, MS, RCS, TAS and TS is *Init*.
 3. If the status of one or more of the components is not *Init*, select [**Reset all**] again.
 4. When the status of all the components BS, ICS, MMS, MQC, MS, RCS, TAS and TS is *Init*, select [**Start**].
 5. When both pop-up windows appear, calibrate the robot arm. Refer to Calibrate the Robo (page 6-1)t Arm.



6.2 Calibrate the Robot Arm

1. Select the pop-up window: *Calibration robotarm*.
2. Select [**Start**].
3. Make sure:
 - The robot arm moves up, out, up again and then forward to the limits of all the cylinders
 - The robot arm stops at the fully forward position.
4. If all the cylinders move to their limits, select [**Accept**] and make sure the robot arm moves to the home position.
5. If all the cylinders do not move to their limits, select [**Stop**] and do steps 2 thru 4 again.

6.3 Start the Milking Robot

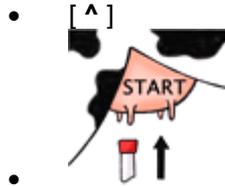
1. Select the pop-up window *Choose startup mode*.
2. Select one of the following modes:
 - [**Normal**]
 - [**Short rinse**]
 - [**Empty boiler**].
3. Select [**OK**].
4. Make sure all components have the status *Running*.



6.4 Put the Milking Robot In Operation

1. Select the Tab [Process].
2. If the text is *Out of operation*:

1. Select:



2. If the button changes to  and then to , the milking robot is in operation.

3. If the button only changes to  and the text in the field

Progress is Cleaning in progress, select  and make

sure the button changes to .

4. Go to step 3.
3. If the text is *Cleaning in progress*:
 1. Go to the CRS+ and identify if a CRS+ process is running.
 2. If a CRS+ process is running, wait until the process is complete, then do steps 1 and 2.
 3. If a CRS+ process is not running, press [ENTER].
 4. Select: Cleaning system > Robots in operation > Yes.
 5. Press [ENTER].
 6. Do steps 1 thru 3.



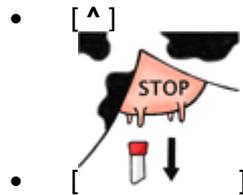
6.5 Take the Milking Robot Out of Operation

It is possible to take the milking robot out of operation with the X-Link (page 6-4) or the CRS+ (page 6-4).

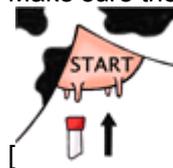
6.5.1 Take the Robot Out of Operation (X-Link)

When the milking robot is in operation:

1. Select:



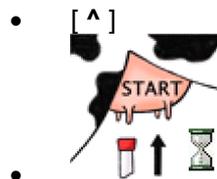
2. Make sure the button changes to [] and then to



[], the milking robot is then out of operation.

When the milking robot is going into operation:

1. Select:



2. Make sure the button changes to [], the milking robot is then out of operation.

6.5.2 Take the Robot Out of Operation (CRS+)

1. Press [ENTER].
2. Select: Cleaning system > Robots out of operation > Yes.
3. Press [ENTER].



6.6 Robot Arm Movements

6.6.1 Move the Robot Arm to the Service Position

1. Take the milking robot out of operation with the X-link (page 6-4).



Wait until the robot arm stops in the service position before you do maintenance on the milking robot.

2. Select:
 - Tab [**Test**]
 - [Robot arm]
 - [**Service-3**]
 - [**Move robotarm**].
3. Wait until the robot arm stops in the service position.

6.6.2 Robot arm in service position



Wait until the robot arm stops in the service position before you do maintenance on the milking robot.

1. Select:
 - Tab [**Test**]
 - [Robot arm]
 - [**Home**]
 - [**Move robotarm**].
2. Wait until the robot arm is in the home position.
3. If applicable, Put the milking robot in operation with the X-link (page 6-2).



6.7 Empty the milk tank

1. Make sure the milk hose from the milk tanker is connected to the milk tank.
2. On the CRS+ select:
 - Main Menu > Settings > Cleaning system settings > Milk reception.
3. Identify the configuration of the system.
4. If the configuration of the system is one tank, one tank with bufferbarrel Boetech , or one tank with buffertank:
 1. Press  .
 2. When the LED on the left of the button is green select:
 - Main Menu > Cleaning system > Open milktank valve > Open.
 3. Press **[Enter]**.
 4. When the tank is empty, disconnect the milk hose from the milk tank.
 5. Clean the milk tank.
 6. Select:
 - Main Menu > Cleaning system > Open milktank valve > Close .
 7. Press **[Enter]**.
 8. Press  .
5. If the configuration of the system is one tank with automatic cleaning refer to the documentation supplied with the system.



6.8 Cleaning System

6.8.1 X-Link

Start Main Cleaning with X-Link

1. Select:

- [^]
- [<]



- [].

2. A pop-up window appears with the text *The following types of cleaning can be started manually.*

3. In the field *Main cleaning*, select:

- [Automatic]
- [OK].

Start Astri-Lin Main Cleaning (X-Link)

1. Select:

- [^]
- [<]



- [].

2. A pop-up window appears with the text *The following types of cleaning can be started manually.*

3. In the field *Main cleaning*, select:

- [Astri-Lin]
- [OK].



Start Astri-Cid Main Cleaning (X-Link)

1. Select:

- [^]
- [<]



- [].

2. A pop-up window appears with the text *The following types of cleaning can be started manually.*

3. In the field *Main cleaning*, select:

- [Astri-Cid]
- [OK].

Rinse the Milkline (X-Link)

1. Select:

- [^]
- [<]



- [].

2. A pop-up window appears with the text *The following types of cleaning can be started manually.*

3. In the field *Cluster*, select:

- [Rinse]
- [OK].

Do a Short Rinse with the X-Link

1. Select:

- [^]
- [<]



- [].

2. A pop-up window appears with the text *The following types of cleaning can be started manually.*

3. In the field *Local*, select:

- [Short rinse]
- [OK].



Start a Lelywash (X-Link)

1. Select:

- [^]
- [<]



- [].

2. A pop-up window appears with the text *The following types of cleaning can be started manually.*

3. In the field *Local*, select:

- [Lelywash]
- [OK].

Start an sTDS Cleaning (X-Link)

1. Select:

- [^]
- [<]



- [].

2. A pop-up window appears with the text *The following types of cleaning can be started manually.*

3. In the field *Local*, select:

- [sTDS cleaning]
- [OK].

Cancel rinse

1. Select the Tab [Process].

2. In the field *Cleaning*, select [Cancel rinse].



6.8.2 CRS+

Start Automatic Main Cleaning (CRS+)

1. Select:
 - Main Menu > Cleaning system > Start maincleaning
 - Yes.
2. Press **[Enter]**.

Start Astri-Lin Main Cleaning (CRS+)

1. Select:
 - Main Menu > Cleaning system > Start main Cleaning Hypo
 - Yes.
2. Press **[Enter]**.

Start Astri-Cid Main Cleaning (CRS+)

1. Select:
 - Main Menu > Cleaning system > Start main Cleaning acid
 - Yes.
2. Press **[Enter]**.

Start Rinsing the Milkline

1. Select:
 - Main Menu > Cleaning system > Main Rinsing
 - Yes.
2. Press **[Enter]**.

Blow the Milkline Empty (CRS+)

1. Select:
 - Main Menu > Cleaning system > Blow empty milkline
 - Yes.
2. Press **[Enter]**.



7. MAINTENANCE

7.1 Introduction

This chapter contains the preventive maintenance procedures for the ASTRONAUT A3 Milking Robot done by the operator of the milking robot. The procedures are based on the maintenance schedule (farmer), as shown in the next chapter.

The preventive maintenance schedule (service technician) contains the tasks that must be done during the seven visits of the service technician, spread out over two years, to an ASTRONAUT A3 Milking Robot as defined in the maintenance contract.

The sub-columns 1 thru 7 identify the visit number and the tasks that must be done during the specific visit.

The last column identifies who, the farmer/operator or the service technician, is primarily responsible for the execution of that task. All tasks the farmer/operator is responsible for are done for verification by the service technician.

The structure of this chapter is as follows:

- Introduction
 - Maintenance schedule (farmer)
 - Preventive maintenance schedule (service technician)
 - Maintenance visit report
- Covers and doors procedures
- Box procedures
- Feeding system procedures
- Robot arm system procedures
- Milking system procedures
- Milk transport system procedures
- Cleaning system procedures
- Support system procedures
- Control system procedures.

Each procedure contains all the necessary information to complete the task. Therefore, if you do maintenance on more than one part, you may repeat steps that you have done on a previous part.

Read and understand all procedures for the applicable visit before you start. This will enable you to identify tasks that can be done only once (for example: put the milking robot out of operation, open the multiple function box).



7.1.1 Preventive Maintenance Schedule (Farmer)

The following table shows the preventive maintenance schedule for the ASTRONAUT A3 Milking Robot defined by Lely. Preventive maintenance must also be done as specified by local regulations.

Each task mentioned in this table is described further in this chapter.

Note:

The frequencies of the tasks shown in the table are the minimum frequencies recommended.

Maintenance Tasks	Frequencies						
	Hours	Day	Week	Month	Year	Operating Hours	Milkings
Examine the attention alarms (page 7-51)	8						
Examine the milking robot attention list (page 7-51)	8						
Replace the filter element of the single filter (page 7-38)	8						
Replace the filter element of the twin filter (page 7-40)	8-15						
Clean the sTDS screen (page 7-48)	12						
Clean the touch screen of the X-Link (page 7-52)		1					
Clean the bleed holes (page 7-18)		1					
Clean the robot arm and the box (page 7-29)		1					
Clean the outside of the teat cups (page 7-18)		1					
Examine the cleaning brushes (page 7-41)		1					
Examine the twin tubes (page 7-35)		1					
Examine the cup centering (page 7-27)		1					
Examine the teat cup sleeves (page 7-26)		1					
Examine the quantity of Astri-Uc (page 7-43)		1					
Examine the quantity of Astri-Cid (page 7-44)		1					



Maintenance Tasks	Frequencies						
	Hours	Day	Week	Month	Year	Operating Hours	Milkings
Examine the quantity of Astri-Lin (page 7-45)		1					
Examine the quantity of Astri-L (page 7-46)		1					
Examine the compressor and air dryer (page 7-48)		1					
Examine the robot performance list (page 7-51)		1					
Measure the weight of the feed portion (page 8-2)			1				
Measure concentration of Astri-L (page 8-13)			1				
Test the spray beam of the teat disinfection nozzle (page 8-12)			1				
Examine the teat cup liners (page 7-31)			1				
Replace the teat cup liners (page 7-32)			8-10				silicon 10.000
Measure the temperature of the hot cleaning water (page 8-13)			1				
Examine the cup cords (page 7-20)			1				
Examine the compressor for leaks (page 7-48)				3		2.000	
Clean the exterior of the vacuum pump				6			
Examine the vacuum pump oil level (page 7-48)						2.000	
Examine the feed funnel (page 7-14)				1			
Test the save-life switch (page 8-16)				1			
Cut the tails of the cows approximately 3 cm (1.2 in) below the tail bone				3			
Shave the udders. Refer to udder and tail shaving				3			
Test the earthing of the milking robot (page 8-17)					1		

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7.1.2 Preventive Maintenance Schedule (Service Technician)

The following preventive maintenance schedule shows the maintenance tasks done by the service technician during the seven visits, spread out over two years, to an ASTRONAUT A3 Milking Robot as defined in the maintenance contract.

Some of the tasks are also done by you, the operator/owner. If during a visit the service technician find defects that must be corrected by you, the service technician consults you and you must decide who will do the repair.

Task	Task no.	Visit No.							Who
		1	2	3	4	5	6	7	
Box									
n/a									
Feeding system									
Examine the Feed Funnel (page 7-14)	155	x	x	x	x	x	x	x	Farmer
Measure the weight of the feed portion (page 8-2)	275		x		x		x	x	Farmer
Robot arm system									
Clean the bleed holes (page 7-18)	121a	x		x		x		x	Farmer
Examine the cup cords (page 7-20)	121b	x		x		x		x	Farmer
Examine the teat cup angle	121c	x		x		x		x	Technician
Examine the cup centering (page 7-27)	121d	x		x		x		x	Farmer
Examine the teat cup milking position	121e	x		x		x		x	Technician
Examine the teat cup sleeves (page 7-26)	121f	x		x		x		x	Farmer
Milking system									
Examine the teat cup liners (page 7-31)	135	x	x	x	x	x	x	x	Farmer
Examine the pre-milk device	185			x			x		Technician
Replace the 4effect sleeves	170	x		x		x		x	Technician
Replace the 4effect valve rubbers	175	x		x		x		x	Technician
Replace the 4effect air filter	180			x			x		Technician
Milk transport system									
Examine the twin tubes (page 7-35)	145	x	x	x	x	x	x	x	Farmer
Examine the 5-folded tube	130	x		x		x		x	Technician
Clean the milk level meter	225a		x			x			Technician
Do the water test	225b		x			x			Technician
Examine the correct function of the sampling cylinder	245	x	x	x	x	x	x	x	Technician
Examine the blow-empty valve of the milk line	280		x					x	Technician
Examine the robot 3-way valve(s)	250a		x			x			Technician

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Examine the milk tank 3-way valve	250b		x			x			Technician
Replace the silicon non-return valve of the milk filter	265	x	x	x	x	x	x	x	Technician
Examine the twin filter 3-way valves	250c		x			x			Technician
Cleaning system									
Confirm the availability of Astri-TDS	235	x	x	x	x	x	x	x	Technician
Confirm the use of the correct Astri-products	240	x	x	x	x	x	x	x	Technician
Test the main cleaning system	205		x		x	x		x	Technician
Examine the jetters	255		x			x			Technician
Test the spray beam of the teat disinfection nozzle (page 8-12)	270		x		x		x	x	Farmer
Examine the cleaning brushes (page 7-41)	140	x		x		x		x	Farmer
Lubricate the air motor of the cleaning brush unit	260	x	x	x	x	x	x	x	Technician
Examine the running hours of the air motor		x	x	x	x	x	x	x	Technician
Support systems									
Calibrate the sTDS	125	x		x		x		x	Technician
Test the save-life switch (page 8-16)	165	x	x		x	x	x		Farmer
Test the earthing of the milking robot	160			x				x	Technician
Test the pressure sensor	150			x				x	Technician
Replace the 5µ filter cartridge of the pressure regulator	285a		x			x			Technician
Replace the filter cartridge of the active carbon filter	285b		x			x			Technician
Do the air compressor maintenance	290	x	x	x	x	x	x	x	Technician
Complete the measure and recommendation report	190	x		x		x		x	Technician
Measure the vacuum level and pulsation curve	195	x		x		x		x	Technician
Clean the vacuum pump unit	200	x		x	x		x		Technician
Replace the tube of the Astri-cid pump	210			x				x	Technician
Replace the tube of the Astri-lin pump	210			x				x	Technician
Replace the tube of the Astri-L pump	210			x				x	Technician
Replace the milk pump seals	220							x	Technician
Replace the rubber non-return valve of the milk pump	215	x	x	x	x	x	x	x	Technician
Control system									
Examine the X-link report list	120	x	x	x	x	x	x	x	Technician
Miscellaneous									
Confirm the contents of the toolbox	295	x	x	x	x	x	x	x	Technician



7.1.3 Maintenance Visit Report

After a visit, when all the maintenance tasks are done, the service technician completes the visit report. The report is completed by hand or with the computer. The report must be signed by both the farmer/owner and by the service technician. The original is for the farmer/owner and the copy is for the service technician's/Lely's record.

An example of a completed visit report is shown hereafter.

Lely
Service Report

Order header:

Error report date:	donderdag 7 december 2006	Report-ID:	[REDACTED]
Customer number:	[REDACTED]	Address 3:	[REDACTED]
Customer name:	[REDACTED]	Address 4:	[REDACTED]
Address 1:	[REDACTED]	Postal code:	[REDACTED]
Address 2:	[REDACTED]		

Individual item:

Ind. item number:	[REDACTED]	Delivery date:	[REDACTED]
Model description:	ROB 1, 10 (R)	Receipt date:	[REDACTED]
Item number:	5.1002 [REDACTED]	Installation date:	[REDACTED]
Serial number:	[REDACTED]		

Assignment:

Assignment type:	Preventive maintenance	Function area:	[REDACTED]
Error cause:	[REDACTED]	Service action:	[REDACTED]
Service manager:	[REDACTED]	Service technician:	[REDACTED]

Start travel:	00:00	End travel:	00:00	Travel break:	00:00	Calculated times: Travel time: 00:00 Labour time: 00:00 Departure time: 00:00 Total: 00:00 KM: 0
Start labour:	00:00	End labour:	00:00	Labour break:	00:00	
Start departure:	00:00	End departure:	00:00	Departure break:	00:00	
Error symptom text:	[REDACTED]					
Error symptom text:	[REDACTED]					
Error symptom text:	[REDACTED]					

Order lines:

No.:	Item number:	Expenses:	Name:	Qty.:	Unit:	Whs:	W:	R:	Serial no.:
1	5.1001.0330.0		TDS flatcable 50mm incl.tap	1	PCE	BLB	<input type="checkbox"/>	<input type="checkbox"/>	
2	5.9000.1224.0		Maintenance 2 (30)(Mink)As	1	PCE	BLB	<input type="checkbox"/>	<input type="checkbox"/>	
3		100D0027	Voorrijkosten onderhoud	1	PCE	BLB	<input type="checkbox"/>	<input type="checkbox"/>	
4		100D0061	Arbeidsuren onderhoud	1	H	BLB	<input type="checkbox"/>	<input type="checkbox"/>	

Signature customer:

Signature technician:

Page 1 of 2 pages



7.2 Covers and Doors

7.2.1 Open the Multiple Function Box

Open

1. Use a screwdriver to turn the locks (fig. 1/1) and (3) 90° counterclockwise to release the cover of the multiple function box.
2. Pull the bottom edge of the cover (2) toward you to open the multiple function box.

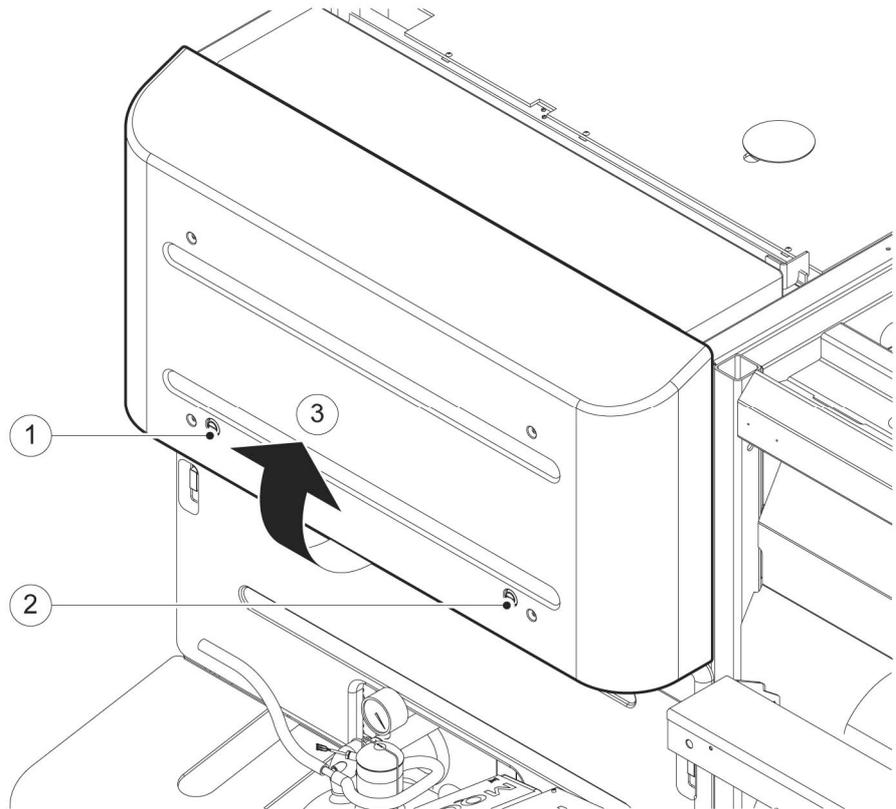


Figure 1: Open the multiple function box

7.2.2 Close the Multiple Function Box

Close

1. Pull the cover (fig. 1/2) down to close the multiple function box.
2. Use a screwdriver to turn the locks (1) and (3) 90° clockwise.

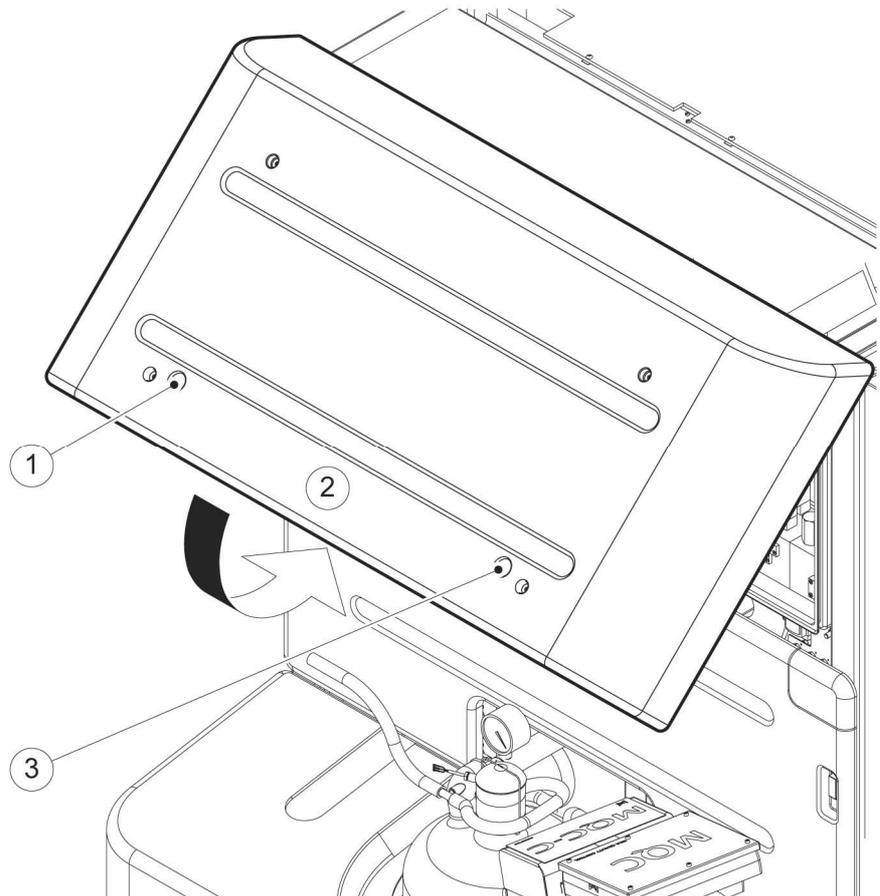


Figure 1: Close the multiple function box



7.2.3 Remove the Between Cover

Removal

1. Remove the locking pin (fig. 1/2).
2. Remove the between cover (1).

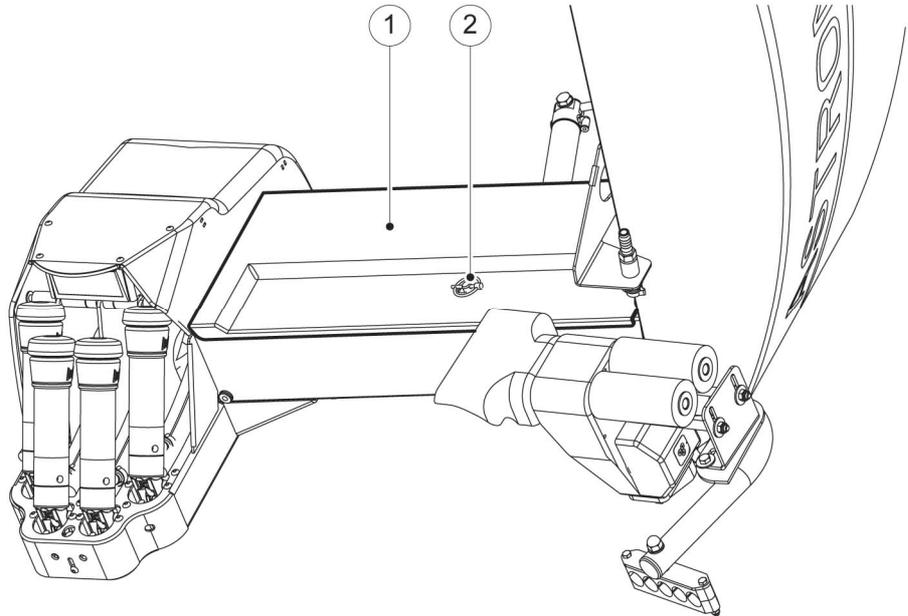


Figure 1: Remove the between cover

7.2.4 Install the Between Cover

Installation

1. Make sure the tubes and the cables are in the correct position and install the between cover (fig. 1/1).
2. Install the locking pin (2).

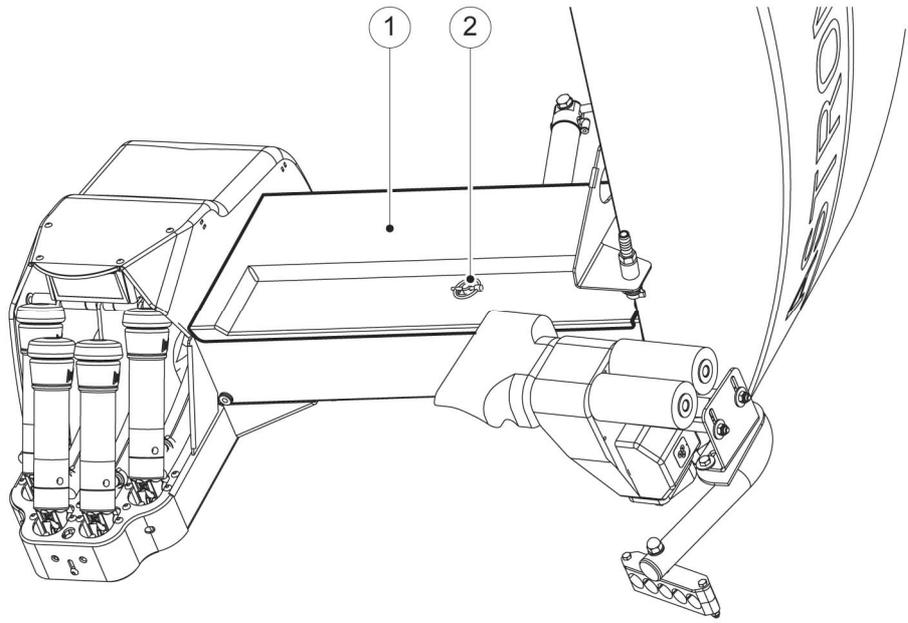


Figure 1: Install the between cover



7.2.5 Remove the Mothership Cover

Removal

1. Remove the screw (fig. 1/5) and the locking pin (4).
2. Loosen the bolts (1) and (2) until the mothership cover (3) can move easily.

CAUTION

Make sure the sTDS cable does not become tight or damaged when you remove the mothership cover.

3. Carefully move the mothership cover away from the teat cups and the mothership.
4. Carefully put the mothership cover on the ground next to the mothership.

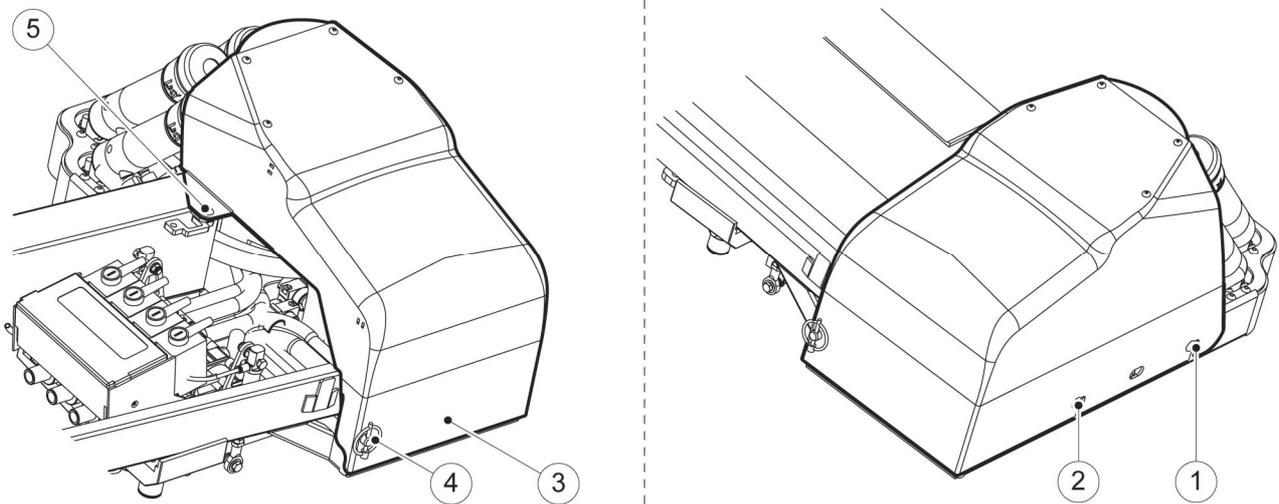


Figure 1: Remove the mothership cover

7.2.6 Install the Mothership Cover

Installation

1. Carefully position the mothership cover (fig. 1/3) on the mothership.



Make sure the sTDS cable does not get stuck between the mothership and the mothership cover.

2. Tighten the two bolts (1) and (2).
3. Install the screw (5) and the locking pin (4).

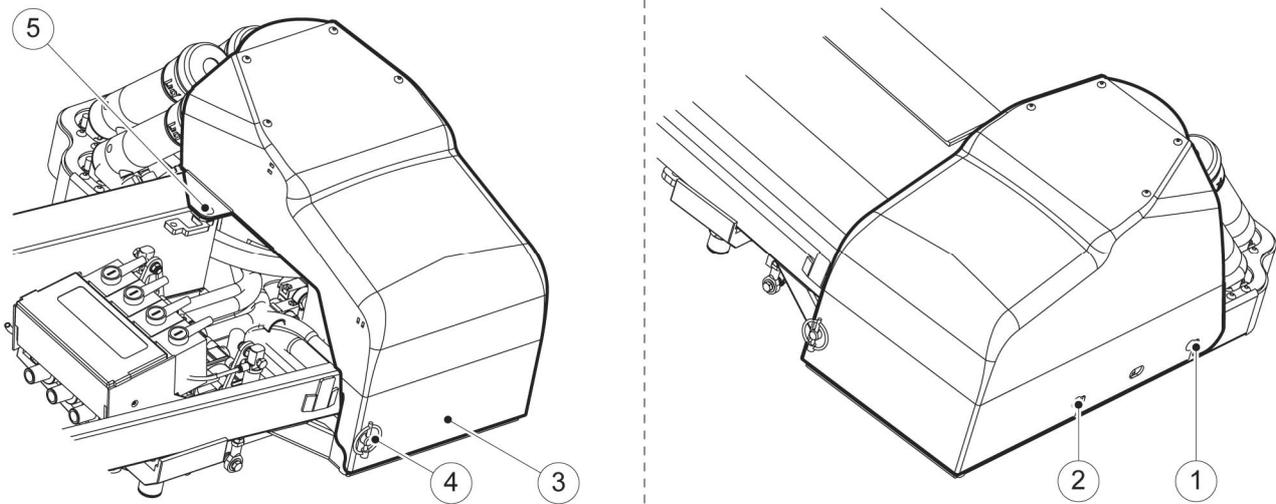


Figure 1: Install the mothership cover



7.3 Box

There are no maintenance procedures for the box.



7.4 Feeding System

7.4.1 Examine the Feed Funnel

Preparation



Block the cow traffic to the milking robot before you do this procedure.

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Select:
 - Tab [**Test**]
 - [**Box**]
 - [**Gates**].
3. In the field *Gates*, select *Exit gate*, [**Open**].

Examine

1. Go into the box via the exit gate.
2. Remove the locking pins (fig. 1/1) and (7).
3. Remove the feed funnel cover (8).



Do not touch or put your fingers near the moving parts.

4. Make sure:
 - The deflector funnel is clean
 - The pneumatic feed cylinder is installed correctly and cannot be removed.
5. Empty the feed bin.
6. Install the feed funnel cover.
7. Install the locking pins.
8. Go out of the box via the exit gate.

Close-up

1. Select:
 - Tab [**Test**]
 - [**Box**]
 - [**Gates**].
2. In the field *Gates*, select, *Exit gate*, [**Close**].
3. Unblock the cow traffic.
4. Put the milking robot in operation with the X-link (page 6-2).



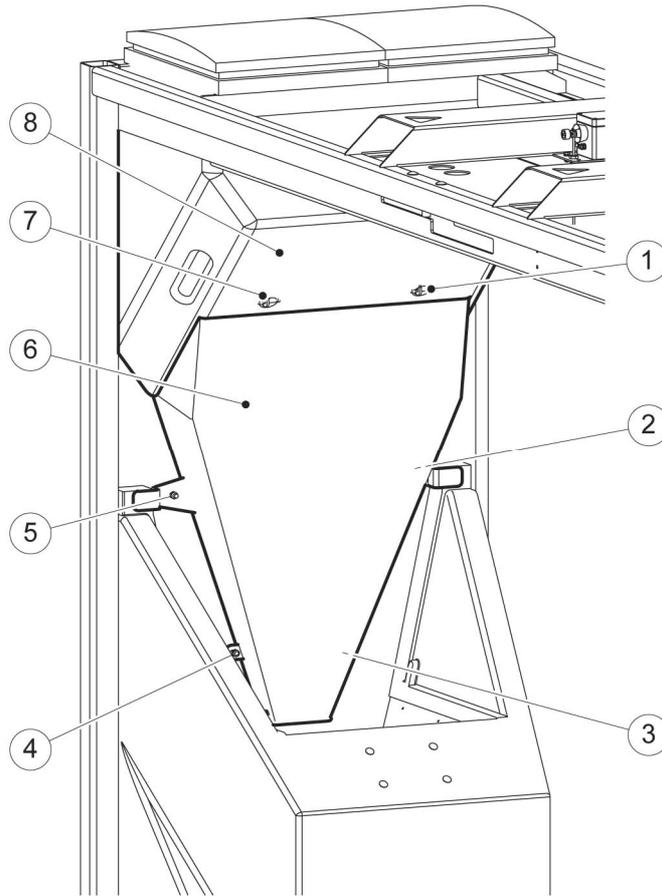


Figure 1: Removal of the feed funnel

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7.4.2 Clean the Feed Funnel

Preparation



Block the cow traffic to the milking robot before you do this procedure.

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Select:
 - Tab [**Test**]
 - [Box]
 - [Gates].
3. In the field *Gates, Exit gate*, select [**Open**].
4. Go into the box via the exit gate.

Clean

1. Remove:
 - The two locking pins (fig. 1/1) and (7)
 - The feed funnel cover (8)
 - The four deflector plate bolts (2), (3), (4) and (5)
 - The deflector plate (6).
2. Clean all the parts with a hard broom brush.
3. Empty the feed bin.
4. Install:
 - The deflector plate
 - The four deflector plate bolts
 - The feed funnel cover
 - The two locking pins.

Close-up

1. Go out of the box via the exit gate.
2. Select:
 - Tab [**Test**]
 - [Box]
 - [Gates].
3. In the field *Gates, Exit gate*, select [**Close**].
4. Unblock the cow traffic.
5. Put the milking robot in operation with the X-link (page 6-2).



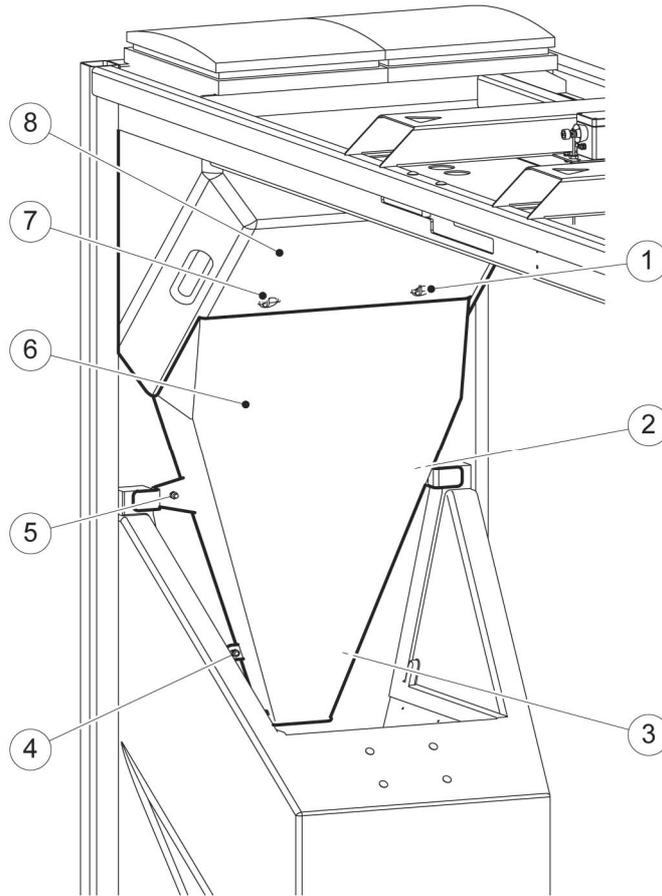


Figure 1: Removal of the feed funnel

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7.5 Robot Arm Systems

7.5.1 Clean the Bleed Holes

Special Tools

- Bleed hole needle (fig. 1/1)

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Move the robot arm to the service position (page 6-5).

Clean

1. Clean the bleed hole (2) in each teat cup with the bleed hole needle (1).

Close-up

1. Move the robot arm to the home position (page 6-5).
2. Put the milking robot in operation with the X-link (page 6-2).
3. Do a short rinse with the X-link (page 6-8).

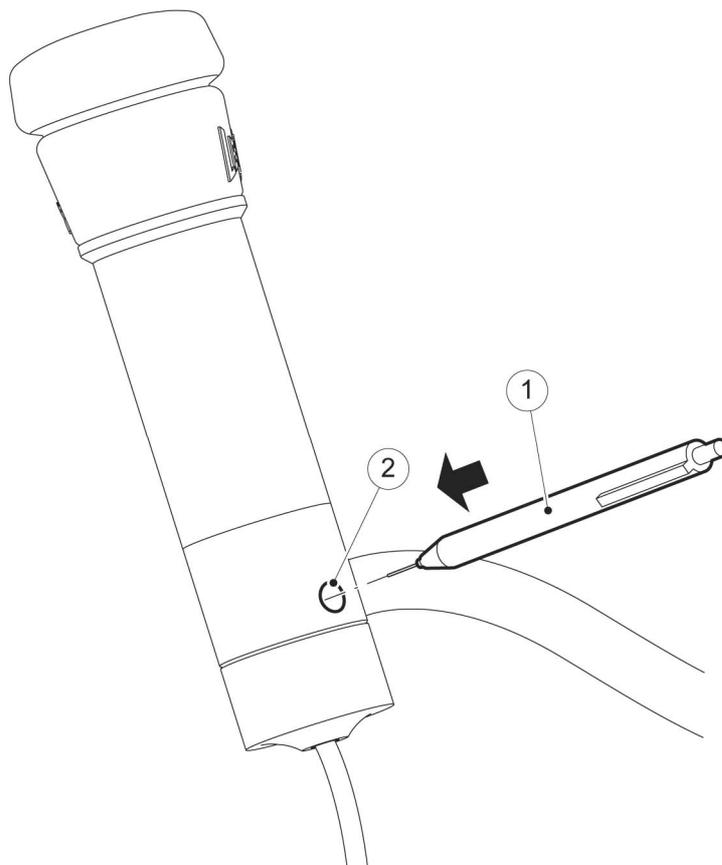


Figure 1: Clean the bleed holes



7.5.2 Clean the Outside of the Teat Cups



Do not use a high pressure cleaner to clean the teat cups. Damage to the teat cups may occur.

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Move the robot arm to the service position (page 6-5).

Clean

1. Use a bucket of water and a brush, or a soft spray hose to clean the outside of the teat cups.

Close-up

1. Move the robot arm to the home position (page 6-5).
2. Put the milking robot in operation with the X-link (page 6-2).
3. Start a Short Rinse (X-Link).



7.5.3 Examine the Cup Cords

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Move the robot arm to the service position (page 6-5).

Examine

1. Select:
 - Tab [**Test**]
 - [**Mothership**]
 - [**Cups**].
2. In the field *Tilt cups*, select:
 - *LF* [**Straight**]
 - *LR* [**Straight**]
 - *RF* [**Straight**]
 - *RR* [**Straight**].
3. In the field *Tilt cups*, select:
 - *LF* [**Loose**]
 - *LR* [**Loose**]
 - *RF* [**Loose**]
 - *RR* [**Loose**].
4. Examine the cup cords for dirt and damage.
5. If the cords are (much) thicker or thinner than the original thickness of the cup cord, shorten the cup cords (page 8-4).
6. Measure the cup cords (fig. 1) and make sure the length is between 22.5 and 23.5 cm (8.86 in and 9.25 in).
7. If necessary, shorten the cup cords (page 8-4).
8. In the field *Cord cups*, select:
 - *LF* [**Fixed**]
 - *LR* [**Fixed**]
 - *RF* [**Fixed**]
 - *RR* [**Fixed**].

Close-up

1. Move the robot arm to the home position (page 6-5).
2. Put the milking robot in operation with the X-link (page 6-2).



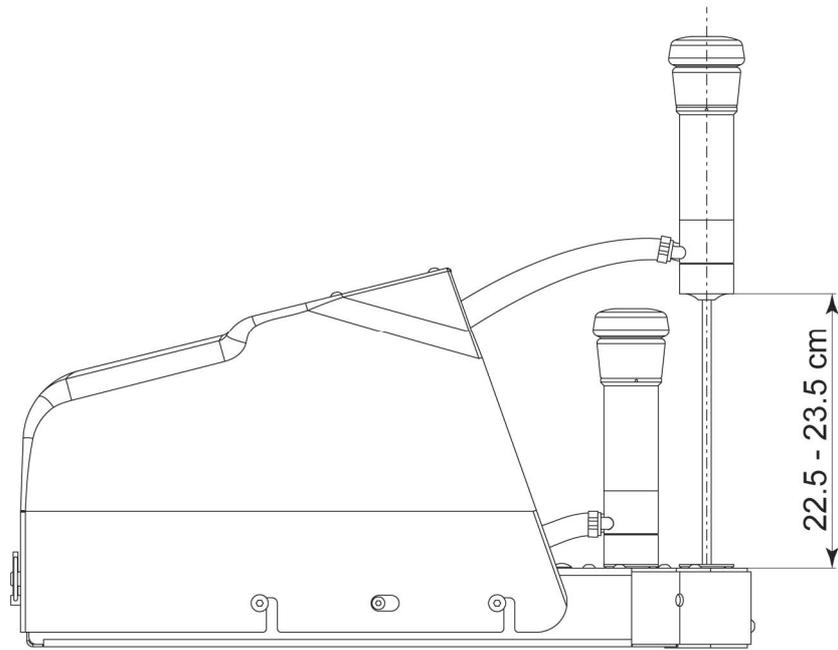


Figure 1: Measure the cup cords

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7.5.4 Replace the Cup Cords

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Move the robot arm to the service position (page 6-5).
3. Remove the mothership cover (page 7-10).
4. Remove the between cover (page 7-8).

Removal

1. Select:
 - Tab [**Test**]
 - [Mothership]
 - [Cups].
2. In the field *Tilt cups*, select:
 - *LF* [**Straight**]
 - *LR* [**Straight**]
 - *RF* [**Straight**]
 - *RR* [**Straight**].
3. In the field *Tilt cups*, select:
 - *LF* [**Loose**]
 - *LR* [**Loose**]
 - *RF* [**Loose**]
 - *RR* [**Loose**].
4. Remove the two Allen screws (fig. 1/5) and (6) and the centering piece (4) from the milk collector (1).
5. Untie (2) the cup cord from the centering piece.
6. Remove bolt (12), the washer (11) and the guide profile (10).
7. Remove the cup cord (8) by pulling it from the mothership side.

Installation

1. Put the new cup cord (8) through the hole (13) in the mothership.
2. Route the cup cord as shown in the figure, through the washer (14) and the holes (13), (9) and (7).
3. Push the cup cord through the centering piece (4) and the washer (3).
4. Tie a knot (2) in the cup cord.
5. Install the centring piece with the two screws (5) and (6) on the milk collector (1).
6. Install the guiding profile (10) with the washer (11) and the bolt (12).
7. In the field *Cord cups*, select [**Fixed**] for the applicable teat cup.
8. Make sure the cup cord (fig. 3/3) is put through the washer (2).
9. Pull the cup cord on the mothership side. Make sure the teat cup is firmly in the tilt cup.
10. Use a ballpoint pen to mark (1) the cup cord where it goes into the mothership.
11. In the field *Cord cups*, select [**Loose**] for the applicable teat cup.
12. Tie a slip knot (fig. 4/1) in the cup cord just behind the mark (3).

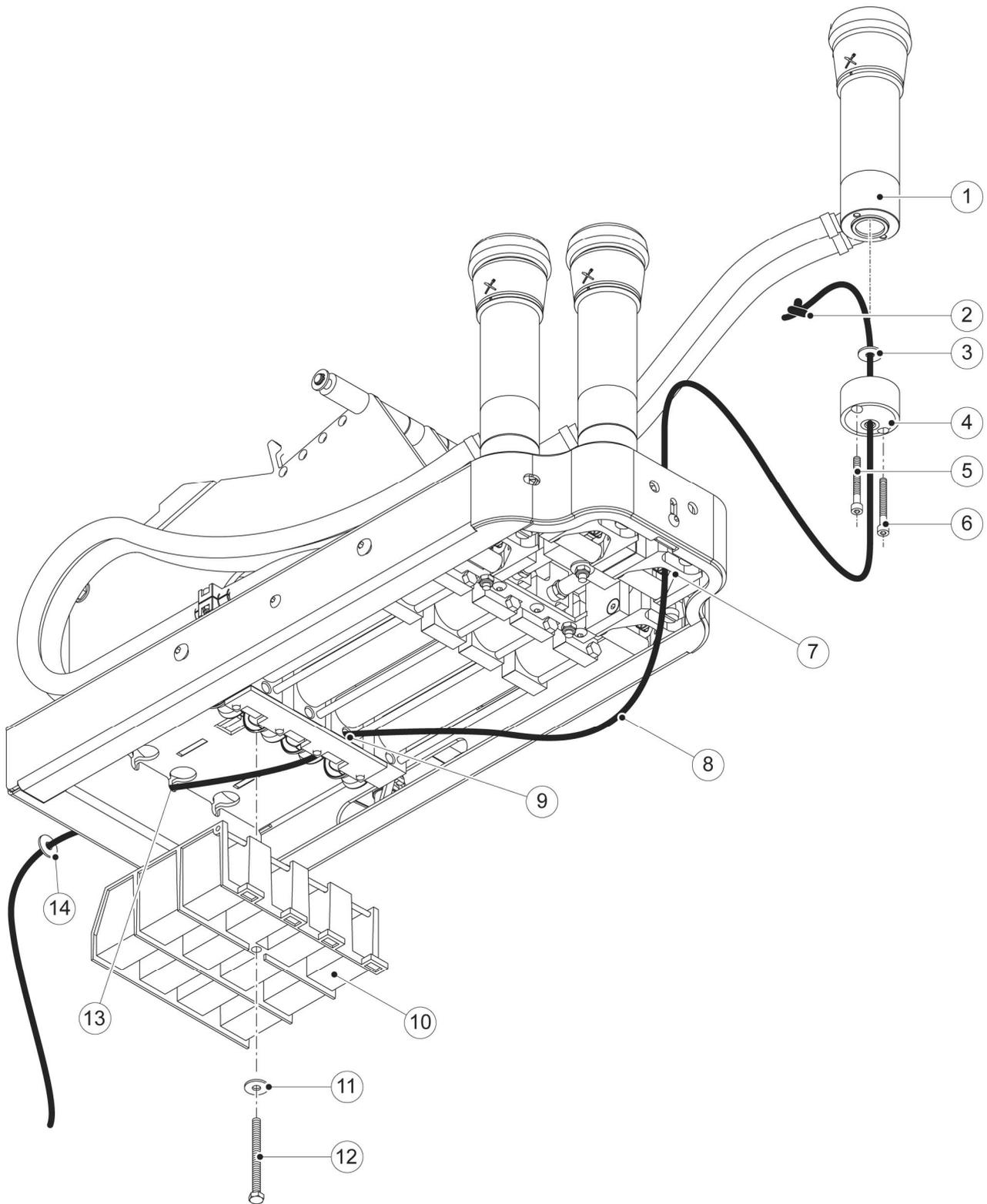


13. In the field *Cord cups*, select [**Fixed**] for the applicable teat cup.
14. Make sure the teat cup is firmly in the tilt cup.
15. Put the cup cord(s) into the mothership (2).
16. Put the cup cord(s) into the mothership (2).

Close-up

1. Install the mothership cover (page 7-11).
2. Install the between cover (page 7-9).
3. Move the robot arm to the home position (page 6-5).
4. Put the milking robot in operation with the X-link (page 6-2).





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Figure 1: Remove the cup cords

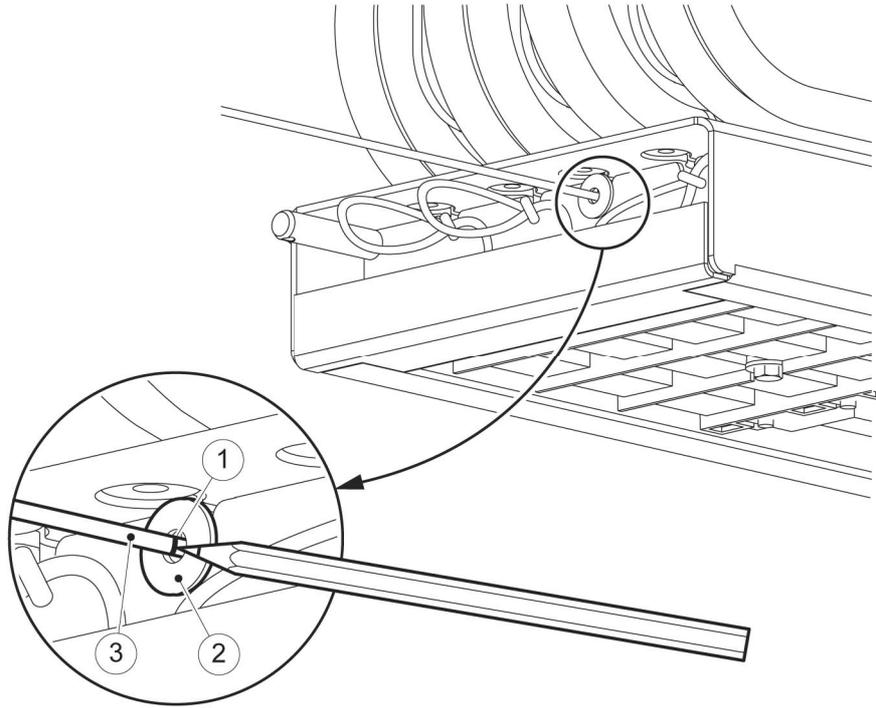


Figure 2: Mark the cord

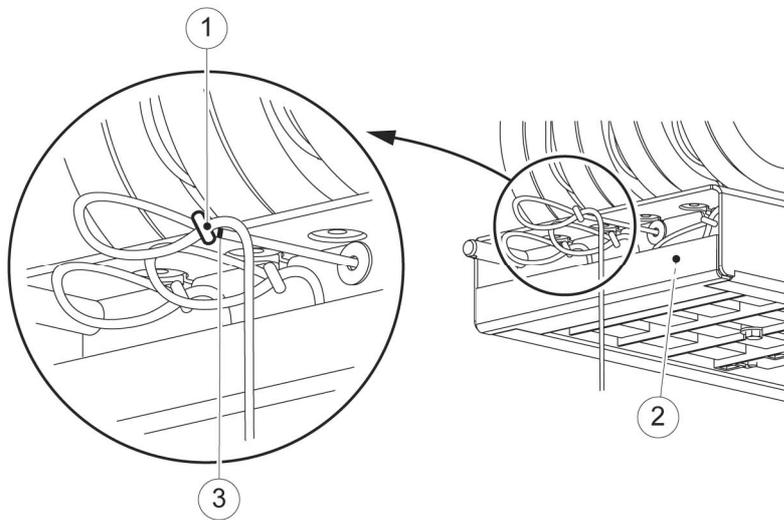


Figure 3: Tie the cord just behind the mark

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7.5.5 Examine the Teat Cup Sleeves

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Move the robot arm to the service position (page 6-5).
3. Select:
 - Tab **[Test]**
 - **[Mothership]**
 - **[Cups]**.
4. In the field *Tilt cups*, select:
 - *LF* **[Straight]**
 - *LR* **[Straight]**
 - *RF* **[Straight]**
 - *RR* **[Straight]**.
5. In the field *Cord cups*, select:
 - *LF* **[Loose]**
 - *LR* **[Loose]**
 - *RF* **[Loose]**
 - *RR* **[Loose]**.

Examine

1. Examine the teat cup sleeves for damage.
2. Examine the teat cup sleeves are installed straight on the milk collection cup.
3. If necessary, replace the teat cup sleeves (page 7-32).

Close-up

1. In the field *Cord cups*, select:
 - *LF* **[Fixed]**
 - *LR* **[Fixed]**
 - *RF* **[Fixed]**
 - *RR* **[Fixed]**.
2. Move the robot arm to the home position (page 6-5).
3. Put the milking robot in operation with the X-link (page 6-2).



7.5.6 Examine the Cup Centring

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Move the robot arm to the service position (page 6-5).

Examine

1. Select:
 - Tab [**Test**]
 - [Mothership]
 - [Cups].
2. In the field *Tilt cups*, select:
 - *LF* [**Straight**]
 - *LR* [**Straight**]
 - *RF* [**Straight**]
 - *RR* [**Straight**].
3. In the field *Tilt cups*, select:
 - *LF* [**Loose**]
 - *LR* [**Loose**]
 - *RF* [**Loose**]
 - *RR* [**Loose**].
4. Examine the centering cups for erosion and damage.
5. If necessary, replace the centring cups (page 7-27).
6. Examine the tilt cups for erosion and damage.
7. If necessary, replace the tilt cups.
8. In the field *Cord cups*, select:
 - *LF* [**Fixed**]
 - *LR* [**Fixed**]
 - *RF* [**Fixed**]
 - *RR* [**Fixed**].
9. Make sure the teat cups are not loose in the tilt cups.
10. If necessary, shorten the cup cords (page 8-4).

Close-up

1. Move the robot arm to the home position (page 6-5).
2. Put the milking robot in operation with the X-link (page 6-2).



7.5.7 Replace the Centering Cup

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Move the robot arm to the service position (page 6-5).

Removal

1. Select:
 - Tab [**Test**]
 - [**Mothership**]
 - [**Cups**].
2. In the field *Tilt cups*, select:
 - *LF* [**Straight**]
 - *LR* [**Straight**]
 - *RF* [**Straight**]
 - *RR* [**Straight**].
3. In the field *Tilt cups*, select:
 - *LF* [**Loose**]
 - *LR* [**Loose**]
 - *RF* [**Loose**]
 - *RR* [**Loose**].
4. Remove the two screws (fig. 1/6) and (7) and the centering cup (4) from the milk collector (1).
5. Untie (2) the cup cord (5) at the centering cup.
6. Remove the cup cord from the washer and the centering cup.

Installation

1. Push the cup cord (5) through the centering cup (4) and the washer (3).
2. Make a knot (2) in the end of the cup cord.
3. Install the centering cup on the milk collector (1) with the two screws (6) and (7).

Examine

1. Examine the cup cords (page 7-20).
2. In the field *Cord cups*, select:
 - *LF* [**Fixed**]
 - *LR* [**Fixed**]
 - *RF* [**Fixed**]
 - *RR* [**Fixed**].

Close-up

1. Move the robot arm to the home position (page 6-5).
2. Put the milking robot in operation with the X-link (page 6-2).



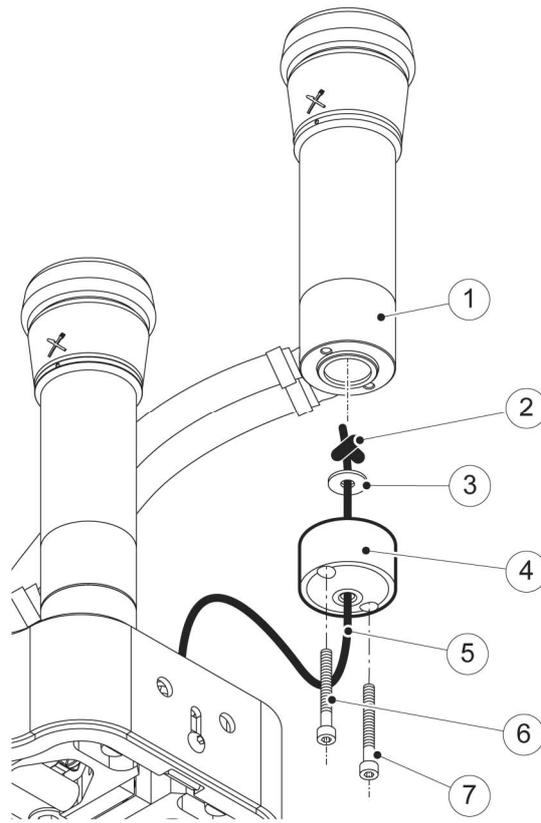


Figure 1: Replace the centring cup

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7.5.8 Clean the Robot Arm and the Box



Do not use a high pressure cleaner when you clean the robot arm and the box. The robot arm contains many electronic parts. A high pressure cleaner may cause damage to these parts.

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Move the robot arm to the service position (page 6-5).

Clean

1. Use a bucket of water and a brush, or a soft spray hose to clean the robot arm and the box.

Close-up

1. Move the robot arm to the home position (page 6-5).
2. Put the milking robot in operation with the X-link (page 6-2).
3. Start a Short Rinse with the X-Link.



7.6 Milking System

7.6.1 Examine the Teat Cup Liners

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Move the robot arm to the service position (page 6-5).

Examine

1. Examine the teat cup liners for dirt and damage.
2. If necessary, replace the teat cup liners (page 7-32).

Close-up

1. Move the robot arm to the home position (page 6-5).
2. Put the milking robot in operation with the X-link (page 6-2).
3. Do a short rinse with the X-link (page 6-8).



7.6.2 Replace the Teat Cup Liners

Special Tools

- Teat cup liner installation tool (fig. 3/1)

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Move the robot arm to the service position (page 6-5).
3. Select:
 - Tab [**Test**]
 - [**Mothership**]
 - [**Cups**].
4. In the field *Tilt cups*, select:
 - *LF* [**Straight**]
 - *LR* [**Straight**]
 - *RF* [**Straight**]
 - *RR* [**Straight**].
5. In the field *Cord cups*, select:
 - *LF* [**Loose**]
 - *LR* [**Loose**]
 - *RF* [**Loose**]
 - *RR* [**Loose**].

Removal

Do the steps in this sub-section for all four teat cup liners.

1. Turn the teat cup liner (fig. 1/3) counterclockwise until you can remove them from the milk collector (2).
2. Make sure the milk collector cup is clean.
3. If necessary, clean the milk collector cup.
4. Pull the teat cup liner (1) at the upper side to remove them from the teat cup sleeve.

Installation

Do the steps in this sub-section for all four teat cup liners.

1. Install the teat cup liner in the teat cup sleeve.
2. Push the upper part of the teat cup liner on the teat cup sleeve.
3. Make sure the mark (fig. 2/1) on the teat cup liner is aligned with the mark (2) on the teat cup sleeve.
4. If necessary, turn the liner.
5. Make sure the teat cup liner is not twisted (fig. 2/right) in the teat cup sleeve.
6. Rub the lower part of the teat cup liner and the teat cup sleeve in with soapy water.



CAUTION

Do not turn the installation tool when you push the teat cup liner in the teat cup sleeve.

7. Use the teat cup liner installation tool (fig. 3/1) to push the lower part of the liner in the teat cup sleeve.
8. Make sure the bottom of the teat liner (2) engages correctly in the bottom of the teat cup sleeve.
9. Examine the O-ring (3) of the teat cup sleeve for damage.
10. If necessary, replace the O-ring.
11. Lubricate the thread and O-ring of the teat cups with vaseline.
12. Install the teat cups in the milk collectors and turn them clockwise.
13. In the field *Cord cups*, select:
 - *LF [Fixed]*
 - *LR [Fixed]*
 - *RF [Fixed]*
 - *RR [Fixed]*.

Close-up

1. Move the robot arm to the home position (page 6-5).
2. Put the milking robot in operation with the X-link (page 6-2).
3. Do a short rinse with the X-link (page 6-8).

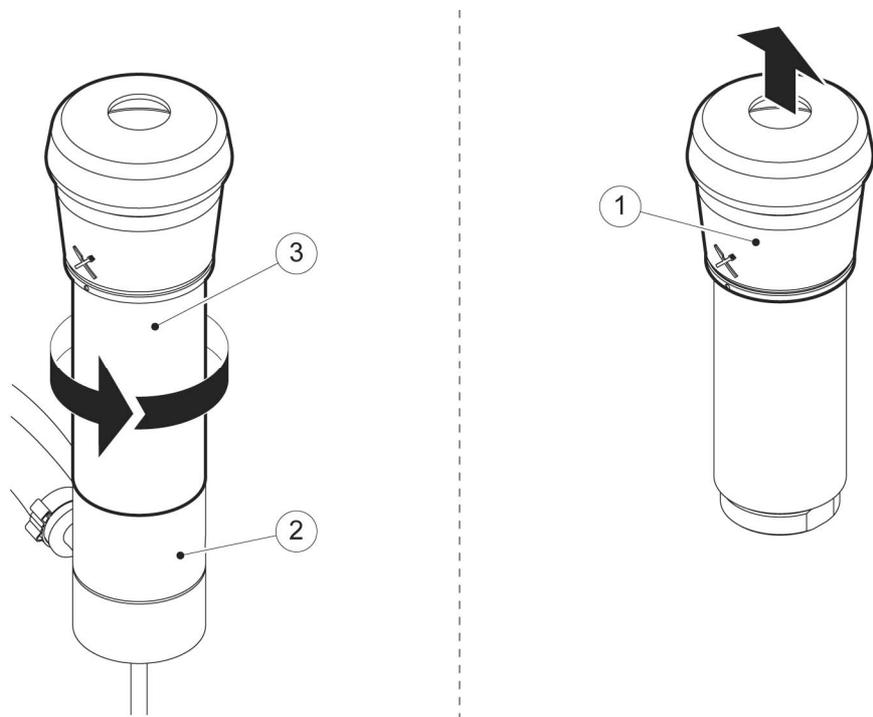


Figure 1: Remove the teat cup sleeve and teat cup liner

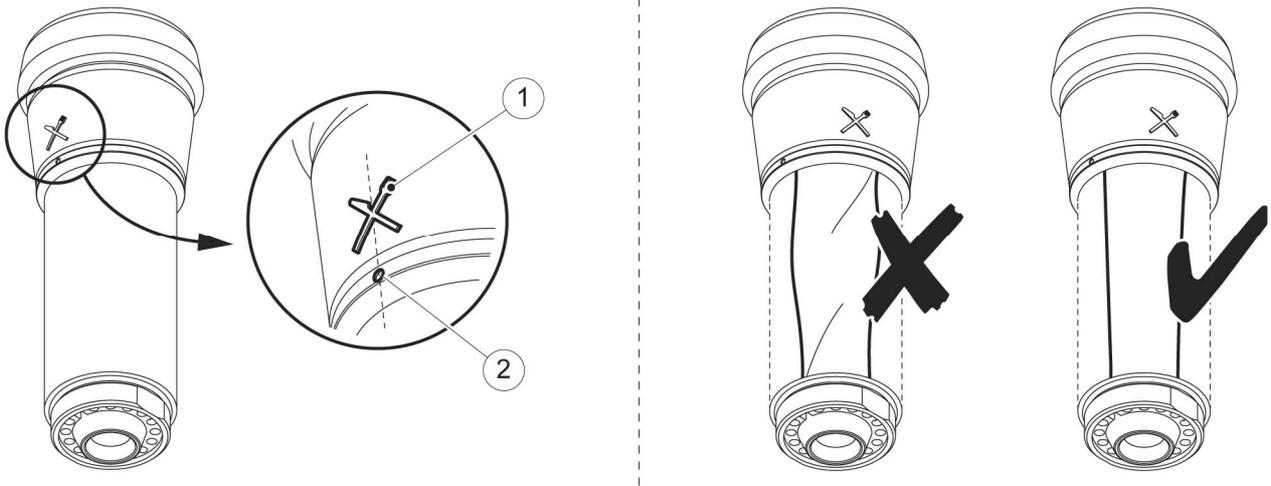


Figure 2: Insert the new teat cup liner in the teat cup sleeve

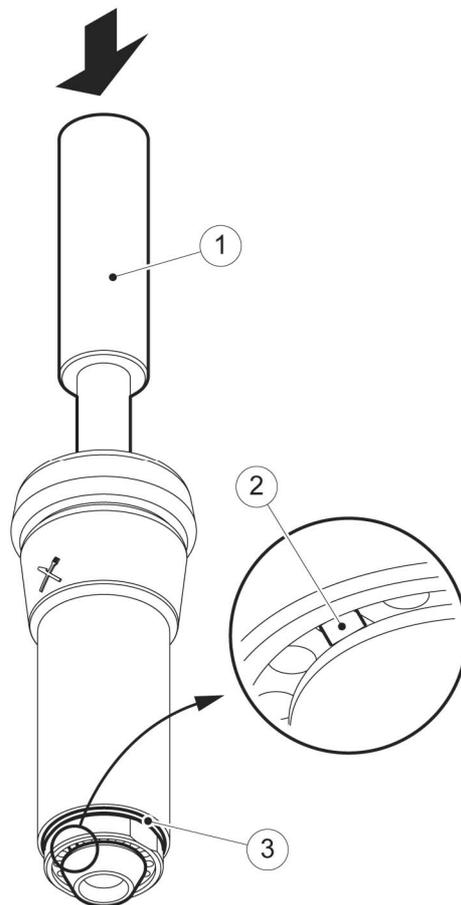


Figure 3: Install the teat cup liner in the teat cup sleeve



7.7 Milk Transport System

7.7.1 Examine the Twin Tubes

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Move the robot arm to the service position (page 6-5).
3. Select:
 - Tab [**Test**]
 - [Mothership]
 - [Cups].
4. In the field *Tilt cups*, select:
 - *LF* [**Straight**]
 - *LR* [**Straight**]
 - *RF* [**Straight**]
 - *RR* [**Straight**].
5. In the field *Cord cups*, select:
 - *LF* [**Loose**]
 - *LR* [**Loose**]
 - *RF* [**Loose**]
 - *RR* [**Loose**].

Examine

1. Examine the twin tubes for damage.
2. If necessary, shorten the twin tubes (page 7-35) or replace the twin tube.
3. Put a finger in the teat cup and hold the teat cup in a position similar to the milking position.
4. Make sure the teat cup hangs vertically.
5. If the teat cup does not hang vertically, adjust the twin tube connection on the applicable teat cup.

Close-up

1. In the field *Cord cups*, select:
 - *LF* [**Fixed**]
 - *LR* [**Fixed**]
 - *RF* [**Fixed**]
 - *RR* [**Fixed**].
2. Move the robot arm to the home position (page 6-5).
3. Put the milking robot in operation with the X-link (page 6-2).



7.7.2 Shorten the Twin Tubes

Special Tools

- Clamp pliers (fig. 1/1)
- Hose scissors (fig. 2/3)

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Move the robot arm to the service position (page 6-5).

Shorten

1. Select:
 - Tab [**Test**]
 - [Mothership]
 - [Cups].
2. In the field *Tilt cups*, select:
 - *LF* [**Straight**]
 - *LR* [**Straight**]
 - *RF* [**Straight**]
 - *RR* [**Straight**].
3. In the field *Tilt cups*, select:
 - *LF* [**Loose**]
 - *LR* [**Loose**]
 - *RF* [**Loose**]
 - *RR* [**Loose**].
4. Use the clamp pliers (fig. 1/1) to release the clamp (2) on the applicable twin tube.
5. Disconnect the twin tube from the teat cup.
6. Use the hose scissors (fig. 2/3) to cut off the damaged part (2) of the twin tube.
7. Cut off a part with the same length of the other part (1) of the twin tube.
8. Use a knife (fig. 3/1) to make an incision in the twin tube, with the same length as the part you cut off.

Installation

1. Connect the twin tube to the milk collector.
2. Use the clamp pliers to tighten the clamp on the twin tube.
3. Hold the teat cup, and with one finger in the liner make sure the teat cup does not turn.
4. Make sure the shortened twin tube has sufficient freedom of movement.
5. If there is not sufficient freedom of movement, replace the twin tube.
6. If necessary, turn the twin tubes to align the teat cup.
7. Fully tighten the clamps with the special tool.
8. In the field *Cord cups*, select:
 - *LF* [**Fixed**]
 - *LR* [**Fixed**]
 - *RF* [**Fixed**]
 - *RR* [**Fixed**].



Close-up

1. Move the robot arm to the home position (page 6-5).
2. Put the milking robot in operation with the X-link (page 6-2).
3. Do a short rinse with the X-link (page 6-8).

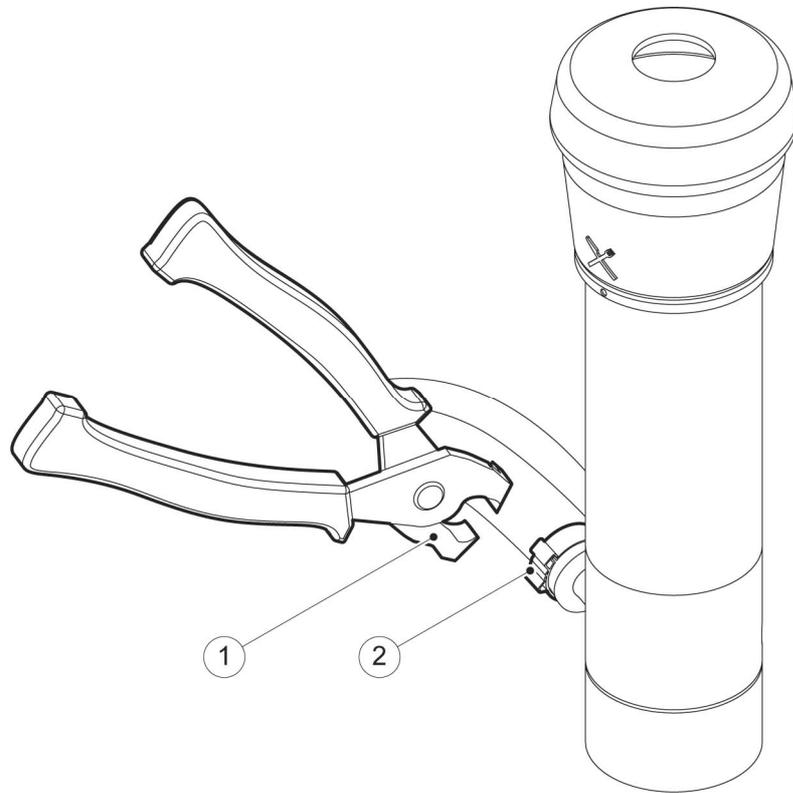


Figure 1: Release the clamp from the twin tube

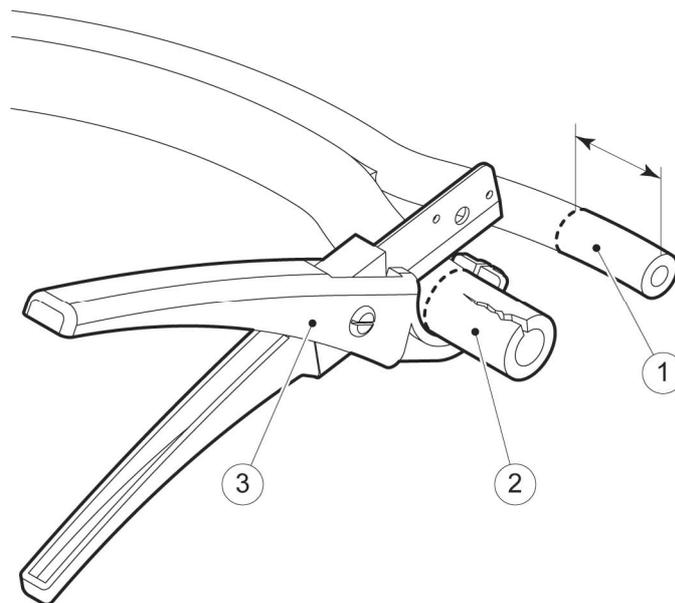


Figure 2: Cut off the damaged part of the twin tube

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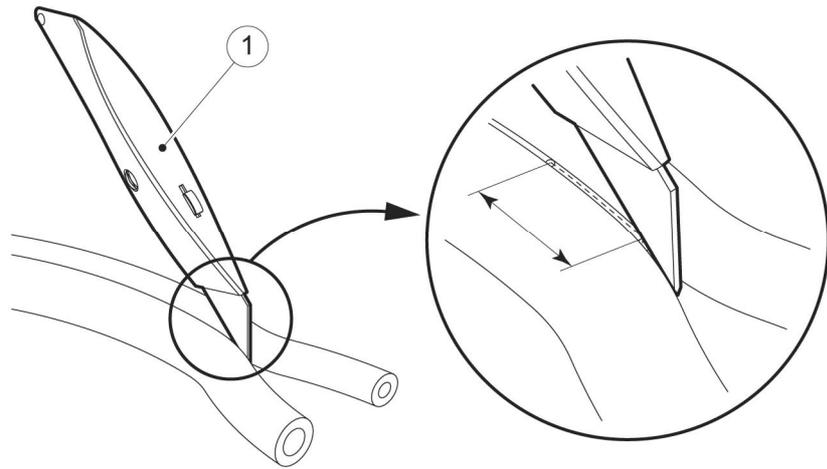


Figure 3: Make an incision in the twin tube



7.7.3 Replace the Filter Element of the Single Filter

Replace

1. Select:

- [^]



- [].

2. When the pop-up window with the text *Continue milk filter exchange* opens, select [OK].
3. A pop-up window opens with the text *The milk filter is being prepared*



for exchange and the button changes to [].

4. Wait until the text in the pop-up window changes to *The milk filter is ready for exchange*.
5. Hold the filter housing and remove the cap.
6. Remove the filter housing.
7. Remove the filter sock and the spring from the filter housing.
8. Examine the filter sock for flakes that indicate mastitis in the herd.
9. Remove the filter ring and the filter sock from the spring.
10. Rinse the filter ring and the filter housing with clean water.
11. Make sure the thread and the top of the filter housing are clean and dry.
12. Slide the spring into a new filter sock and fold the sock top into the top of the spring.
13. Install the filter ring on the spring.
14. Slide the filter sock and the spring in the filter housing until approximately 15 cm (5.90 in) of the filter sock is outside the filter housing.
15. Hold the filter housing in position below the milkline and push the filter sock fully into the tapered part of the milkline.
16. Connect the cap to the filter housing and tighten the cap hand-tight.
17. Select [Milk filter has been exchanged].
18. The pop-up window closes and the button changes to



[].



7.7.4 Replace the Filter Element of the Twin Filter

Replace

1. On the CRS+, press:



- [ENTER].
2. Hold the filter housing and remove the cap.
 3. Remove the filter housing.
 4. Remove the filter sock and the spring from the filter housing.
 5. Examine the filter sock for flakes that indicate mastitis in the herd.
 6. Remove the filter ring and the filter sock from the spring.
 7. Rinse the filter ring and the filter housing with clean water.
 8. Make sure the thread and the top of the filter housing are clean and dry.
 9. Slide the spring into a new filter sock and fold the sock top into the top of the spring.
 10. Install the filter ring on the spring.
 11. Slide the filter sock and the spring in the filter housing until approximately 15 cm (5.90 in) of the filter sock is outside the filter housing.
 12. Hold the filter housing in position below the milking line and push the filter sock fully into the tapered part of the milking line.
 13. Connect the cap to the filter housing and tighten the cap hand-tight.
 14. On the CRS+, press [ENTER].



7.8 Cleaning Systems

7.8.1 Examine the Cleaning Brushes

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Move the robot arm to the service position (page 6-5).

Examine

1. Make sure there are enough hairs with sufficient length on the brushes to clean the teats.
2. If there are not enough hairs with sufficient length on the cleaning brushes, replace the cleaning brushes (page 7-42).

Close-up

1. Move the robot arm to the home position (page 6-5).
2. Put the milking robot in operation with the X-link (page 6-2).



7.8.2 Replace the Cleaning Brushes

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Move the robot arm to the service position (page 6-5).

Removal

1. Select:
 - Tab [**Test**]
 - [Mothership]
 - [Other]
 - *Pre treatment arm [On]*.
2. Loosen the two Allen screws (fig. 1/2).
3. Remove the two brushes (1) from the shaft.

Installation

1. Install the two new brushes (1) on the shaft.
2. Tighten the two Allen screws (2).
3. Select:
 - Tab [**Test**]
 - [Mothership]
 - [Other]
 - *Pre treatment arm [Off]*.

Close-up

1. Move the robot arm to the home position (page 6-5).
2. Put the milking robot in operation with the X-link (page 6-2).
3. Do a short rinse with the X-link (page 6-8).



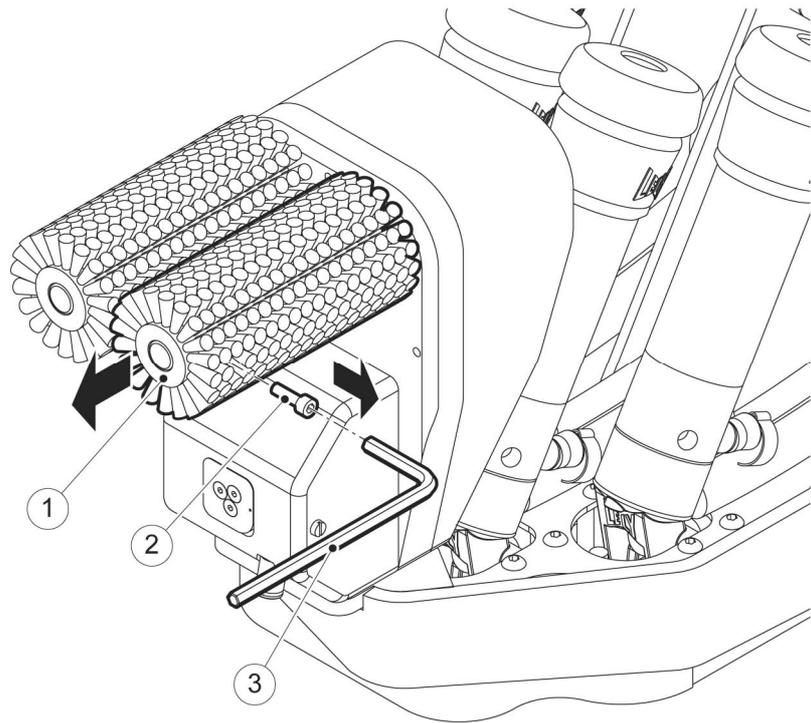


Figure 1: Replace the cleaning brushes

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7.8.3 Examine the Quantity of Astri-Uc

⚠ WARNING

Block the cow traffic to the milking robot before you do this procedure.

Note:

The transparent hose goes to the Astri-Uc container.

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Open the doors of the machine room.

Examine

1. Make sure there is sufficient Astri-Uc in the container and the hose is sufficiently into the liquid to suck correctly.
2. If necessary, replace the container with a full one when the level is too low.

Close-up

1. Close the doors of the machine room.
2. Unblock the cow traffic.
3. Put the milking robot in operation with the X-link (page 6-2).



7.8.4 Examine the Quantity of Astri-Cid



Block the cow traffic to the milking robot before you do this procedure.



Astri-Cid is a chemical hazard. Always wear protective gloves when you do work on the Astri-Cid.



The red hose goes to the Astri-Cid container.

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Open the doors of the machine room.

Examine

1. Make sure there is sufficient Astri-Cid in the container and the hose is sufficiently into the liquid to suck correctly.
2. If necessary, replace the container with a full one when the level is too low.

Close-up

1. Close the doors of the machine room.
2. Unblock the cow traffic.
3. Put the milking robot in operation with the X-link (page 6-2).



7.8.5 Examine the Quantity of Astri-Lin



Block the cow traffic to the milking robot before you do this procedure.



Astri-Lin is a chemical hazard. Always wear protective gloves when you do work on the Astri-Lin.

Note:

The blue hose goes to the Astri-Lin container.

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Open the doors of the machine room.

Examine

1. Make sure there is sufficient Astri-Lin in the container and the hose is sufficiently into the liquid to suck correctly.
2. If necessary, replace the container with a full one when the level is too low.

Close-up

1. Close the doors of the machine room.
2. Unblock the cow traffic.
3. Put the milking robot in operation with the X-link (page 6-2).



7.8.6 Examine the Quantity of Astri-L



Block the cow traffic to the milking robot before you do this procedure.



Astri-L is a chemical hazard. Always wear protective gloves when you do work on the Astri-L.

Note:

The green hose goes to the Astri-L container.

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Open the doors of the machine room.

Examine

1. Make sure there is sufficient Astri-L in the container and the hose is sufficiently into the liquid to suck correctly.
2. If necessary, replace the container with a full one when the level is too low.

Close-up

1. Close the doors of the machine room.
2. Unblock the cow traffic.
3. Put the milking robot in operation with the X-link (page 6-2).



7.9 Support Systems

7.9.1 Clean the sTDS Screen

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Move the robot arm to the service position (page 6-5).

Clean



Only clean the sTDS screen with Astri-TDS. The use of other fluids can cause damage to the sTDS screen.

1. Use a soft moist towel with a small quantity of Astri-TDS to clean the sTDS screen.

Close-up

1. Move the robot arm to the home position (page 6-5).
2. Put the milking robot in operation with the X-link (page 6-2).

7.9.2 Examine the Air Compressor and the Air Dryer

Note:

You must obey local rules and standards. For certain countries a yearly report of the pressure vessel must be made.

Examine

1. Select:
 - Tab [Test]
 - [Facilities].
2. In the field *Air supply*, compare the *Temperature dewpoint* value with the *Temperature environment* value.
3. If the environment temperature is higher than the dew point temperature, call your local service organization.
4. Refer to the compressor and air dryer manual for further maintenance information.

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7.9.3 Examine the vacuum pump oil level

Examine

1. Refer to the vacuum pump manual for details.



7.9.4 Clean the Exterior of the Vacuum Pump

Preparation



Block the cow traffic to the milking robot before you do this procedure.



During operation the temperature of the surface of the vacuum pump may be more than 70 °C (158 °F). Make sure the vacuum pump is cool before you do maintenance on the vacuum pump.

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Open the multiple function box (page 7-7).

Clean

1. Set the vacuum pump switch (fig. 1/1) to the down position.
2. Select:
 - Tab **[Test]**
 - **[Vacuum pump]**
 - *Vacuum pump* **[On]**.
3. Make sure the vacuum pump does not start.
4. If the vacuum pump starts, see the Service Manual for more information.
5. In the field *Vacuum pump*, select **[Off]**.
6. Open the doors of the machine room.
7. Set the light switch (fig. 2/1) of the inspection lamp (2) in the on position.
8. Make sure the pump house, the fan cowling, the fan wheel, the ventilation grills and the cooling fans are free of dust and debris.
9. If necessary, clean the parts.
10. Set the vacuum pump switch (fig. 1/1) to the up position.

Close-up

1. Set the light switch (fig. 2/1) of the inspection lamp (2) in the off position.
2. Close the doors of the machine room.
3. Close the multiple function box (page 7-7).
4. Unblock the cow traffic.
5. Put the milking robot in operation with the X-link (page 6-2).



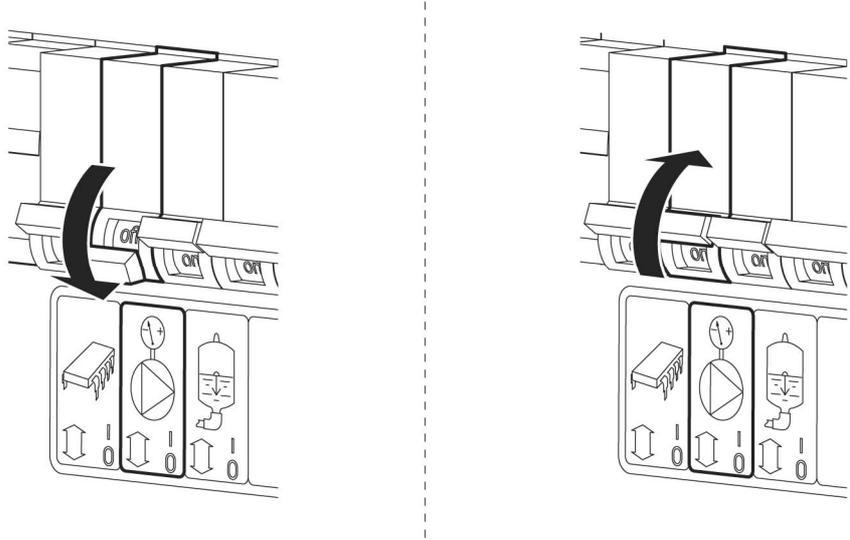


Figure 1: The vacuum switch

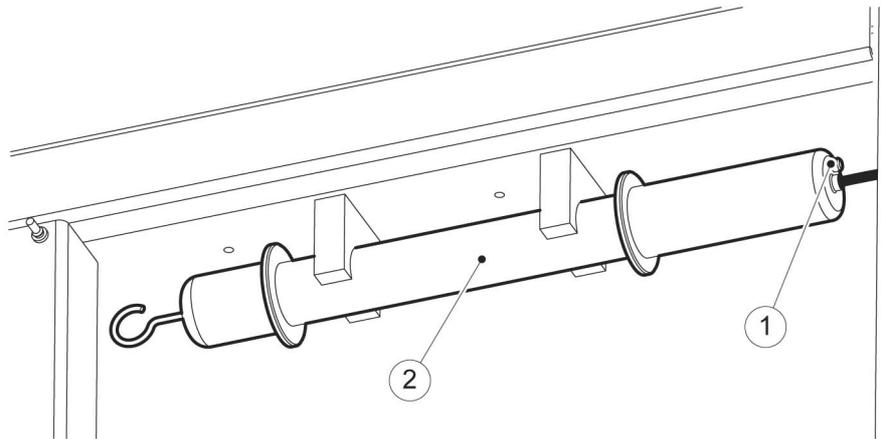


Figure 2: The light switch



7.10 Control Systems

7.10.1 Examine the Attention Alarms

Examine

1. Examine the attention alarms on the X-Link, T4C or the CRS+ as follows:
 - On the X-Link, select Tab **[Indications]**.
 - On the T4C system, refer to the T4C manual.
 - On the CRS+, select Main Menu > Alarm system > List active alarms.
2. If necessary, correct the problems shown by the attention alarms.

Note:

Cows with a milking interval of more than 10 hours must be guided into the milking robot.
Cows with a different conductivity, color attention, feed intake or milk yield must be examined for (udder) health.

7.10.2 Examine the Attention List

Examine

1. Examine the attention list on the X-Link or the T4C as follows:
 - On the X-Link, select tab **[T4C]**.
 - On the T4C system, refer to the T4C manual.

Note:

– Cows with a milking interval of more than 10 hours must be guided into the milking robot.
– Cows with a different conductivity, color attention, feed intake or milk yield must be examined for (udder) health.



7.10.3 Examine the Robot Performance List

Examine

In the T4C-software:

1. Select:
 - Tab [Reports]
 - Tab [Milking]
 - Tab [Report].
2. If necessary:
 - Select the robot(s) to make the report from
 - Select the days. The first field is the most recent day of the period, the second field is last day of the period. The value 0 (nul) is used for the present day.
 - Select the sort order
 - Select the output format.

Note:

- You must have Adobe Reader installed on your computer in order to use the PDF output format.
- You must have Microsoft Excel installed on your computer in order to use the Excel output format.

3. Select [Make report].

7.10.4 Clean the Touch Screen of the X-Link

Clean

1. Select:

- [^]
- [<]



-
2. Clean the X-Link touch screen with a soft lint-free cloth made moist with warm water.
3. Press one of the three black buttons on the X-Link below the touch screen to enable the touch screen.



8. TEST AND ADJUSTMENT

This chapter contains the preventive test and adjustment procedures for the ASTRONAUT A3 Milking Robot. The procedures are based on the maintenance schedule (farmer) as shown in the chapter Maintenance.

8.1 Covers and Doors

There are no test and adjustment procedures for the covers and doors.

8.2 Box

There are no test and adjustment procedures for the box.



8.3 Feeding System

8.3.1 Measure the Weight of the Feed Portion

Preparation



Block the cow traffic to the milking robot before you do this procedure.

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Select:
 - Tab [**Test**]
 - [**Box**]
 - [**Gates**].
3. In the field *Gates, Exit gate*, select [**Open**].
4. Go into the box via the exit gate.
5. Empty the feed bin.
6. Go out of the box via the exit gate.

Measure the Feed Portion

The steps in this sub-section must be done for all installed feeding valves.

1. Select:
 - Tab [**Test**]
 - [**Feeding**].
2. Select [**Valve feeding 1**].
3. Wait until the feed unit is finished and select [**Valve feeding 1**] again.
4. Do the previous step eight times, so the total of portions given is 10.
5. Put a bucket on the scales.
6. Reset the scales to zero.
7. Remove the bucket.
8. Go into the box via the exit gate.
9. Put the feed from the feed bin in the bucket.
10. Go out of the box via the exit gate.
11. Put the bucket with the feed on the scales.
12. Make a note of the weight.
13. Empty the bucket.



Adjust the Feed Portion

The steps in this sub-section must be done for all installed feeding valves.

1. Divide all the values made a note of by 10.
2. Select:
 - Tab [**Settings**]
 - [Advanced settings]
 - [Feeding system].
3. Compare your values with the value in the corresponding field.
4. If a value is not the same, select the field for the applicable feeding valve.
5. Type the value you made a note of in the field and select [**OK**].

Close Up

1. Select:
 - Tab [**Test**]
 - [Box]
 - [Gates].
2. In the field *Gates, Exit gate*, select [**Close**].
3. Unblock the cow traffic.
4. Put the milking robot in operation with the X-link (page 6-2).



8.4 Robot Arm System

8.4.1 Shorten the Cup Cords

Preparation

1. Take the milking robot out of operation with the X-link (page 6-4).
2. Move the robot arm to the service position (page 6-5).
3. Remove the between cover (page 7-8).
4. Remove the mothership cover (page 7-10).

Shorten

1. Select:
 - Tab [**Test**]
 - [Mothership]
 - [Cups].
2. In the field *Tilt cups*, select:
 - *LF* [**Straight**]
 - *LR* [**Straight**]
 - *RF* [**Straight**]
 - *RR* [**Straight**].
3. In the field *Tilt cups*, select:
 - *LF* [**Loose**]
 - *LR* [**Loose**]
 - *RF* [**Loose**]
 - *RR* [**Loose**].
4. Untie the knot (fig. 1/1) of the cup cord at the mothership side.
5. Remove the two Allen screws and centering piece (fig. 2/4) from the milk collector (1).
6. Pull the cup cord until the damaged part of the cup cord is approximately 20 cm [8 in] away from the cup holder.
7. If there is not enough cord left at the mothership side, replace the cup cord (page 7-21).
8. Cut off the damaged part of the cup cord.
9. Make sure the cup cord is through the centering piece (4) and the washer (3).
10. Tie a knot (2) in the cup cord.
11. Install the centering piece on the milk collector with the two Allen screws.
12. In the field *Cord cups*, select [**Fixed**] for the applicable teat cup.
13. Make sure the cup cord (fig. 3/3) is put through the washer (2).
14. Pull the cup cord on the mothership side. Make sure the teat cup is firmly in the tilt cup.
15. Use a ballpoint pen to mark (1) the cup cord where it goes into the mothership.
16. In the field *Cord cups*, select [**Loose**] for the applicable teat cup.



17. Tie a slip knot (fig. 4/1) in the cup cord just behind the mark (3).
18. In the field *Cord cups*, select **[Fixed]** for the applicable teat cup.
19. Make sure the teat cup is firmly in the tilt cup.
20. Put the cup cord(s) into the mothership (2).

Close-up

1. Install the mothership cover (page 7-11).
2. Remove the between cover (page 7-8).
3. Move the robot arm to the home position (page 6-5).
4. Put the milking robot in operation with the X-link (page 6-2).

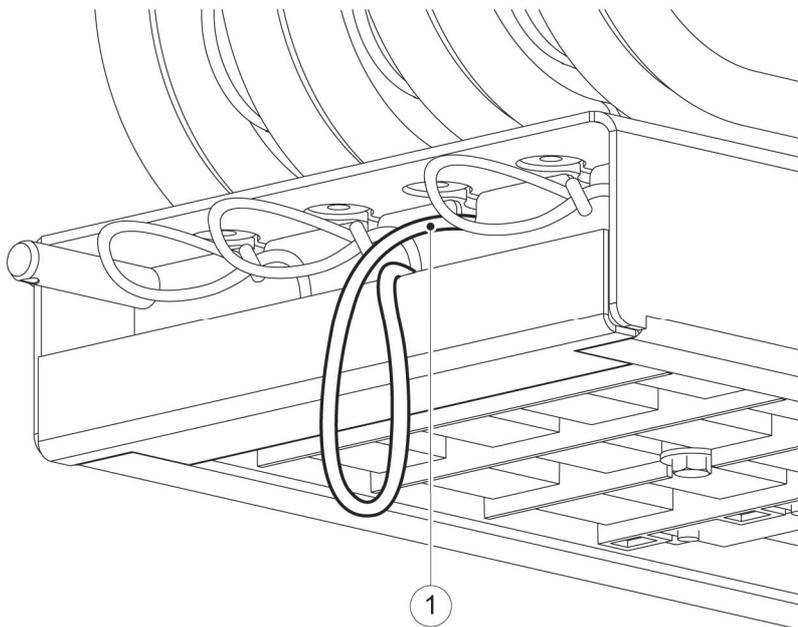


Figure 1: Untie the cord



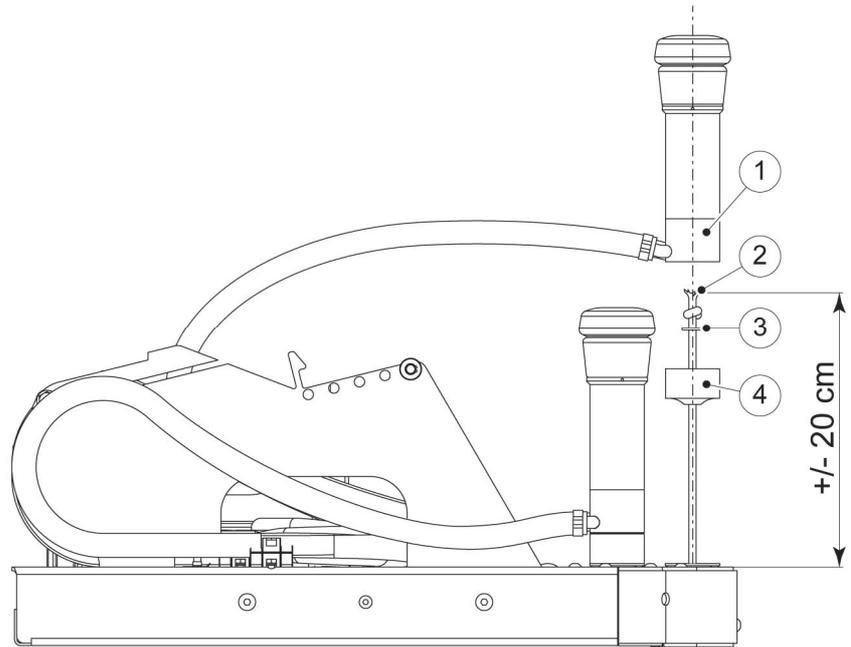


Figure 2: Measure the cord length

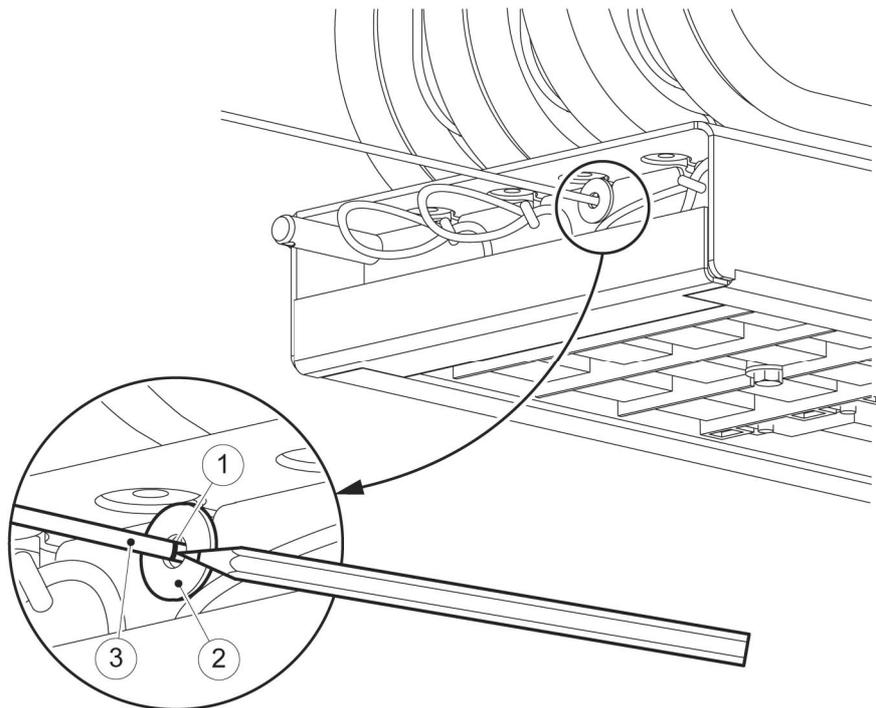


Figure 3: Mark the cord

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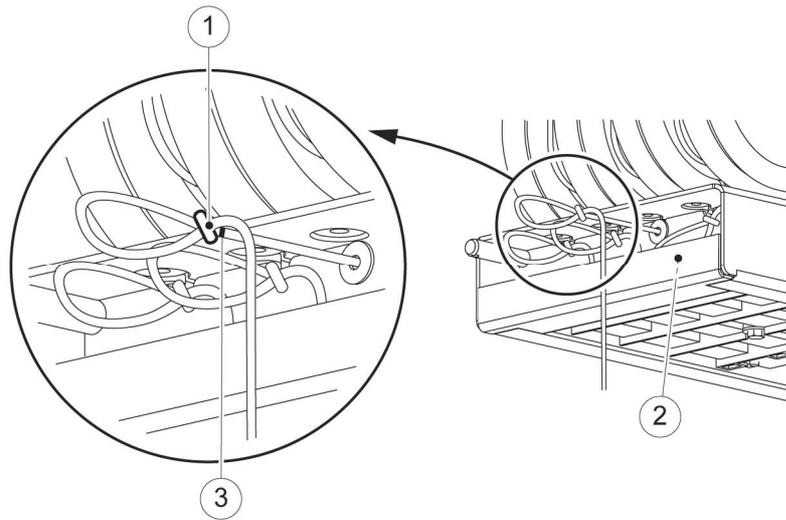


Figure 4: Tie the cord just behind the mark



8.5 Milking System

There are no test and adjustment procedures for the milking system.



8.6 Milk Transport System

8.6.1 Adjust the Milk Separation Settings for Calving Cows

Adjust

In the T4C software:

1. Select the survey tab Farm.
2. Select the applicable cow from the list.
3. Select:
 - Modules tab Calendar
 - Work sheet tab Overview.
4. In the field Expected action, select Calve.
5. Click Execute.
6. When the form appears, type all necessary data in the form.
7. Click Submit.

 **CAUTION**

Before you continue, T4C must have confirmed a successful communication with the milking robot.

Note:

The window will close automatically after 10 seconds if the communication with the milking robot is successful.

8. Click Close.



8.6.2 Adjust the Milk Separation Settings for Sick Cows

WARNING

Always adjust the separation settings in the T4C software before the applicable cow receives the medication that makes separation necessary.

Adjust

In the T4C software:

1. Select the survey tab Farm.
2. Select the applicable cow from the list.
3. Select:
 - Modules tab Health
 - Work sheet tab Disease.
4. In the field Add plan/treatment, select Diagnose.
5. Click Add.
6. When the form appears, type all necessary data in the form.
7. Click Submit.
8. When the form appears, type all necessary data in the form.
9. Click Submit.

CAUTION

Before you continue, T4C must have confirmed a successful communication with the milking robot.

Note:

The window will close automatically after 10 seconds if the communication with the milking robot is successful.

10. Click Close.



8.6.3 Adjust the Milk Separation Manually

Adjust

In the T4C software:

1. Select the tab Farm.
2. Select the applicable cow from the list.
3. Select:
 - Module tab Milking
 - Work sheet tab Separation.
4. Click New.
5. When the form appears, type all necessary data in the form.
6. Click Submit.

 **CAUTION**

Before you continue, T4C must have confirmed a successful communication with the milking robot.

Note:

The window will close automatically after 10 seconds if the communication with the milking robot is successful.

7. Click Close.



8.7 Cleaning Systems

8.7.1 Test the Spray Beam of the Teat Disinfection Nozzle

Test

1. Select:
 - Tab [**Test**]
 - [Mothership]
 - [Other]
 - *Disinfection nozzle* [**On**].
2. Make sure the spray beam (fig. 2/1) is cone-shaped and provides a full spray pattern.
3. Select *Disinfection nozzle* [**Off**].
4. If necessary, clean the teat disinfection nozzle or replace the teat disinfection nozzle.

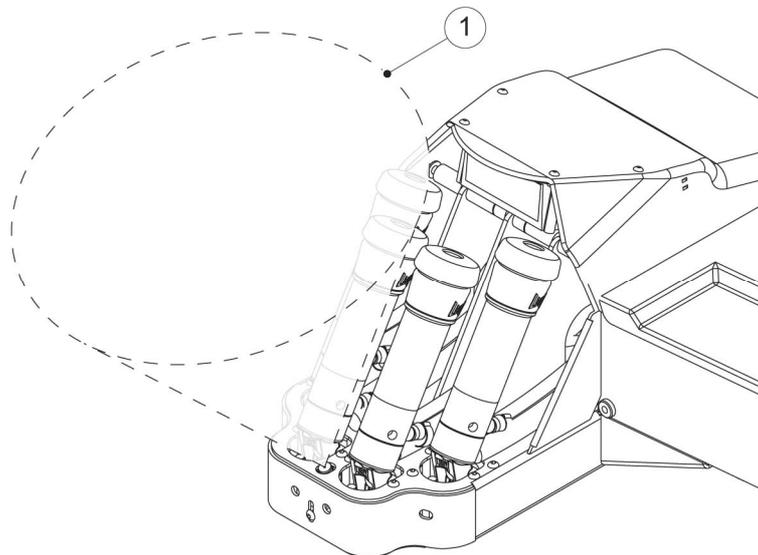


Figure 1: Test the spray beam

8.7.2 Test the Spray Beam of the Disinfection Nozzle for the Cleaning Brushes

Test

1. Select:
 - Tab [**Test**]
 - [Cleaning]
 - [Pre treatment].
2. In the field *Brush cleaning*, select [**On**].
3. Make sure the spray beam is cone-shaped, provides a full spray pattern and fully cover the cleaning brushes.
4. In the field *Brush cleaning* select [**Off**].
5. If necessary, clean the teat disinfection nozzle or replace the teat disinfection nozzle.



8.7.3 Measure the Concentration of Astri-L

Measure

1. Select:
 - Tab [**Test**]
 - [Cleaning]
 - [Pre treatment].
2. In the field *Brush cleaning*, select [**On**].
3. Put a large cup below the roller rinse sprayer and collect almost half a cup of Astri-L water.
4. Add the same quantity of clean water to the cup.
5. Put a Merck hydrogen peroxide test strip in the mixture in the cup.
6. Remove the test strip from the cup and shake the test strip to remove excessive fluid.
7. Wait approximately 30 seconds then compare the color of the test strip with the color scale on the container of the Merck hydrogen peroxide.
8. If the color value is less than 600 or more than 800, contact your local service organization.



8.7.4 Measure the Temperature of the Hot Cleaning Water

Special Tools

- Min/max thermometer (fig. 1/1)

Measure

1. Install a min/max thermometer (1) immediately after the end of the milk pipe line (3) and with the measure part in the water stream (2).
2. Do a hot cleaning of the system.
3. Make sure the temperature of the cleaning water is not less than 77 °C (170 °F) for a minimum of 2 minutes during the hot cleaning.
4. When the hot cleaning is complete, remove the thermometer (1) from the milk line (2).

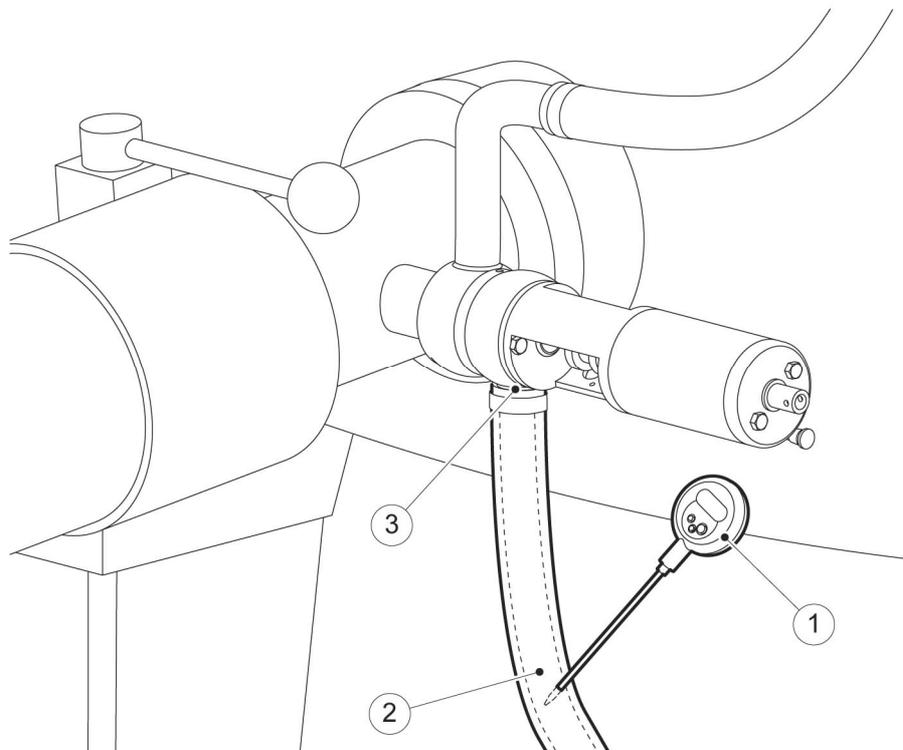


Figure 1: Install the min/max thermometer



8.7.5 Adjust the ACID:HYPO ratio

Adjust

1. On the CRS+, select Main Menu > Settings > Cleaning system settings > Main cleaning > Ratio Acid:Hypo.
2. Use the **arrow up** and **arrow down** buttons to adjust the value.
3. Press **[Enter]**.

8.7.6 Adjust the Quantity of Pre-treatments

Adjust

1. Refer to the T4C manual for the procedure to adjust the quantity of pre-treatments.



8.8 Support Systems

8.8.1 Test the Save-Life Switch

Preparation

1. On the CRS+, make sure a main cleaning is not being prepared.
2. If a main cleaning is being prepared, wait until the main cleaning is complete before you continue this procedure.
3. Take the milking robot out of operation with the X-link (page 6-4).
4. Open the multiple function box (page 7-7).

Test

1. Make sure the back-up batteries in the multiple function box are correctly connected.
2. Press the test-button (fig. 1/1) of the save-life switch (2).
3. If the save-life switch does not operate immediately (the switch goes to the down position (fig. 2/1)), replace the save-life switch.
4. Set the save-life switch (2) to the up position.

Close-up

1. Close the multiple function box (page 7-7).
2. If necessary, start the milking robot (page 6-2).
3. Put the milking robot in operation with the X-link (page 6-2).

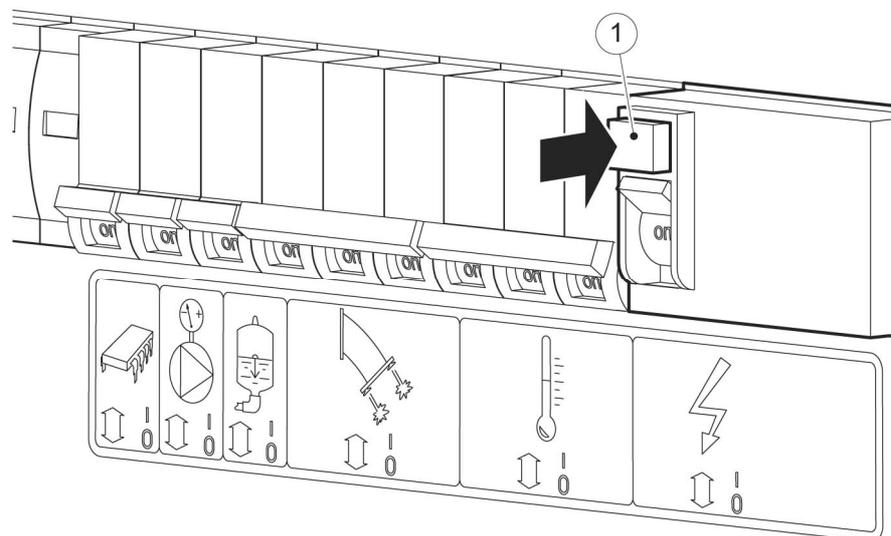


Figure 1: Push the test button



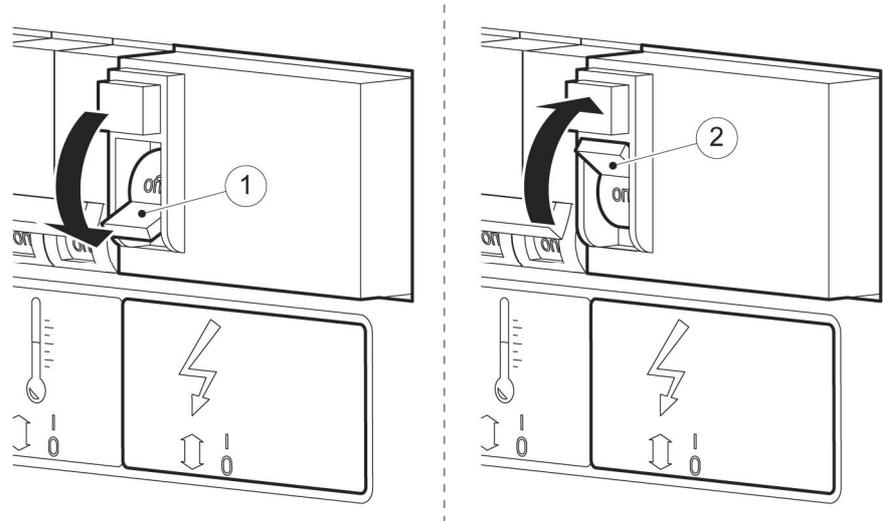


Figure 2: Reset the save-life switch



8.8.2 Test the Earthing

Test

Note:

You must obey local rules and standards. For certain countries a yearly report of the electrical installation and the earthing must be made.

- An authorized electrician must test the earthing of the electrical installation of the barn (the milking robot included) and supply an official report that is given to the Lely service provider.
- Earthing of the milking robot(s) must comply with current earthing regulations for barns.
- The earthing of the milking robot must be installed according to the ASTRONAUT A3 Milking Robot Building Specifications Manual.
 - The two earth wires for each robot are to be connected to the earth point.
 - The feeding fence, gates and milk delivery lines must also be connected to the earth point (to balance potential).



8.9 Control Systems

There are no test and adjustment procedures for the control systems in this manual.



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