GEA DairyRobot R9500 Start-up Guidebook

The path to success

engineering for a better world

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CONGRATULATIONS ON YOUR NEXT STEP IN FUTURE FARMING

Enjoy your new level of flexibility in a modern working environment – get ready for high-tech milking with your own DairyRobot R9500!

Your path to success with DairyRobot R9500

Welcome to the future of milking, welcome to your new freedom. GEA's DairyRobot R9500 allows you to be more flexible in scheduling your day. In fact, your farm is now producing milk 24 hours a day, 7 days a week, without you having to do the physical milking.

By preparing yourself, your staff and your operation years, months, and weeks prior to start-up, you can easily convert your conventional milking herd to a herd that is milked automatically.

Not all dairy farmers who install automated milking systems are fully prepared for the commitment, labor requirements, differing management practices and overall lifestyle changes. The more informed and organized you are for the transition, the better things will go during start-up.

Use this booklet as a reference guide and the manual for specific information to be best prepared. You can contact as well your local GEA dealer or visit our GEA website for more details.

Years prior to start-up

HERD PREPARATION

Prepare your herd by opting for certain conformation characteristics

Udder characteristics, the feet and leg conformation as well as the size of the cows are extremely important factors for successful automated milking. It is crucial to be aware of the parameters for these conformation characteristics and make decisions on what you feel is the best policy. Some dairy farmers begin implementing breeding strategies to correct certain physical conformation characteristics while others opt to cull non-conforming cows and start with new cows that carry the optimum udder and teat profile.

Feet and leg confirmation

In terms of feet and leg conformation, breed your cows to have offspring with feet that are set squarely beneath them. The teat cups in the robot may not attach perfectly if cows have legs that are "hocked-in". If the teats are set further towards the rear of the udder and the legs are "hocked-in", the DairyRobot R9500 may struggle to fit the teat cup between the cows' legs to attach to the correct teat.

Cow size

Consider the size of your cows. Some dairy farmers may opt to reduce the size of their cows while others may opt to breed for bigger cows. Whatever you prefer, ensure that you build your facility, barn and free stalls to suit your current and future needs. Incorrect stall dimensions can adversely affect the cows' comfort and reduce lying time, which can spiral into lameness issues, decreased feed intake and lower production.

PREPARING YOUR HERD

...to be milked by the DairyRobot R9500 system can be beneficial years before installation. Set up an appointment with your dealer for udder assessment and teat measuring to form the basis for proper attachment performance.

Udder characteristics

Rear teats too close together or low udders too close to the ground can cause struggles during attachment. Hence, there are certain udder characteristics you should try to avoid:

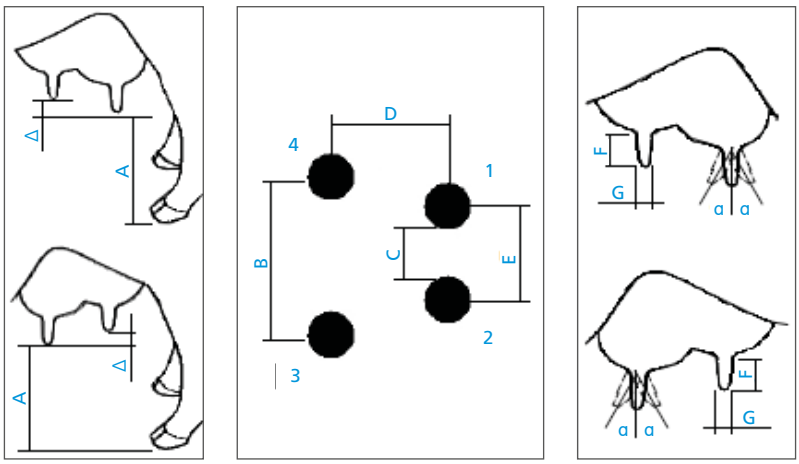
- reverse tilted udders
- teats that are too short
- teats that are set too close together

Instead, breed your cows to have:

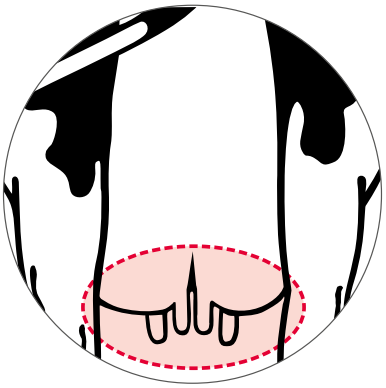
- teats that are set squarely beneath the udder
- udders that are well attached and well-presented
- level udder base
- strong median suspensory ligaments (MSL) to ensure that udders do not fall below the hocks too early in the cows' lifespan

However, be aware that there can be a fine line between a strong MSL indicative of teats positioned too closely together and a weak MSL that will not hold up as well over several lactations.

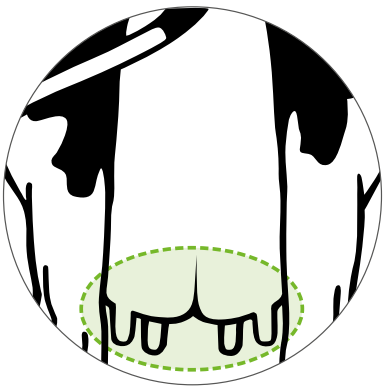
How an optimal udder should look like:



Distance (mm)		min.	max.
A	Ground to teat tip	340	800
B	Front teats	130	340
C	Rear teats (distance between them)	5	235
D	Front-rear teats	60	215
E	Rear teats	60	290
F	Teat length	20	95
G	Teat diameteer	10	44
α	Teat angle (all directions)	-	40°
Δ	Difference in elevation	-	50



Rear teats that are set too close together can be difficult.



Teats set squarely beneath the udder are ideal for automated milking systems.

FINANCIAL ISSUES TO CONSIDER

Include labor costs in your cash flow

Consider additional labor in the first couple weeks of start-up to support during the most stressful points of start-up. Plan for costs of hiring personnel to cover night shifts. Allowing for extra labor in general and particularly at night will give you (as the owner) the opportunity to sleep and so you are available and motivated during the day. However, be aware that the system is in operation 24/7. That means that you might get a call in the middle of the night if something unexpected happens.

Thoroughly review maintenance and warranty agreements

Some dairy farmers are unaware of the maintenance costs of these machines each year. Be sure to discuss this with your dealer so that you are better informed and prepared. You need to know in detail what is covered, what is not covered and even what could possibly void warranty. These are crucial issues that need to be discussed openly to avoid subsequent disagreements with your dealer about conditions that have not been agreed on previously. Always keep in mind that a good relationship with your dealer and technician will be a very important factor moving forward.

RATHER PROACTIVE THAN REACTIVE

Understand your maintenance obligations. A few minutes invested each day will save down time and money.

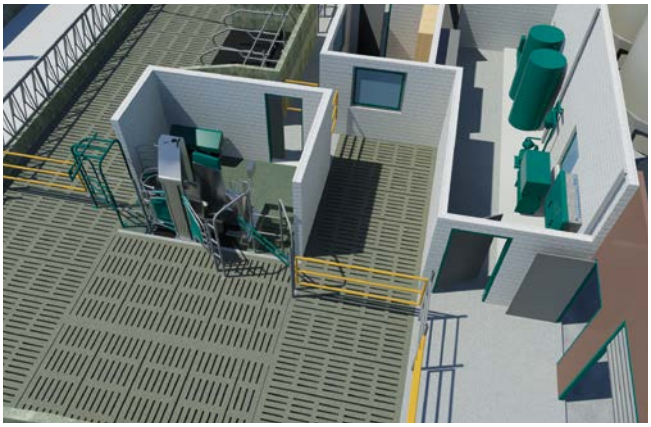
BARN DESIGN

Visit other farms and farmers to obtain advice and ideas

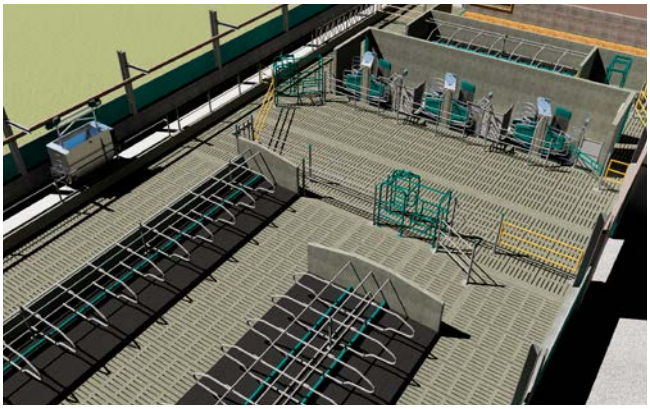
We strongly recommend to visit farms already using automated milking technology so you can build your barn according to your herd and your management style. Ask these dairy farmers for hints and opinions on how to successfully build and manage a barn with a milking robot. Every barn is different and all farmers manage their barn differently. Therefore, be sure to visit multiple farms, not just one or two. Get a broad range of ideas and opinions, thus you will quickly pick up on things you like about certain barn designs and things you do not like. Bring together all your preferred ideas to realize your own concept.

Build your barn with the cow in mind

The barn is going to be the place where your cows will spend nearly all their time. Cows that are comfortable and healthy will produce more milk for you. Therefore, be sure to think about what is best for your cows and yourself when designing the barn. Thanks to a well-organized barn, you will have fewer cows that need to be fetched for milking, less mastitis cases and fewer cow health issues.

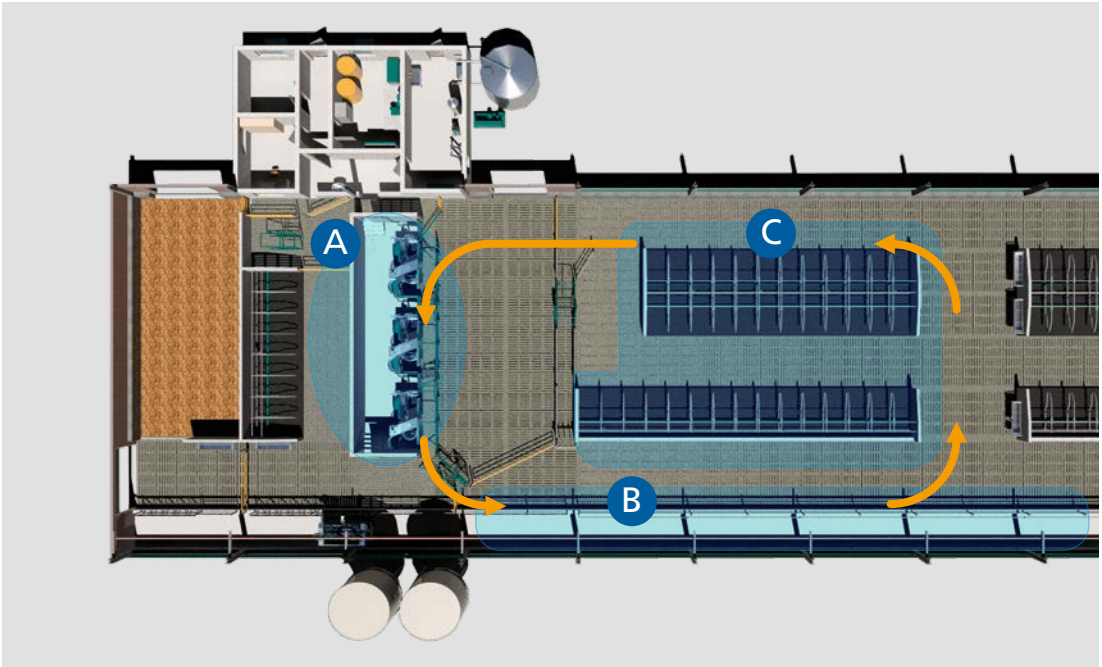


Single box configuration with selection after milking.



Multibox configuration with Guided Exit.

A - Milking
B - Feeding
C - Resting

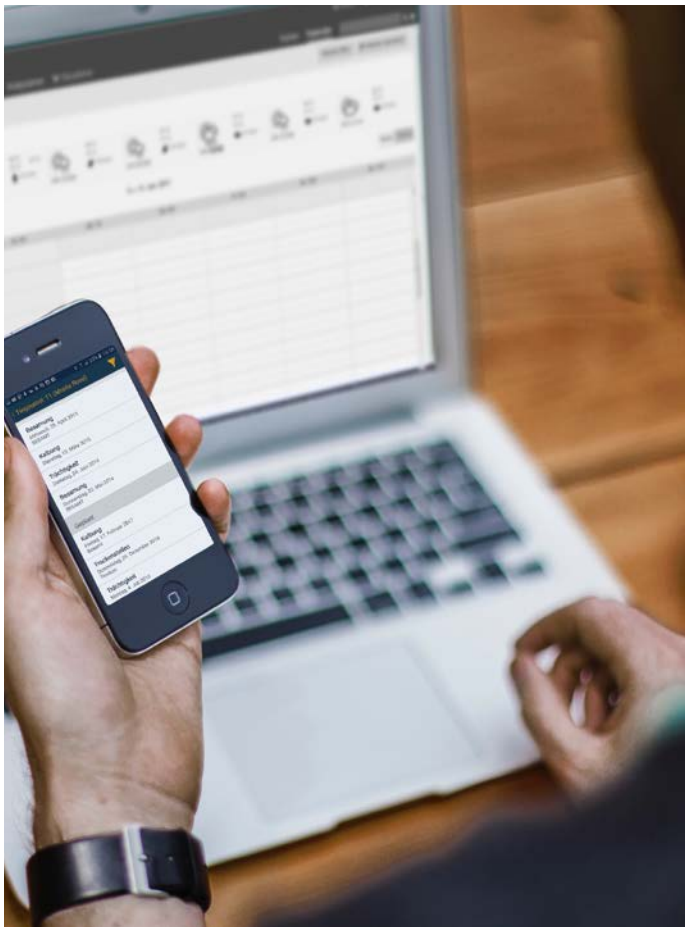


Multibox configuration with Guided Exit.

CHOOSE YOUR BARN WISELY

Care for cow comfort and choose a cow flow system that fits your management style and your goals.

Three months prior to start-up



COW DATA INPUT

Input data into your GEA herd management software

If you have previously used GEA herd management (HM) software, make sure to have all your information transferred and start using your new computer. If not, now is the time to start using GEA HM software. Get this task done early as it may be time consuming. If all data is already in the system, all you will need to do on the day of start-up is assist your cows through the robot and make small adjustments if needed, as some data might not have been inputted or transferred correctly.

We strongly recommend to use GEA HM software as your sole herd management software to avoid any miscommunication to or from third party software systems or a lack of information in your GEA HM software. For example, if someone enters a treatment into the other herd management program, the treament will not be sent to the GEA HM software, so the treated cow will be milked into the good milk line unless you manually mark the cow as treated in the GEA HM software.

We also recommend to enter all cow data (birth dates, calving dates, inseminations, dry-off dates, calves and any other registration information or other information you would like to include) into GEA HM software. Once a cow enters the milking robot, the system will need to know that the cow has calved and is in lactation.

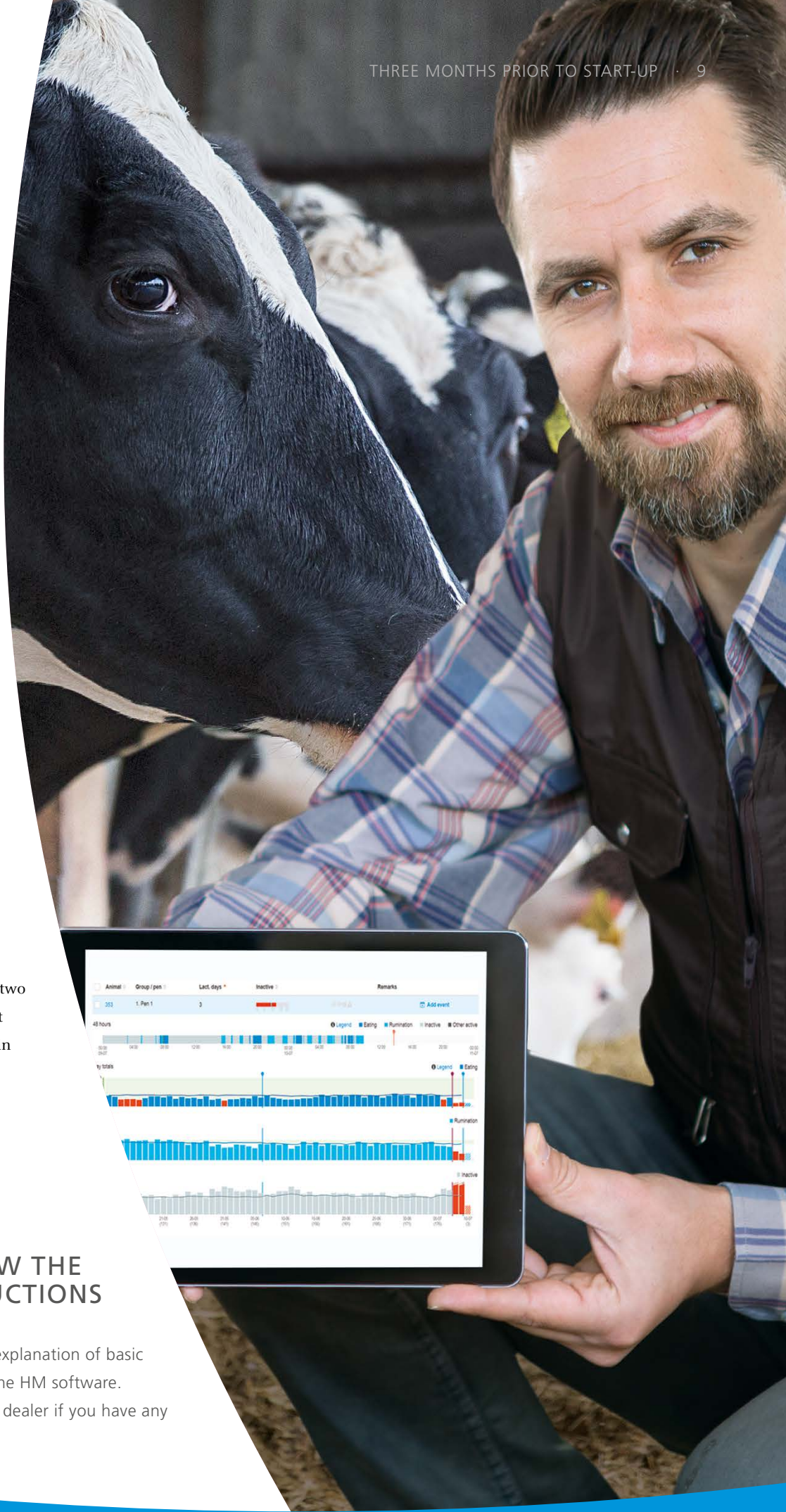
MAKE SURE

...to actively use the start-up checklist as to-do list while planning and preparing for start-up. A copy can be found in the appendix at the back of this booklet.

Enter data into CowScout

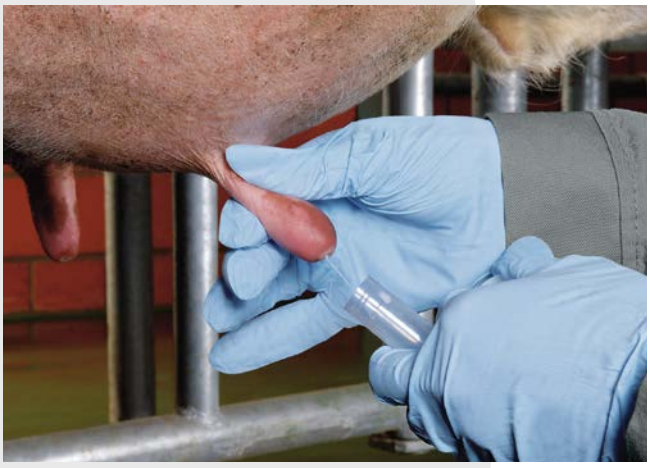
CowScout as a part of GEA HM software is the program used to monitor all cow activity especially for heat detection (plus options like rumination time, eating time, lying time, inactive time, etc). Enter label number correctly to ensure the right data assignment.

It is beneficial to start using your CowScout system as soon as possible, as it will start calculating individual cow averages and establishing norms. It will also give you the opportunity to get used to the system before start-up. At least two weeks before start-up CowScout has to be fully understood and in function.



FOLLOW THE INSTRUCTIONS

Refer to the appendix for an explanation of basic CowScout and How To's for the HM software. Please contact your local GEA dealer if you have any further questions.



PREPARATION OF COWS: COW HEALTH, HOOF CARE AND SCC

Care for cow fitness and pedicure

There are many factors determining whether cows can be milked successfully with DairyRobot R9500. Make sure they are healthy and safe once they have transitioned to automated milking. Do a hoof trimming of all cows at least six weeks before start-up. Cows with sore feet will not enter the robot voluntarily as quickly as cows that do not have foot problems. If you have a new slatted floor, ensure that all sharp edges are deburred.

Make sure your cows are in a good condition and their dry matter intake is not compromised. Changing routines is stressful for cows and farmer. Ensuring that cows are well prepared for the adjustments in habits and processes will aid in a smooth transition.

Check for somatic cell count (SCC) issues

We highly recommend performing a cytobacterial herd check at least six weeks before start-up. Any sick cows should be treated and returned to good health. Compared to healthy cows, sick cows are under stress and they will only be put under increased stress during start-up.

DISCUSS ANY CHANGES IN HEALTH MANAGEMENT WITH YOUR VET

Changing a milking system is challeging. For example, the way you implement herd health checks and footbaths may be different from the method you used before when milking conventionally. A cow also needs a functional hoof trimming at least twice a year.

DETERMINATION OF FEED RATION

Define feed ration changes and the amount of pellets

The only major ration change during start-up should be the switch from a Total Mixed Ration (TMR) to a Partly Mixed Ration (PMR). Any other significant ration changes should be made well ahead of start-up so that they do not hinder your success.

The amount of pelleted feed your cows eat during the first week will depend on how acclimatized they are to the robot. Cows that have never previously entered the robot or have not had the pelleted feed as a consistent part of their diet will not eat much of the pelleted feed when they first enter the robot. Keep things consistent. If cows have entered the robot prior to start-up, keep it simple for the first week until you can be sure your cows are eating the pelleted feed consistently. Daily average milk yields should be also consistent or back to normal levels.

If you would like to have a feeding station in your barn, you need to find a proper position for it. It is not advisable to place the feeding station directly next to the DairyRobot R9500 milking box(es).

DISCUSS FEED RATION CHANGES WITH YOUR NUTRITIONIST AND HERD MANAGEMENT ADVISOR

The ration may need to be adjusted since the amount of pelleted feed the cows are consuming increases throughout the start-up period.

One month prior to start-up

LABOR SCHEDULE AND COW TRAINING

Schedule working shifts

Fill in a labor schedule for the first three weeks after start-up. The schedule should include different shifts defining who will be responsible for which boxes during these shifts. The hours will depend on what you are most comfortable with – it can be 6-8 hour shifts or 12-hour shifts. If you are starting up more than one or two boxes, you will need to have more people involved and be more specific about the role of each person.

Consider a training phase

During the first week, it will take lots of time to guide the cows to the milking system. If your cows are well adjusted to the system and you have the opportunity of implementing a "training period", the amount of time needed to physically guide cows through the robot may be reduced. Several dairy farms have already benefited from implementing a robot training period after the installation is complete. This training phase prior to start-up allows cows to walk through the milking box, be identified and fed. From a practical point of view, you can add 2 kg of concentrate in the box without changing the basic ration. It allows the cows to become accustomed to the automated milking environment before actual milking begins. This will make the transition phase run more smoothly.

DON'T MISS THE CHANCE

Make sure to discuss with your dealer how to fill in the schedule. A sample schedule can be found in the appendix. If you are interested in implementing a training period, please contact your dealer or local herd management advisor.

PREPARATION OF COWS: ID TAGS AND UDDER/TAIL HAIR

Place CowScout tags on your cows

CowScout tags should be placed on all cows prior to start-up. These tags offer an opportunity to place numbers on the side of the neck for ease of identification. Doublecheck all responder numbers in your GEA HM software to ensure they are all entered correctly. Make sure that the tags are fit correctly, however adjustment during lactation may be necessary.

Remove hair from the udder and tail

Excessive hair on udders and tails may be troublesome for cows when they begin milking with DairyRobot R9500. It could also become a hygiene issue. Udders that are shaved or singed will provide for improved attachment efficiency and increased cleanliness. Be sure to complete this simple task before cows enter the milking box to increase your success with automated milking. And don´t forget to do it at least every second month for the whole herd.

INTRODUCTION OF PELLETED FEED

Introduce the pelleted feed in advance

Most dairy farmers choose to introduce the pelleted feed prior to start-up. The cows are familiar to it when they enter the robot for the first time. There are different ways of incorporating pellets into the ration before to start-up:

- including it in the ration itself
- top-dressing the TMR
- adding it to a grain mix for component-fed rations

Have this discussion with your nutritionist and GEA specialist to decide what is best for you and your operation. We advise only using pelleted concentrate in the robot.

STAY CLEAN

Taking care of proper udder hygiene starts inside the barn. Be sure to refer to the recommendations in the appendix.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The week prior to start-up

DATA AND TIME MANAGEMENT

Update cow information in the GEA HM system

Take the time to finish uploading all cow data into your GEA HM software (if you have not already done so). You may not have a lot of time to input data once the DairyRobot R9500 is fully operational.

We recommend taking the time to sit down and finish inputting your data a few weeks in advance of start-up. This data is needed to milk your cows. The software needs to know that your cows have calved and are in lactation. If the system thinks cows are dry or heifers, it will let them go out of the box without being milked. Also, be sure to input any three-quarter cows, properly noting the quarter that is not milked.

Finalize your labor schedule

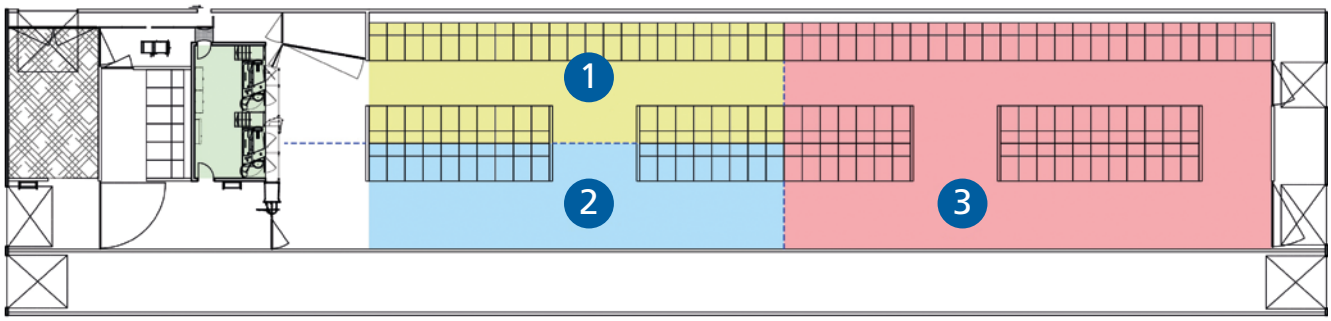
As mentioned before, a labor schedule for the first weeks after start-up is critical. As you are learning to manage the robot during the first week, having enough help pushing cows through will decrease your stress levels. You will have more time to learn how to bring new cows into the robot as well as how to fix any technical specifications or small issues that may arise during this week with your technician.

Furthermore, make sure you schedule time to be away from the barn for sleep and/or other chores. Some dairy farmers find themselves spending 36 straight hours in the barn without realizing it. Prevent yourself from doing so and take enough time to leave the barn occasionally.

OBSERVE YOUR COWS' BEHAVIOUR

Since you have entered data into CowScout in advance, you will receive data about your cows' behaviour from now on.

COW FLOW PREPARATION



Milking groups for start-up phase.

1 - Pre-milking group
2 - Post-milking group
3 - Resting group

Split your herd into groups, set up gates

The cow flow during start-up will differ from how your robots will be managed after the start-up period. You will need gates to help guide cows to the robots. Usually, cows are split into two groups. The flow set-up will change depending on the number of robots per pen and how your barn is set up for cow flow.

Usually two groups work well, with one group being the resting group and the other group split between a pre-milking group and a post-milking group. Cows will be split evenly, with half of the cows in the resting group and the other half in the pre-milking group. As cows begin going through the DairyRobot R9500 to be milked, they move into the post-milking group. Once all cows from the pre-milking group have been successfully milked, they should all be in the post-milking group. Cows in the resting group are then moved into the area of pre-milking and all cows from the post-milking group are then moved to the area of resting.

This process will continue for the first few days until cows begin entering the box without much assistance. The goal is to move all cows through DairyRobot R9500 at least 3 times a day. After the first couple of days, many cows will already go through the robot on their own and only a few cows will need to be guided. Within a few days, more and more cows will enter the robot without assistance and temporary gating can be removed. By the end of the second week, 80% of the cows should be entering the robot voluntarily.

FEED TABLES

Set up your feed tables

Setting up your feed tables correctly during the first week is important. Most often, during the first and second start-up push, cows are automatically given a certain amount of pelleted feed per visit to ensure that they receive some feed but reduce the chance of overfilling the feed bowls. Discuss all feed table settings as well as the allocation of feed with your nutritionist and GEA dealer to ensure that they are set up correctly.

Be alert to the amount of milk your cows are averaging before you turn on feed tables to ensure that you do not limit high-producing cows which have decreased production during the week of start-up but will increase in milk after start-up. Feed in the robot should be increased throughout the first week of start-up until cows are eating a consistent amount and milk averages are stable. Only then should feed tables be enabled.

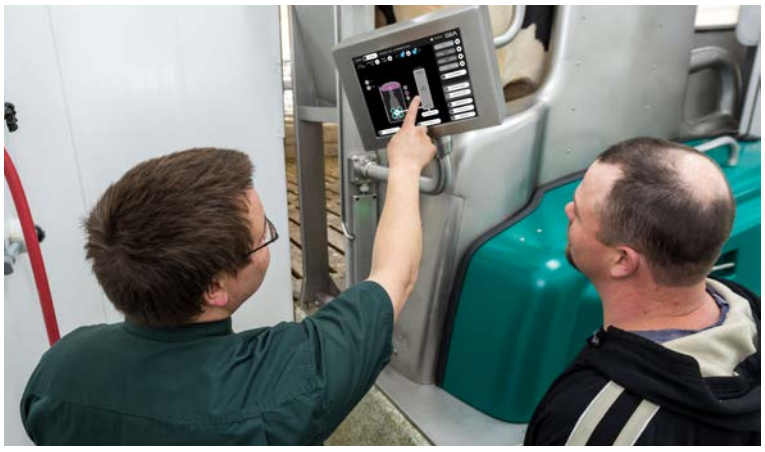
SOFTWARE AND FUNCTIONS

Become familiar with the software and functions

Take the time to learn how DairyRobot R9500 works. Some basic features will be helpful during the week of start-up, for example:

1. MView Features
2. Gate Control Mode
3. Supervised Mode (incl. manual assistance)
4. Service Mode
5. How to Change Milk Filters
6. Restart the Whole System
7. Cleaning Routines

Understanding how these features work before start-up will help you during the start-up process. Check your DairyRobot R9500 operation manual and cooperate with your dealer to understand all DairyRobot R9500 functions.



GET TRAINED AND MAKE FINAL CHECKS

Have a look at the How To's for MView and refer to your DairyRobot R9500 start-up checklist to ensure everything is completed and you are ready for a successful start-up. We usually recommend that the start day is a Monday or Tuesday, with the previous day (Friday or Monday respectively) available to do final checks. This gives you a full week for start-up and the following weekend will be easier to handle when people/employees leave your dairy.

Start-up

REALISTIC GOALS

Let your cows take it step by step

The first week is going to be full of challenges. Some cows may not be comfortable during their first milking experience with a robotic arm moving underneath them where they cannot see it. Some cows might kick at first, but they will become more comfortable the more they enter the robot. Most cows pick up the concept quickly and it will be smooth routine from there. However, cows are going to look tired during the first week of start-up. You are changing their schedules and starting something new. It is important to give cows in the resting group ample water, feed and lying space to ensure that they are well rested for when they enter the pre- and post-milking groups. Whatever the situation, be open minded and aware of the challenges to come.

Plan for a likely dip in production

It is important to set realistic expectations for milk production during the start-up period. Dairy farmers often see variability in production numbers during the start-up period depending on the herd's transition. Sometimes it depends on whether a PMR or TMR is used. This difference is due to part of the ration being fed in the DairyRobot R9500, and only part of the ration being fed at the bunk. Therefore, as mentioned in the former chapter, a nutrition plan that best fits your operation's goals should be a priority before start-up.

KEEP CALM AND FOLLOW YOUR DAILY ROUTINES

Starting up a new technology is exciting and demanding all at the same time. Be patient and kind to your cows when starting up the robots. Complete all daily routines shown in the appendix.

KEEPING IT POSITIVE

Make the cow's first milking experience the best it can be

Cows that have an undesirable experience the first time they are milked in a DairyRobot R9500 will take longer to train and will not enter the robot without assistance as quickly as other cows.

Make sure that everyone who is supporting you on your farm understands basic cow behavior. People making loud noises, moving cows too quickly and slapping cows to move them into the robot will be detrimental to your start-up.

CHECK SYSTEM PERFORMANCE

Milking with DairyRobot R9500 also includes online monitoring for your automated milking system. Get used to FarmView – an overview of all basic functions can be found in the appendix.

COW GUIDANCE

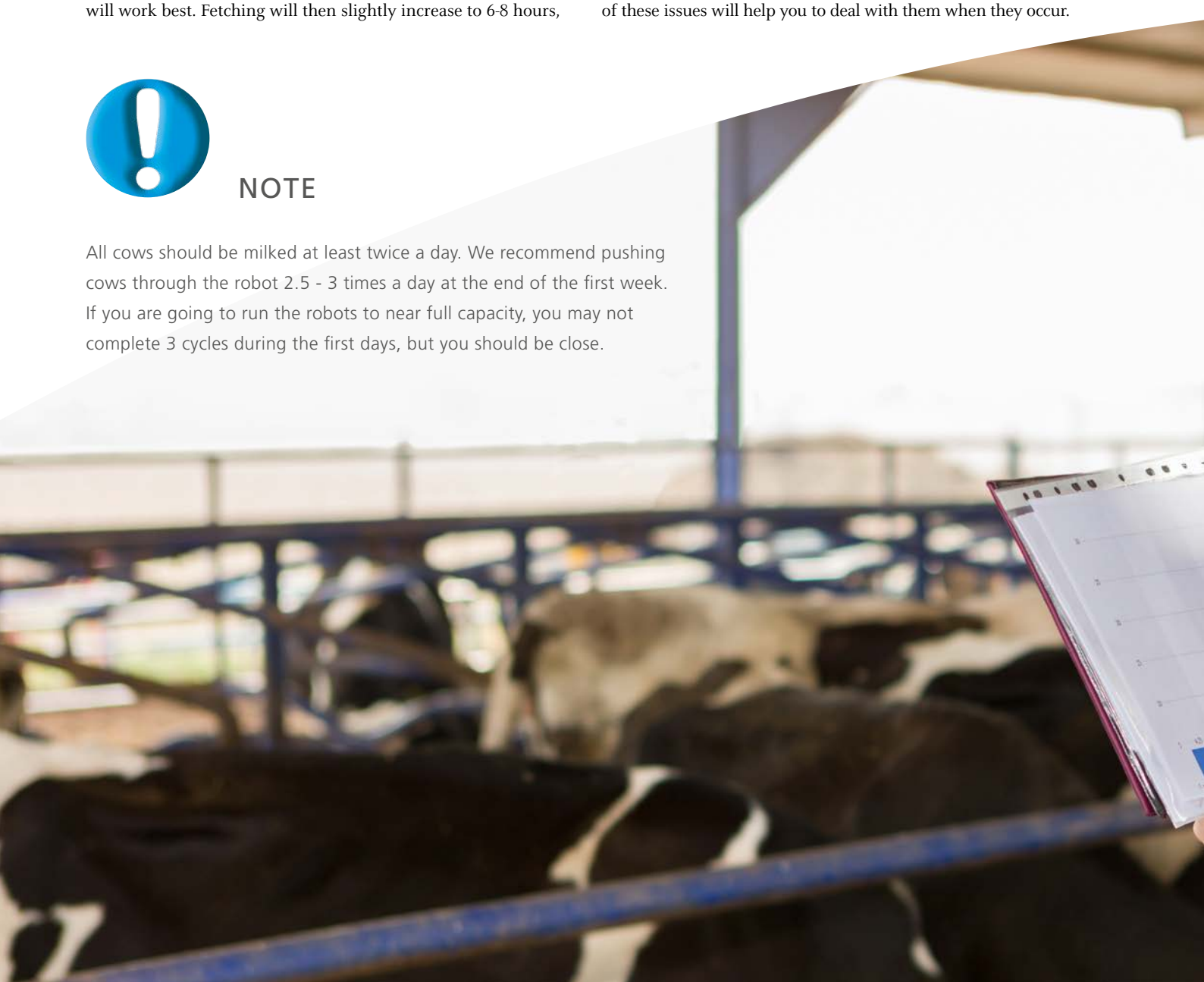
Focus on frequent box visits

The goal during the beginning of the week is that your cows will pass through the robot 2.5- 3 times a day. As the cows become acclimated to the robot, remove the gates and let cows enter voluntarily. However, not all cows will go in and fetching will be required. An acceptable range is to maintain around 2.5 or more milkings per cow per day by the end of the first week. The first couple of weeks will involve fetching several cows to achieve this goal. Even though these first few weeks can be daunting, improvements will be continuous as more and more cows begin entering the robot on their own.

Depending on when gates are removed and manual pushing of cows is over, you will begin fetching only cows that do not enter the robot on their own. During the first week after the gates have been removed, you may find that fetching cows every 3-4 hours will work best. Fetching will then slightly increase to 6-8 hours, and then to a normal routine. Cows that should be fetched in the start-up phase include:

- Cows away from the robot more than 9 - 10 hours
- High yielding and fresh cows

It should be noted that there will still be quite a few fetch cows in the first couple of months. Don't be discouraged. It takes three weeks to form a habit in humans and this is usually a pretty good standard for cows as well. The longer you are in the barn, the easier it will get. Cows will learn to enter on their own and your fetch list will decrease. However, some cows that are later in lactation during start-up may not enter on their own until the next lactation. Some cows that are older and used to an old system of milking may never learn to enter the DairyRobot R9500 on their own and may need to be fetched on a constant basis. Being aware of these issues will help you to deal with them when they occur.



NOTE

All cows should be milked at least twice a day. We recommend pushing cows through the robot 2.5 - 3 times a day at the end of the first week. If you are going to run the robots to near full capacity, you may not complete 3 cycles during the first days, but you should be close.

MEASUREMENTS AND AVERAGE CALCULATIONS

Calculate activity and conductivity readings for individual cows

During the first week, averages are calculated for individual cows concerning activity and conductivity readings. It takes 7 days for production averages and health measurements to be accurate for individual cows.

While milk may drop a little on the first day, it should continue to climb as the first week progresses. Also, during the first week, you will need to check cows with increased conductivity values. Reports monitoring conductivity can be used to find these cows.

LISTEN CAREFULLY TO EXPLANATIONS

...and write important questions down. In the course of the first week, you need to be able to work independently with your DairyRobot R9500 and make sure your cows entering the milking box frequently.

FOR MORE INFORMATION

Transitioning your milking environment to an automated milking system is an exciting yet challenging time and it calls for your full commitment. Rely on your GEA automated milking dealer and your GEA herd management advisor for complete support to ensure a successful DairyRobot R9500 start-up and subsequent milkings for years to come. Don’t hesitate to contact your GEA team with any questions specific to your operation.

The first three weeks after start-up

CONSIDERATION OF DIFFERENCES

Let your cows create their individual schedule

It is important to not train your cows to enter the robot when you enter the barn. They need to enter the robot on their own schedule, not yours. Be ready to let the cows figure it out and go on their own. Occasionally, you may need to let a cow go a little longer and see if she will enter the robot on her own. Depending on the farm, you may decide to keep or sell cows that never enter on their own. Some dairy farmers find it too time consuming to keep fetching these same cows every day and decide to let them go to reduce the overall amount of time fetching and focus on more productive tasks.

Group management during first days

Most often, cows are placed in a 4 times milking group during start-up to ensure they are milked when they are brought to the robot. Keep all cows in that group for the first 14 days (approx.). During the start-up process, getting cow traffic rolling is most important. After this period, put cows more than 80-100 Days in Milk (DIM) in the group according to their milk production. Some cows set in a group to be milked 4 times per day may actually only be milked twice per day during the first few days. Particular attention should be paid to this and the affected cows moved to another group as they may not get their full allocation of feed.

CONSISTENCY AND INCONSISTENCY

Find the perfect balance

Overall, in the first three weeks, ensure that you are not letting cows have too many hours away from the robot. To ensure you do not miss a cow or a cow does not get milked for 24 hours, fetch consistently during the first week. Nevertheless, be cautious. Once the fetch list gets smaller and you get into a routine, do not be so habitual with fetching that cows as they might become used to being fetched.

If you fetch twice a day, spread out your fetching hours and fetch anywhere between 10-12 hours. If you fetch three times a day, fetch every 7-9 hours. After the initial start-up process, you will begin to find cows that only enter when you bring them to the robot. Mixing up the fetching times by an hour or two can sometimes get cows to enter on their own.

With the robot, do not feel pressured to start chores or fetching at certain times. The beauty of these systems is their flexibility. There will always be things that need to stay constant, including feeding times. But sometimes a little inconsistency can be good.

...and now enjoy milking with your DairyRobot R9500!

Start-up checklist

CHECKLIST FOR YOUR DEALER

Three months prior to start-up	
Communicate with GEA regarding start-up plans	☐
Download DairyPlan and CowScout onto the dairy farmer's computer	☐
Measure teat dimensions to find and order the right liner	☐

One month prior to start-up	
Create and communicate start-up plan	☐
Determine where temporary gating will be placed	☐

The week prior to start-up	
Complete test wash/milking before start-up to ensure functions are in order	☐
Finish all construction work	☐
Set up DairyRobot R9500 to begin milking	☐

CHECKLIST FOR YOU AS DAIRY FARMER

Three months prior to start-up		
General	Install office computer with internet and printing capabilities and start using your smartphone actively	☐
Herd management software	Begin to input all cow data into DairyPlan (transfer or enter individually)	☐
	Enter data into CowScout or send data to CowScout from DairyPlan	☐
Cows	Correct any hoof issues and complete necessary trimming	☐
	Do a cytobacterial herd check	☐
Feeding	Determine the feed ration	☐

One month prior to start-up		
General	Create start-up plan and labor schedule	☐
	Set up farm-specific herd management protocols	☐
Herd management software	Enter correct cow numbers into DairyPlan (once CowScout tags are placed on the cows)	☐
	Start using DairyPlan (enter inseminations, calvings etc.)	☐
Cows	Put CowScout tags on all cows	☐
	Remove hair from udder and tail	☐
Feeding	Introduce pelleted feed in agreement with your nutritionist and GEA specialist (month or week before, i.e. top dress TMR)	☐

The week prior to start-up		
General	Finalize labor schedule	☐
	Make sure temporary gating is available and ready	☐
	If applicable, start training period	☐
	Learn/discuss basic functions of DairyRobot 9500	☐
Herd management software	Check correctness of all cow data in DairyPlan (cows set to be milked, groups created, etc.)	☐
Cows	Ensure udder hair has been removed from all cows (clipped or singed)	☐
Feeding	Discuss and set up feed tables with your nutritionist	☐

Labor schedule

EXAMPLE: Two robots in one group

Michael = farmer/operator/owner

WEEK 1 after start-up			
Monday	**Robot No. 1 + 2**		
	6 – 14 h	**14 – 22 h**	**22 – 6 h**
ROBOT	Michael	Michael	Peter
FETCHING COWS	Marc, Ron, David, Jeff	Marc, Ron, David, Jeff	Kevin, Sam, Tim, John
RESERVE	Peter	Peter	Andy

Tuesday	**Robot No. 1 + 2**		
	6 – 14 h	**14 – 22 h**	**22 – 6 h**
ROBOT	Michael	Michael	
FETCHING COWS	Marc, Ron, David, Jeff	Tom, Simon, Greg, John	Kevin, Sam, Tim
RESERVE	Peter	Peter	Andy

Wednesday	**Robot No. 1 + 2**		
	6 – 14 h	**14 – 22 h**	**22 – 6 h**
ROBOT	Michael		
FETCHING COWS	Marc, Ron, David	Tom, Simon, Greg	Kevin, Sam, Tim
RESERVE	Jeff	John	

Thursday	**Robot No. 1 + 2**		
	6 – 14 h	**14 – 22 h**	**22 – 6 h**
ROBOT	Michael		
FETCHING COWS	Marc, Ron, David	Marc, Ron, David	Kevin, Sam, Tim
RESERVE			

Friday	**Robot No. 1 + 2**		
	6 – 14 h	**14 – 22 h**	**22 – 6 h**
ROBOT			
FETCHING COWS	Marc, Ron, David	Tom, Simon, Greg	Kevin, Sam, Tim
RESERVE			

Saturday	**Robot No. 1 + 2**		
	6 – 14 h	**14 – 22 h**	**22 – 6 h**
ROBOT			
FETCHING COWS	Tom, Simon, Greg	Marc, Ron, David	John, Andy, Joe
RESERVE			

Sunday	**Robot No. 1 + 2**		
	6 – 14 h	**14 – 22 h**	**22 – 6 h**
ROBOT			
FETCHING COWS	Marc, Ron	Marc, Ron	John, Andy
RESERVE	David	Greg	Joe

WEEK 2 after start-up			
Monday	**Robot No. 1 + 2**		
	6 – 14 h	**14 – 22 h**	**22 – 6 h**
ROBOT			
FETCHING COWS	Michael, Marc	Marc, David	Kevin, Sam
RESERVE			

Tuesday	**Robot No. 1 + 2**		
	6 – 14 h	**14 – 22 h**	**22 – 6 h**
ROBOT			
FETCHING COWS	Marc, Ron	Marc, David	Kevin, Sam
RESERVE			

Wednesday	**Robot No. 1 + 2**		
	6 – 14 h	**14 – 22 h**	**22 – 6 h**
ROBOT			
FETCHING COWS	Marc, Ron	Tom, Simon	Kevin, Sam
RESERVE			

Thursday	**Robot No. 1 + 2**		
	6 – 14 h	**14 – 22 h**	**22 – 6 h**
ROBOT			
FETCHING COWS	Marc, Ron	Tom, Simon	Tim, Jeff
RESERVE			

Friday	**Robot No. 1 + 2**		
	6 – 14 h	**14 – 22 h**	**22 – 6 h**
ROBOT			
FETCHING COWS	Marc, Ron	Tom, Simon	Tim, Jeff
RESERVE			

Saturday	**Robot No. 1 + 2**		
	6 – 14 h	**14 – 22 h**	**22 – 6 h**
ROBOT			
FETCHING COWS	Greg, David	Tom, Simon	Tim, Jeff
RESERVE			

Sunday	**Robot No. 1 + 2**		
	6 – 14 h	**14 – 22 h**	**22 – 6 h**
ROBOT			
FETCHING COWS	Marc, Ron	Marc, Ron	John, Andy
RESERVE			

Daily routines

MORNING

Herd Management Software

- Check performance if you are keeping up with your goals
- Check performance of the robot to ensure its performing up to standards
- Note overdue cows that exceed 12- 14 hrs
- Check udder health reports and note cows for further investigation
- Check CowScout for activity and health notifications

- Check fresh and problem cows to make sure they are making progress

OVER THE DAY

- Feeding the cows

EVENING

- Same as in the morning

LATE EVENING

Herd Management Software

- Note suspicious cows for the next morning

MORNING

DairyRobot R9500
- Visual check of the robot
- Check the feed trough
- Clean the robot and the equipment
- Clean the camera according to the protocol
- Change milk filter

Barn
- Push up feed
- Maintain proper stall cleanliness
- Clean cubicles, water troughs, cross overs e.g.

- Intensive animal care

OVER THE DAY

- Intensive animal care
- Hoof trimming
- Treatments

Barn
- Push up feed
- Clean cubicles

DairyRobot R9500
- Other maintenance (liner change, greasing e.g.)

EVENING

- Same as in the morning

LATE EVENING

DairyRobot R9500
- Short visual inspection of the robot (prevents downtime in the night)

Assessing udder hygiene

Udder hygiene, and in particular the cleanliness of its teats is a prerequisite to obtain healthy acceptable milk. Moreover, it prophylactically helps to avoid mastitis. To allow a quick assessment of the farm hygiene status, udder hygiene scoring provides a very simple and practical alternative to assess the animal stock (herd).

Score 1
Clean, free from dirt

Score 2
Slightly dirty,
2 - 10 % of surface

Score 3
Moderately dirty,
10 - 30 % of surface

Score 4
Very dirty,
>30 % of surface

AT LEAST 80% OF THE COWS SHOULD HAVE SCORE 1-2

If more than 10% of the herd have a SCORE 4, hygiene measures are urgently required. Cows with SCORE 3 and 4:

- ➜ Have an increased risk of mastitis infection
- ➜ Make the teat cleaning more difficult
- ➜ Reduce the performance of the robot (cup attachment)
- ➜ Have an increased risk of germs in milk

Shortening or removing the udder hair is an important prophylactic and proactive measure

Firstly, adhesion of dirt is less likely and secondly, clean udders with few or no hair remain clean for longer. Shortening can be done by cutting or carefully flame – scarfing. This is particularly important in winter.

So keep in mind clean udders help you to avoid the entry of pathogens and support the performance of your system!

PREVENTION IS BETTER THAN CLEANING: HOUSING AND STALLS/CUBICLES

Cleanliness begins in the barn since heavy soiling of the udder is a consequence of inadequate housing conditions. Thus, it is necessary to check the overall condition in the barncircum and by improving the cleanliness, life for any pathogens is much more difficult.

Of course, cows should be kept as clean and dry as possible. Naturally, this depends on the number and comfort of the stalls/cubicles for each cow. Either way, building a new barn or converting it, the size of the stalls/cubicles must match the size of an average herd member. The correct stalls/cubicles size is the prerequisite for the acceptance of your cows.

The condition and cleanliness of the udders is largely dependent on following factors:

- Type of barn
- Type of stalls/cubicles
- Bedding material
- Number of stalls/cubicles
- Size and dimensions of the stalls/cubicles
- Stall/cubicle comfort
- Daily working routine

Keep heifers on cubicles at an early stage in order to allow easy adaptation to the barn when they become milking cows!

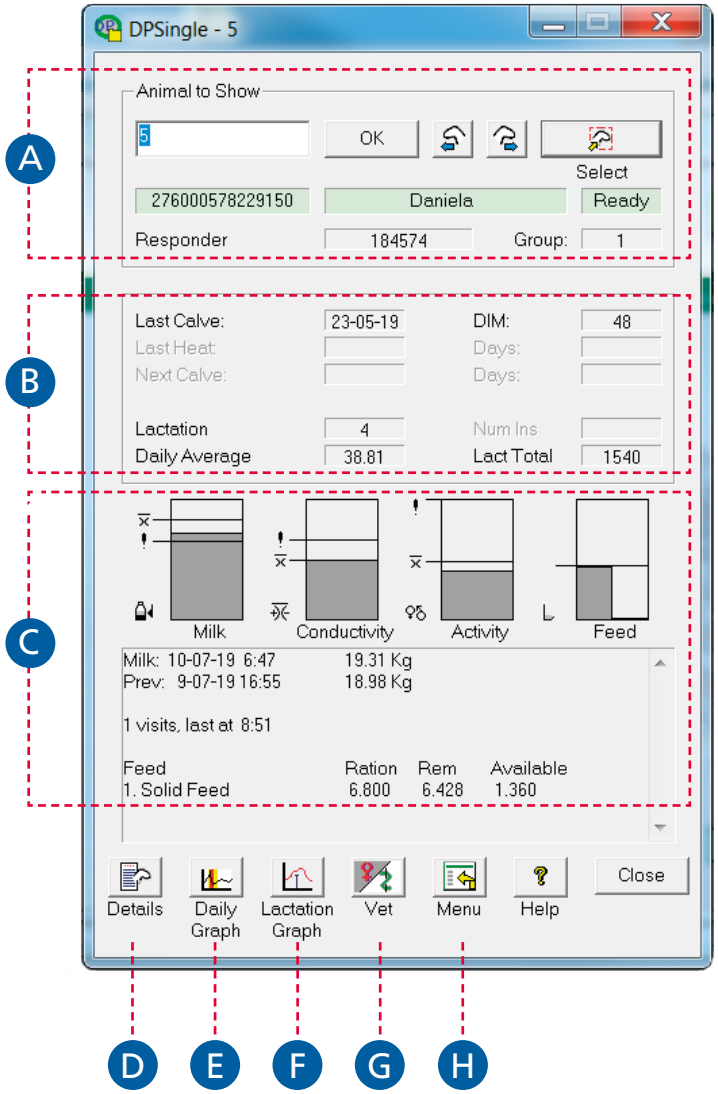
AUTOMATIC TEAT RINSING

...must be set up in a way to insure that the dirtiest teats are clean, after preparation!

"How-To's" for DairyPlan

EXPLANATION OF DPSingle

A - Identification and status
B - Current lactation information
C - Graphs in this area show measurement results:
! → indicates an alarm value and
X → indicates the expected milk value
D - Click on "Details" to view all data available for this animal
E - Click on "Daily graph" to see the activity of the animal
F - Click on "Lactation graph" to pull up graph generator for information on the animal. Graphs included show data on activity, milk and feed
G - Click on "Vet" to enter veterinary actions for the animal
H - Click on "Menu" to return to the main menu



EXPLANATION OF DPVet

Open DPVet to input all veterinary data on the animal (i.e. insemination, pregnancy test, illness, dry-off, etc.).

Enter from Main Menu

Select „Data entry", then select „Insemination". Be sure to enter Animal ID as you are not coming directly from animal's DPSingle.

Enter from DPSingle

Select "Vet", third box from the right on DPSingle page (Refer to explanation of DPSingle, page 32).

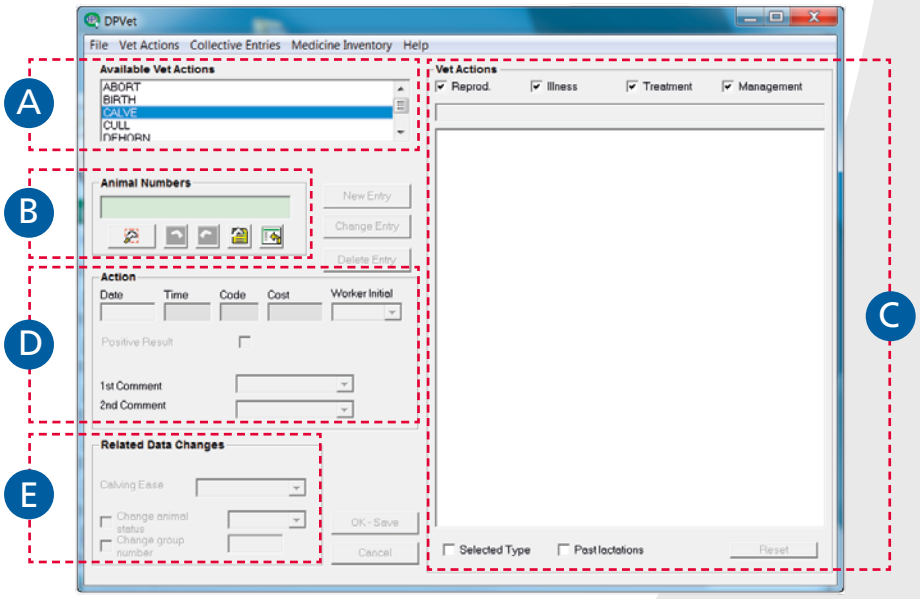
A - Area to select action needed

B - Animal ID field
- → Enter ONE animal: Type animal's ID
- → Enter SEVERAL animals: Enter numbers separated by a comma or space

C - Past and future vet actions

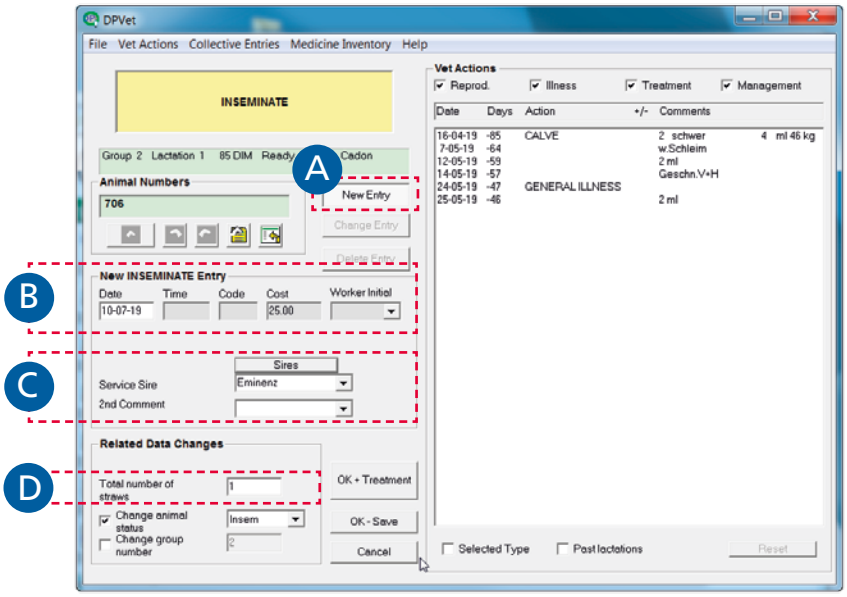
D - Enter information about the action such as date, time, code, worker, service sire, or comments

E - Other changes: Animal status and group number can be changed here



INPUTTING AN INSEMINATION

1. Open DPVet
2. Type in the cow number
   (if not entering from DPSingle)
3. Select the vet action of „INSEMINATE"
4. Select „New Entry" A
5. Input correct date of insemination B
   - person who completed the insemination
     can be input under „Worker Initial"
6. Select Service Sire C
   - a comment can be left such as
   "blood on straw" or "no cervix tone"
   for further information if you desire.
7. Enter number of straws used D
8. Click „OK – Save"
9. Insemination input complete



Note:

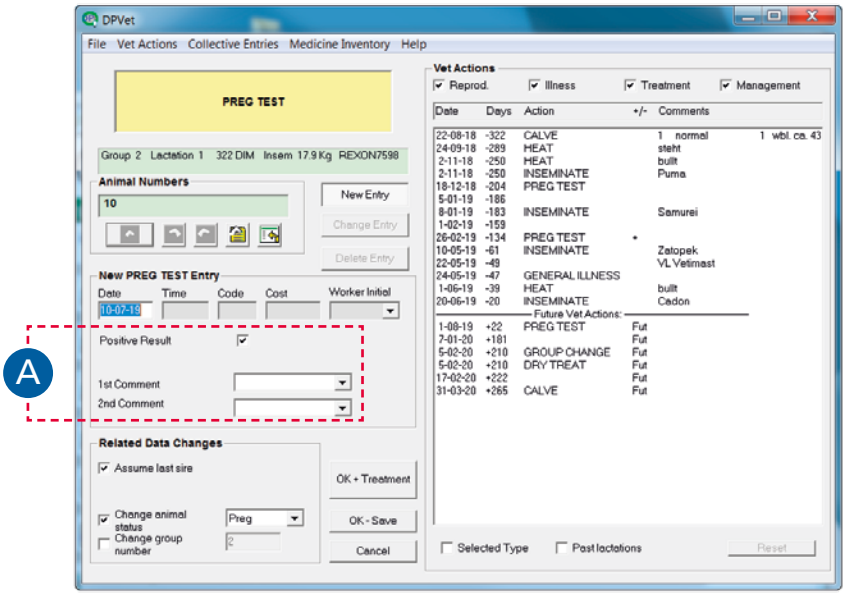
Entering insemination will trigger the following future vet actions: Heat in 21 days, Preg Test in 42 days, Dry Treat 230 days after and an anticipated calving date 280 days later. These specifications can be adjusted if necessary.

INPUTTING PREGNANCY TEST RESULTS

1. Open DPVet
2. Type in the cow number
   (if not entering from DPSingle)
3. Select „PREG TEST"
4. Select „New Entry"
5. Enter the date
6. Enter data depending on the result

Positive result:

7. Insert date of pregnancy confirmation
8. Check box for "Positive Result" A
   - You can leave comments
9. Select „OK – Save"
10. Postive Pregnancy test complete
    - Animal status will change to "Preg".
    This will delete future actions for a
    heat and will keep future actions for
    dry off and calving date.



Negative result:

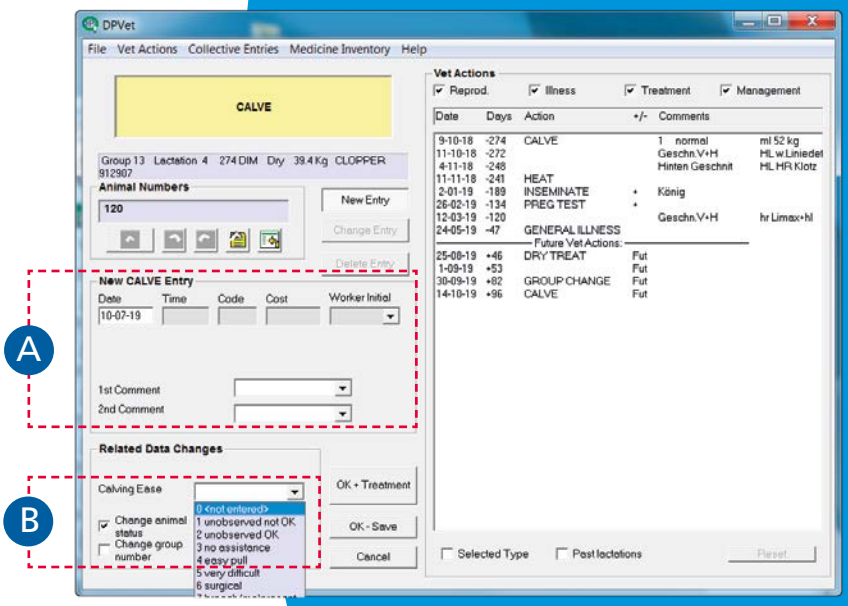
1. Insert date of pregnancy confirmation
2. Un-Check box for "Positive Result" A
   - You can leave comments such as (CL right or F1 left)
3. Select „OK – Save"
4. Negative Pregnancy test complete
   - Animal status will change to "Open". This will delete the future actions for dry off and calving date. It will keep a future action for heat.

Note:

When a pregnancy is confirmed, GEA DairyPlan will automatically assume that the last insemination resulted in a pregnancy. If the cow is not pregnant to the last insemination uncheck the box for assume last sire and then you can enter or select the insemination the cow is pregnant to.

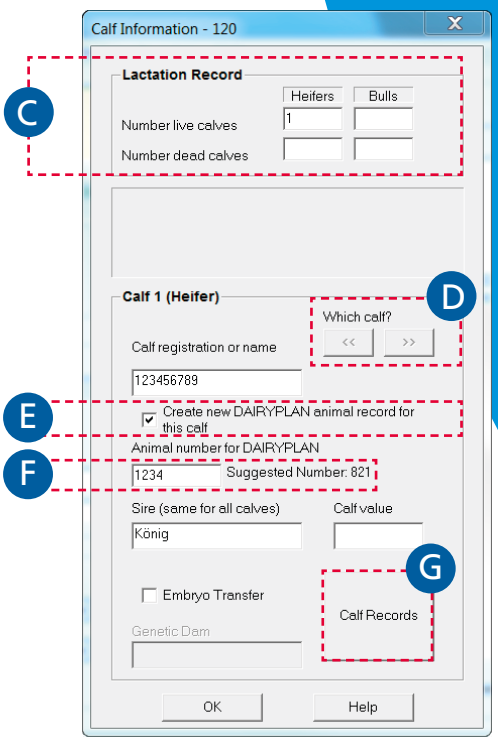
INPUTTING A CALVING

1. Open DPVet
2. Type in the cow number (if not entering from DPSingle)
3. Select „CALVE" and click "New Entry"
4. Enter date of calving A
5. Enter „Calving Ease" information B
6. Click „OK – Save"
7. Continue to calf information entry



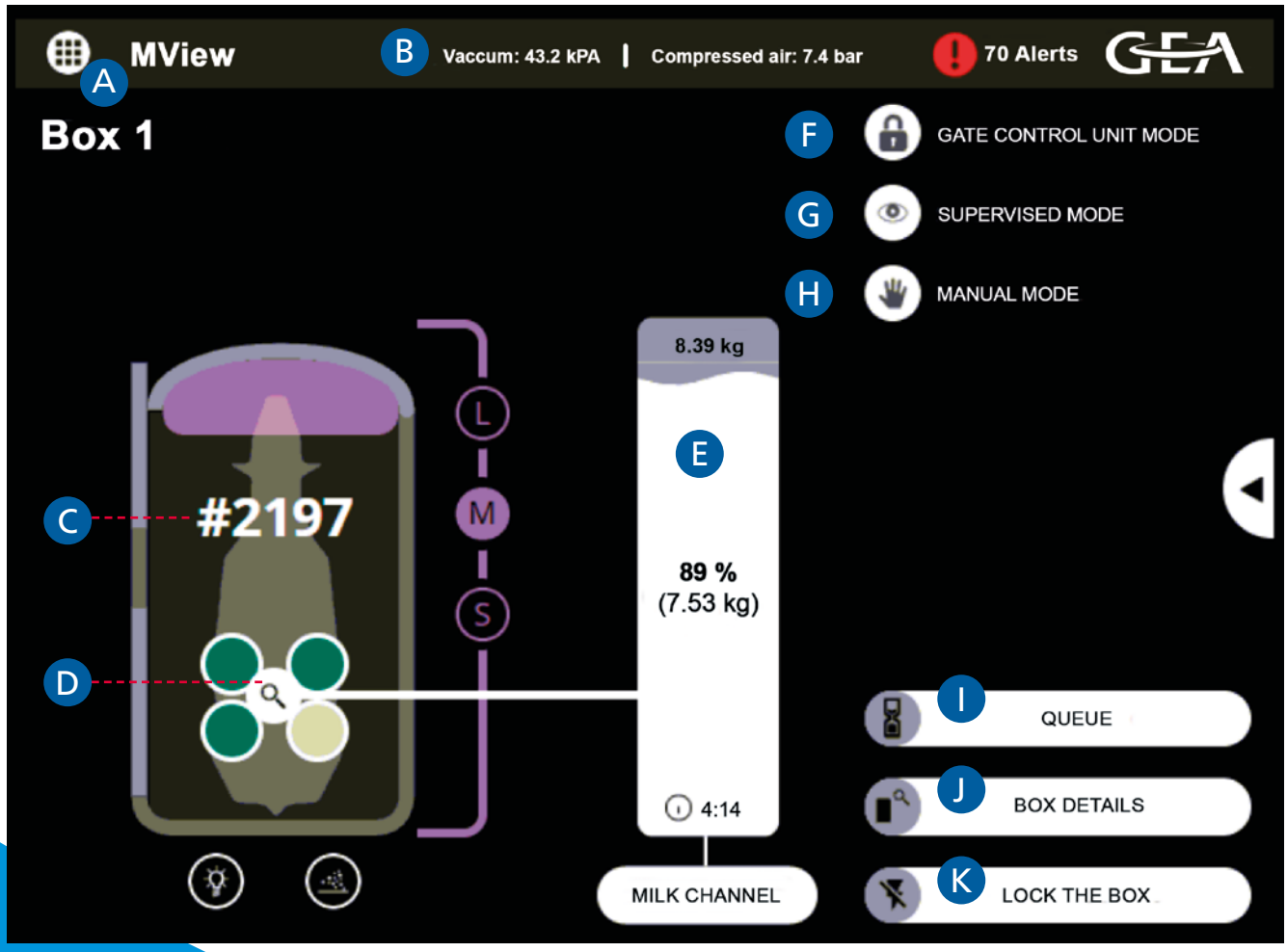
Once an entry has been made, GEA DairyPlan will automatically provide an opportunity to enter any number of calves.

8. Enter the number of calves born C
9. Use the arrows to move to the next calf's records D
10. "Record new calf" allows the animal ID to be entered. Keep this box checked unless calf data is not to be recorded E
11. Enter the animal ID to store calf data in data stock F
12. Selecting "Calf Records" takes you to the DPSingle for the new calf to input additional information if needed G
13. Confirm by clicking „OK"



"How-To's" for MView

EXPLANATION OF THE MILKING BOX VIEW



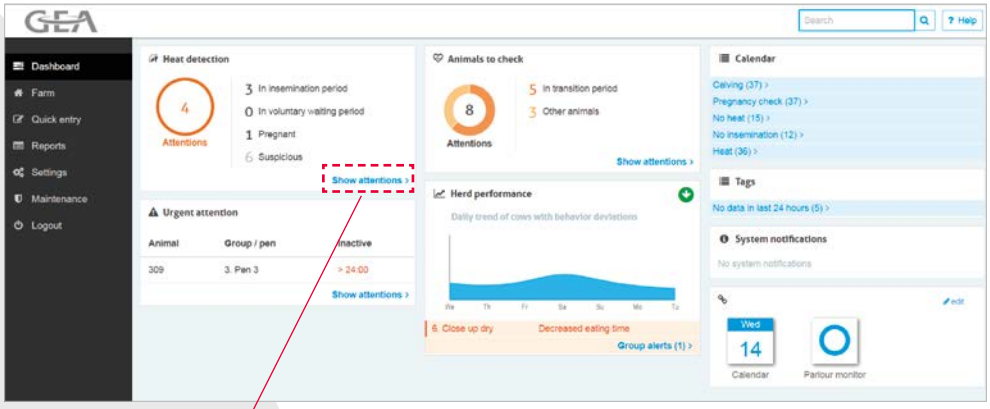
A - Selection of Dashboard (System Overview)
B - Vacuum and compressed Air supply display
C - Display of current milking box and animal number
D - Individual quarter information display – Click to the magnifier and see detailed information about the milk of each quarter
E - Information about the milking process
    a. Top value: Expected milk yield
    b. Middle value: Actual milk yield
    c. Bottom value: Milking duration
F - Switches door control manual mode on/off – Switch on to open and close manual the entrance and exit gates
G - Switches monitor milking on/off – During Supervised Mode every cow has one automatic attachment try. If this fails, you have to attach manually
H - Switches manual mode on/off – During Manual Mode cows can only be attached manually
I - Cows to be milked (Overdue cows)
J - See more information about the milking box
K - Lock a box or unlock a box

Basic functions of CowScout

HEAT MONITORING

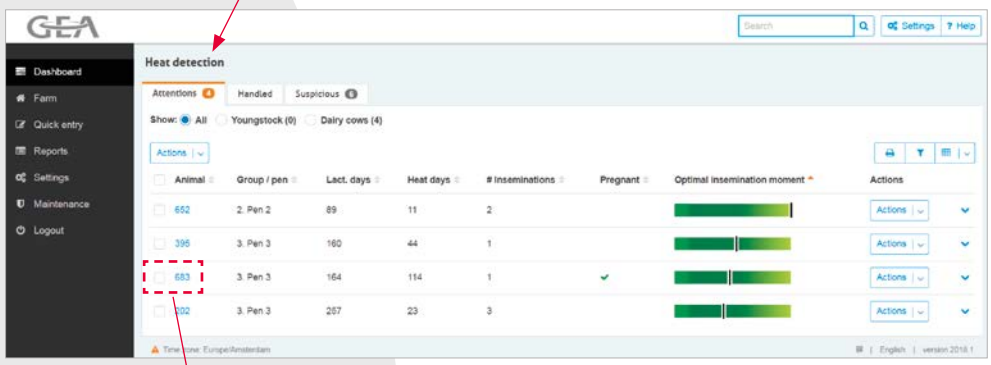
Alarms Notification (two activity alarm levels):

- Heat Detection Attention
  → At least 3 consecutive 2-hour intervals indicating increased activity
- Heat Suspicious
  → 2 consecutive 2-hour intervals indicating increased activity



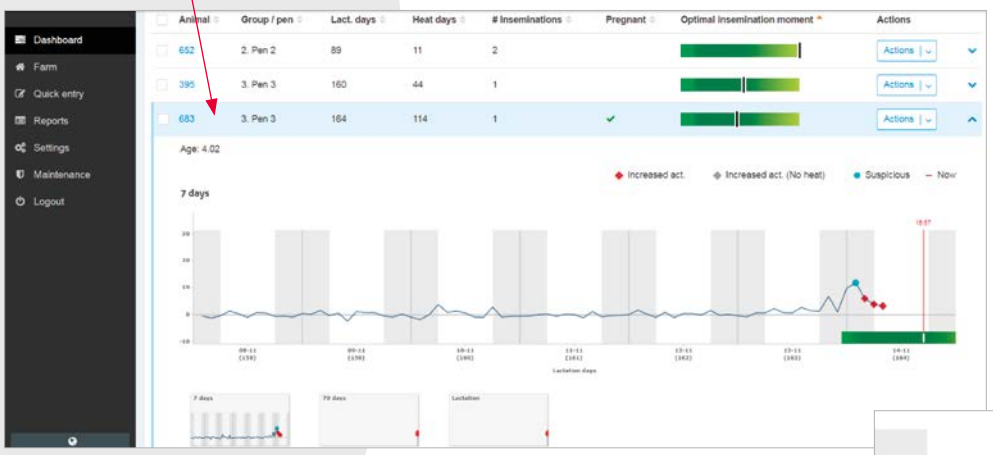
My tasks page

This is the initial screen you see after login with links to active attention lists.



Heat detection attentions list

The perfect time for insemination is when the bar is in the middle of the dark green area.

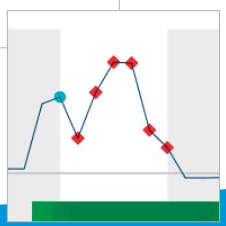


You can click on any cow in this list to bring up a detailed activity line in a 7-day view.

It is also possible to get an overview about the last 70 days or the entire current lactation to date lactation.

Here is an example of two different heat events

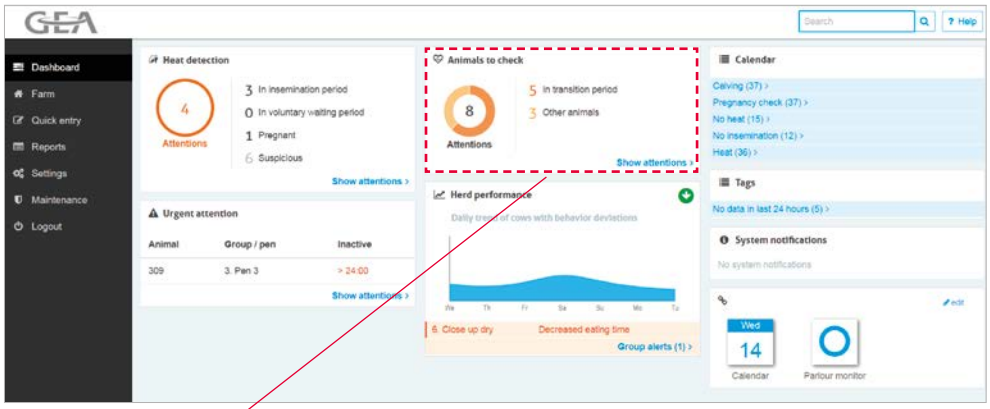
Night Day



Start of heat during day

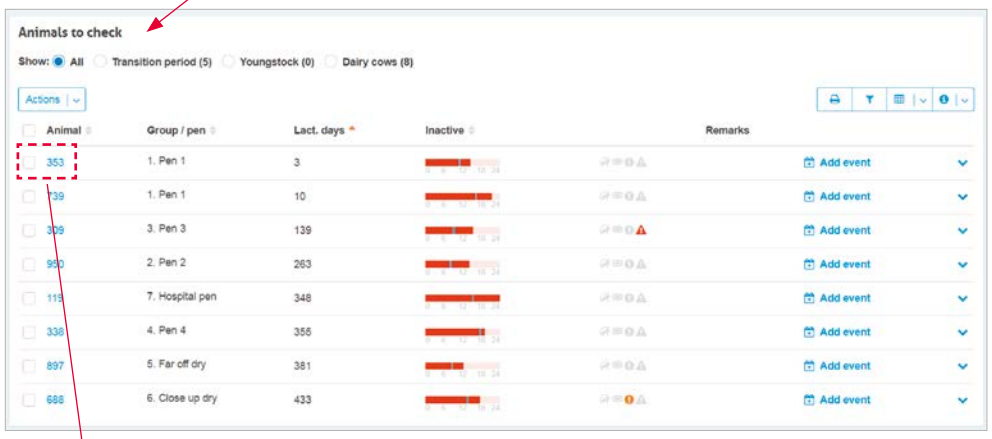
Start of heat during night

HEATH & MANAGEMENT – EATING TIME



Animals to check

This area indicates which animals need urgent attention or must be checked.



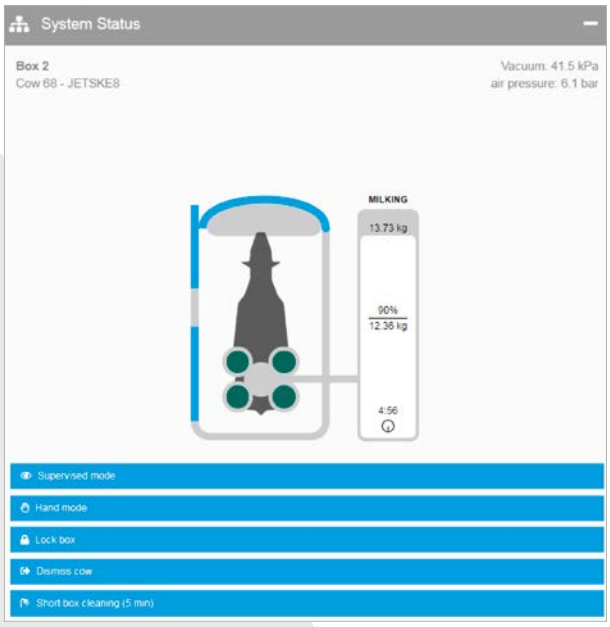
Individual animal measurements can be viewed.

There is a detailed graph for eating, rumination and activity. This example shows that the cow eats and ruminates less and was very inactive. This indicates that something might be wrong with the cow.

Each vertical bar represents the time spent eating within the 24-hour period that begins and ends at midnight. The line marks the average eating, rumination and inactive time baseline. Attentions are generated by percentage deviation from an established baseline average.

Basic functions of FarmView

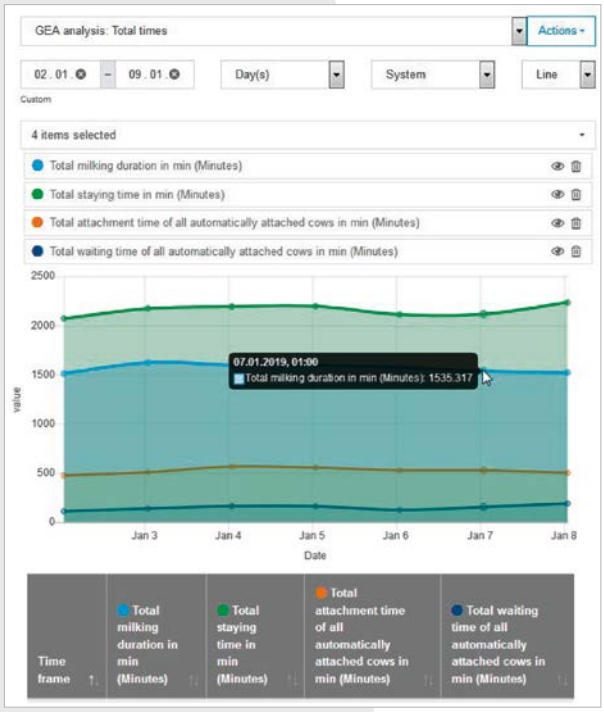
SYSTEM PERFORMANCE MONITORING



A LiveView of your DairyRobot R9500 is directly on your phone

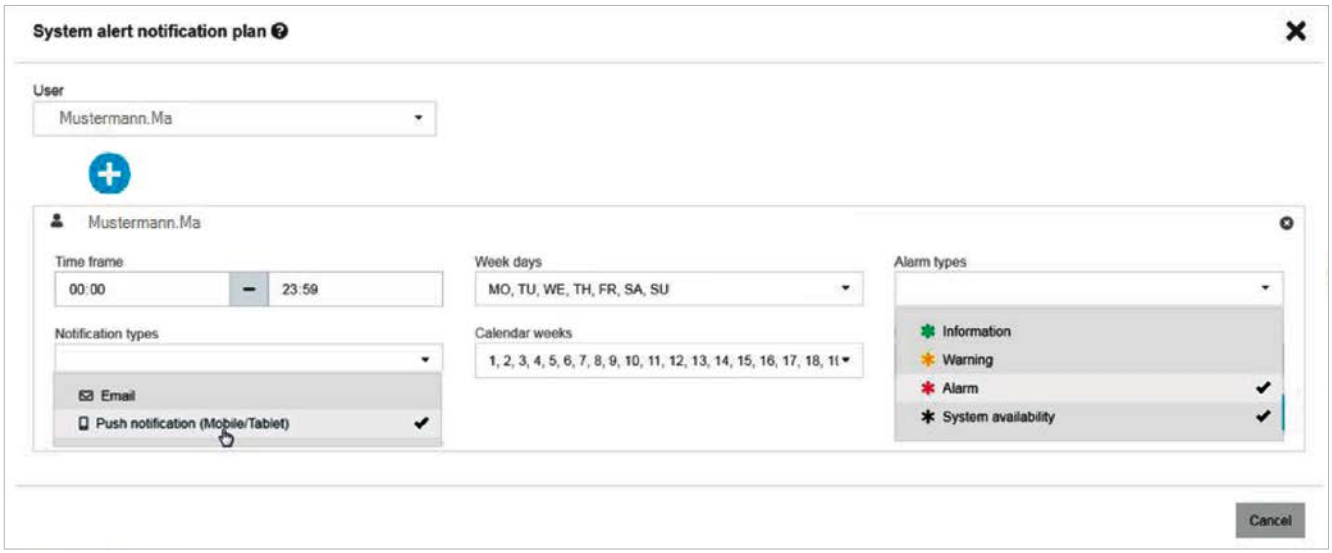
In the LiveView on your phone you can see detailed information about the current status of your system and the milking process.

Under the LiveView of your milking robot, you have the possibility to control your system remotely. The same commands like in the MView are in the FarmView App. To make it inaccessible for unauthorized users and for security reasons you have to enter a password to get control of the robot via the App.



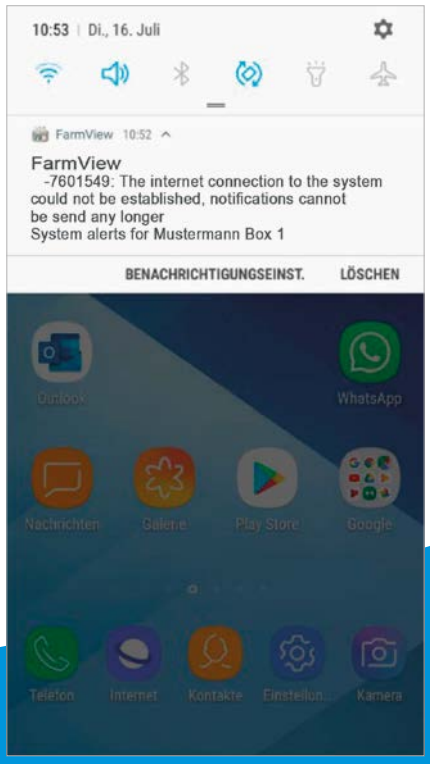
Analyze the performance of the DairyRobot R9500 directly on the phone

You can view individual evaluations of the system performance in the analyses area. Here you can evaluate various analyses, default analyses and self-created analyses over a specific period of time and derive trends. The analyses can be displayed graphically or in tabular form.



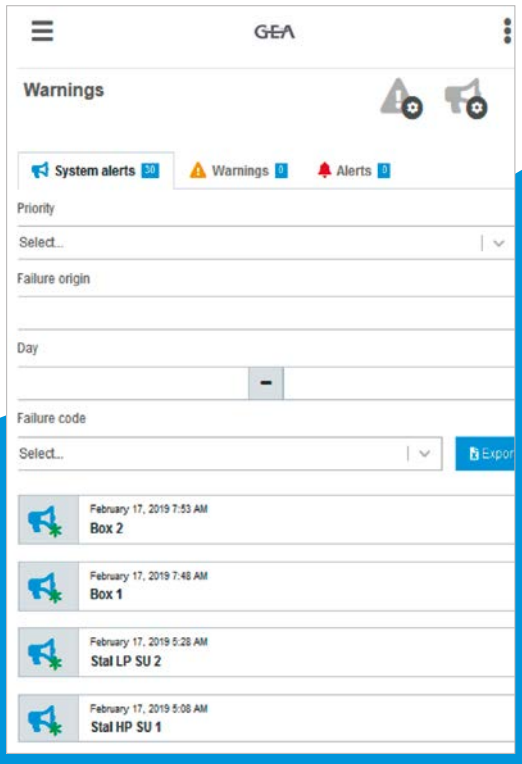
System alarms from the DairyRobot R9500 are send as an E-Mail or as a push notification from FarmView

The prerequisite for receiving the alarms is that the user has a FarmView account and is logged in to the app. An alarm schedule in FarmView must be created for the corresponding people. The user in the notification plan will receive the alarms and system availability 24 hours a day on the phone.



Alarms will be sent now via email and/or push message. The alarm texts (explanation) and numbers (alarm ID) are mentioned. The push message has a long ring tone, so that it is also possible to wake up at night.

In the App you can see the history of all alarms. It is also possible to create or to edit existing notification plans.



Notes

Notes

engineering for
a better world

We live our values.

Excellence • Passion • Integrity • Responsibility • GEA-versity

GEA Group is a global technology company with multi-billion euro sales operations in more than 50 countries. Founded in 1881 the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX® Europe 600 Index. In addition, the company is included in selected MSCI Global Sustainability Indexes.

GEA Germany

GEA Farm Technologies GmbH
Siemensstraße 25 - 27
D-59199 Bönen

Phone +49 23 83 93 7-0
Fax +49 23 83 93 8-0
gea.com

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