LELY VECTOR
Automatic feeding system

Flexible, fresh feeding

www.lely.com
We like helping you making your farm more sustainable, profitable and enjoyable for you and for future generations

Efficient high quality milk production largely depends on the way you can feed the cows consistently, timely and sufficiently. Lely has developed a unique economic concept that can take care of this and will do even more; it allows for 24/7 flexible fresh feeding of cows, being able to feed cows accurately, precisely and with minimum labour requirements. The Lely Vector automatic feeding system is a concept that was developed in close co-operation with our customers and allows for optimal results while maintaining maximum respect for your cows.
Optimum flexibility – feeding without compromises
Taking care of feeding cows is an important daily routine. It is in your mind 24/7. With the Lely Vector automatic feeding system, you are only required to pay attention to feeding the cows once every three days! In addition, with the Vector system you are completely flexible in the feeding strategy you like to implement. It is the perfect solution for every farm, also offering flexibility to adapt to future expansion.

Fresh feed – multiple times a day
Your cows make your money and therefore they deserve their feed just like you want it yourself: in well measured, fresh portions, straight from the kitchen.

The Lely Vector system allows for 24/7 fresh feed and it is brought to the cows multiple times a day (but there is more; because the mixer is filled alternate with small bites of different feeds, the ration only requires a short mixing time).

The highest return on your feed investment
Farming is increasingly a business whereby the difference in financial results is decided by the way in which you manage the margins. Cows become healthier by consistent feeding and a higher feed intake for all cows results in better performance of the low ranking cows. More fresh feed will reduce leftovers which means more efficient use of roughage. In addition, a significant saving in energy-consumption is achieved.

We have your future in mind
We truly foresee a dairy sector in which one man can take care of a sustainable production of two million kilograms of milk per year. Our investments in research and development are focussed on achieving that in an animal friendly matter (being the originators of robotic milking, we have changed traditions in agriculture). In response to a growing demand for a solution to manage the main time-consuming activity on a dairy farm today; feeding, we have now developed a way to feed the cows with the lowest labour input as possible.

It’s a Lely
Year after year, we keep advancing both our organisation and product range with one single goal; to ensure a better future for farmers all over the world.

Live Life Lely!

Alexander van der Lely
CEO Lely Group
Flexibility in feeding routine

Feeding your cows with the Lely Vector automatic feeding system offers you optimum flexibility. You can implement your feeding strategy without any compromises, whether you want to feed your cows several times a day, different rations and in different groups. You will be rewarded with better cow health and increased production.
Quick and easy feed type changes
The feed kitchen of the Lely Vector system is an open space without obstacles and it can store all types of feed. Every feed type has its own location which is very easy to define. This offers enormous flexibility because it is quite easy to change the feed type and redefine the location. Therefore, adjusting the mixed ration to changes of concentrate will be very easy. When changing concentrates at group level, or when engaging another supplier, you can adjust this precisely on a day and hour basis in the ration at the feed fence.

Changing rations in no time
With the Lely Vector system you can feed every group their own ration. You can easily change the ration: composition as well as quantity. The software can determine the amount of feed leftovers. Whenever the amount of feed leftovers drops below a threshold value the system is able to start to feed this group. Automatic feeding is also ideal in combination with grazing. During rainy periods or just on hot and sunny days, the grazing cows will go inside where they can be offered an extra portion.

More precise feeding
With the feed grabber filling system you can grab a lot of feed types. To obtain the right quantity you can adjust the bite size, height and closing of the grabber, so you can feed more precisely. In addition, the system will also correct the feeding quantity through time. If you have fed too much of a specific feed in one run, then it will correct itself in the next runs. Thus, the cows in the group are fed exactly what they need.

Flexibility in changing groups
The software of the Lely Vector system is set up in such a way that only the basic information about the ration is necessary. In this way you can move cows to another group, put the heifers in the group or set up a completely new group without any hassle. The system will automatically see when the threshold value for the feed leftovers is met and will start feeding earlier.
Flexibility in your daily routine

Even in modern barns, feeding the cows still takes a lot of time. Also a mixer unit needs to be filled, driven to the barn and through the feeding alley. Here the accuracy of the feeding depends on the concentration of the driver. The Lely Vector automatic feeding system saves not only a lot of labour, it takes away a lot of hassles from your head as well. The only things left to be done are filling up the kitchen and clean it up once in a while. The Vector system offers you the freedom to manage your farm the way you want to.
Because there are no obstacles in the kitchen the filling is an easy job. A regular feed kitchen is big enough for a storage of around three days.

Freedom to plan your work as well as your social life
The feed kitchen of the Lely Vector system can stock feed for three days in advance. This means there is enough feed available in the kitchen for more than a weekend; this gives you opportunities you never had before. During working days you can plan your work in advance since your feed kitchen can be filled for several days.

Not dependent on external labour
Feeding of cows is a serious job. There is always the choice of doing it yourself or hiring external labour to get it done. With the Vector system you can set up your own feeding programme. You enter the routes in advance, as well as the feeding rations and the setup of your kitchen. Filling the kitchen is an easy job that you can entrust to someone else.

Feeding based on the needs of the cows
An advanced feature on the Lely Vector mixing and feeding robot is the feed height sensor. With this device the robot knows exactly the amount of feed at the feed fence. So it determines where and when fresh feed is needed without any help from the farmer or manager.

Pushing the feed 24/7
The Lely Vector system has an extra advantage. It can also push up the feed in between feeding times and while pushing the feed it measures the amount of feed leftovers. Alternatively, on the way back after feeding a group it can push the feed of another group. The Vector system ensures that there is always fresh feed at the feed fence; 24 hours a day, 7 days a week.
Flexibility for every farm, now and in the future

There are many different types of barns, all with their own advantages and limitations. Because of this, investing in an automatic feeding system was often a matter of compromise. If you opt for the Lely Vector, you will be surprised to see how easily it can be installed and the negligible preconditions that are required to allow it to work in your farm.
Fits in a narrow feed alley without extra support or profiles
As an autonomous vehicle the mixing and feeding robot does not need extra support or profiles, neither power lines nor rails. You can start right away with automatic feeding. The robot requires a minimum feed alley width of only 3.25 m (feeding both sides). Currently, regular feed alleys are often wider. A narrower feed alley allows a significant reduction in construction costs and leaves space for extra cow places.

More barns – one feeding system
With assistance of its distance sensors the mixing and feeding robot can navigate and feed in different barns. When young stock or dry cows are situated in a separate barn, it is very easy to programme the robot for this. The robot can drive outside without problems.

Easy to adjust routes
Changes to your barn or group set-up do not pose any problems; since the mixing and feeding robot is an autonomous vehicle, the system is easily adjusted to all circumstances.

Ready for future expansion
A major advantage of the modular system of the Lely Vector: it can be easily expanded if necessary. One mixing and feeding robot can feed 250-300 animals. To raise the feeding capacity, an extra robot can be used. When one unit is feeding, the other one will be loaded in the feed kitchen. This way you get even more out of your system. In addition, there are practically no restrictions for enlarging the feed kitchen.
Fresh, well mixed portions

Cows deliver best when they are in optimum shape. Obviously good feeding is of the utmost importance to achieve this. The Lely Vector automatic feeding system helps you to serve their feed as fresh as possible in well mixed, balanced portions. Your cows will thank you by showing a good health and offering a high milk production.
Excellent mixing in a short time
The Lely Vector mixing and feeding robot loads the various materials in the best possible order. Consequently the ration only requires light and short mixing; thereby the particle size is left in the correct length supporting an optimal healthy rumen. This, combined with the increased dry matter intake, results in increased milk production.

Everything tastes good
By nature all cows like to eat the most tasteful feed first. However, sorting the ration at the feed fence causes larger fluctuations in the acidity (pH) of the rumen, and therefore a decrease in feed intake which can lead to health problems. By providing fresh feed several times a day, sorting is reduced to the minimum. This results in higher dry matter intake and a minimum of leftovers.

Small fresh meals
When feeding a large quantity of mixed feed at the feed fence only once a day, the whole day's ration is immediately intruded with oxygen. In other words, the ration starts to heat up as soon as the mix is ready. The mixing and feeding robot mixes only small portions which will guarantee a tasty meal for every cow multiple times a day.

Safely stored in the kitchen, for several days
With the Lely Vector system you can provide the cows 24/7 year-round fresh feed. When ensiled properly, the roughage enters the kitchen in optimum condition. The feed remains fresh for days because it is stored in blocks. Storing in this way prevents oxygen from intruding in the feed, thus, food quality is safeguarded while pollution caused by moulds or bacteria is ruled out.

Higher feed intake
Within a normal pattern, a healthy cow will naturally consume 8 to 12 meals a day. The constant delivery of well-mixed, fresh feed by the Lely Vector system will encourage cows to consume more and also provide ample opportunity for low ranking animals to eat, which of course will positively influence their milk production.

Smelling good
Being a nose eater, the cow smells the feed before consuming it. Bringing the feed in small portions, lightly mixed, ensures a good smell and this encourages cows to eat more.
Feeding, make your strategy profitable

Making sure your milk/feed efficiency goes up, while reducing operational costs, is crucial to remain a profitable business. Providing the best ration is a must for healthy, high-production dairy cows. Cows become healthier by consistent feeding and consequently your veterinarian costs will decrease. Higher feed intake for all cows, including young heifers, results in a better performance of the herd and especially of low ranking cows. A more efficient use of feed is realised while more fresh feed leads to less left overs. Furthermore, feeding time will be reduced using the Lely Vector automatic feeding system; time that you can spend on optimizing your farm management.
More milking robot visits
By providing a fresh ration at the feed fence several times a day to the cows, their activity will increase. On robotic farms, this will result in more visits to the robot. More visits will lead to more milkings per cow, while also reducing labour as less cows need to be collected in robotic milking situations.

Suitable for all group sizes
Even smaller groups, e.g. pregnant young stock or dry cows, will get a freshly mixed portion of their own ration, supporting their condition and preparing them for their subsequent lactation. The results: less veterinarian costs and higher milk production.

Feeding according to feed conversion ratio
With the Lely Vector system you can choose easily to provide the best feed for the best cows automatically. The feed grabber will get the feed from the correct feed blocks in the kitchen in a certain order. The Vector system easily prepares different combinations and various volumes of rations, depending on the make-up of the different groups in the herd.

How a healthy meal ensures more milk
A cow eating 20 kg of dry matter per day and producing 24 litres of milk per day has a milk/feed efficiency of 1.20. If the same cow eats a well structured and lightly mixed ration which maximises the environment for the microbial flora in the rumen (through a stable and optimal rumen pH) then an increase of 0.10 Feed Conversion Efficiency would see milk production increase to 26 litres from the same 20 kg/DMI – an additional two litres from the same feed!
Low running costs
When making the financial calculation, obviously there is more to look at than simply the initial investment. Running costs for the Lely Vector system are extremely low and huge savings can be expected if you compare them with the costs to operate conventional systems. The unique concept of direct electric motors of the Vector system avoids the need for energy-inefficient power transmissions.

Saving of eight hours labour a week
The design of the kitchen is custom-made and therefore you only need to tend to the kitchen every three days. Our existing customers report a saving of eight hours a week (when compared with once a day feeding and multiple feed pushing) which equates to a saving of 416 hours over the course of the year. How much is this worth to you? Having to feed the cows on special family days will also become a thing of the past!

Improved feed efficiency
As a dairy manager it is important to know how much feed is distributed at every group and how these groups are performing. Analyzing the feed efficiency starts with precise reporting of the different feed types and the ratio of each feed type in the mixed ration. Furthermore the number of animals and their output is important to calculate the efficiency of the feed intake. For cows in lactation the milk yield and content divided by the feed intake brings the feed efficiency. For young stock and other cattle the output is body weight.

Comparison of feeding systems

<table>
<thead>
<tr>
<th></th>
<th>Mixer wagon</th>
<th>Automatic feeding systems with rail</th>
<th>Lely Vector automatic feeding system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixing quality</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Freshness of feed</td>
<td>+</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Flexibility in rations</td>
<td>+</td>
<td>–</td>
<td>++</td>
</tr>
<tr>
<td>Flexibility in routes</td>
<td>++</td>
<td>–</td>
<td>++</td>
</tr>
<tr>
<td>Installation</td>
<td>+</td>
<td>–</td>
<td>++</td>
</tr>
<tr>
<td>Cost of ownership</td>
<td>+</td>
<td>–</td>
<td>++</td>
</tr>
<tr>
<td>Labour saving</td>
<td>–</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Energy consumption</td>
<td>–</td>
<td>+</td>
<td>++</td>
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</tbody>
</table>
A clean, quiet and energy-saving system

A system that really saves energy
Because the feed is dropped in the mixing unit in small quantities and in a varied order the mixing is less energy consuming.

Eco-mode reduces mixing time
When only small amounts of feed needs to be mixed, the mixing and feeding robot can be switched to the energy-efficient eco mode which reduces the mixing time.

No noise and no pollution
The Lely Vector system is electrically powered. It is soundless and pollution-free and does not disturb the herd or people in any way.

Maximum use of every kW
The experience we have with autonomous vehicles like the Lely Juno feed pusher helped us develop the Lely Vector system. Especially our knowledge about gears, batteries, etc. was very useful to gain maximum use from each kilowatt of power.

Silage clamp
Feed kitchen
Barn with milking cows
Barn with young stock and dry cows
Concentrates and minerals
Mixing and feeding robot
Lely Vector – a comprehensive and intelligently engineered system

Mixing and feeding robot
The mixing and feeding robot of the Lely Vector system is a self-contained, battery-operated vehicle which is capable of automatically feeding a self-mixed ration.

Specifications

<table>
<thead>
<tr>
<th>Dimensions mixing and feeding robot</th>
<th></th>
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<tbody>
<tr>
<td>Length</td>
<td>246 cm</td>
</tr>
<tr>
<td>Width</td>
<td>162 cm</td>
</tr>
<tr>
<td>Weight</td>
<td>1,281 kg</td>
</tr>
<tr>
<td>Height with sliding door open/closed</td>
<td>278 cm/193 cm</td>
</tr>
<tr>
<td>Mixer volume</td>
<td>2 m³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Capacity and requirements</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Max. capacity one robot (animals)</td>
<td>250-300</td>
</tr>
<tr>
<td>Max. number of groups</td>
<td>16</td>
</tr>
<tr>
<td>Surface floor</td>
<td>Flat</td>
</tr>
<tr>
<td>Max. inclination</td>
<td>5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Required min. width feed alley</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeding at both sides</td>
<td>325 cm</td>
</tr>
<tr>
<td>Feeding at one side</td>
<td>310 cm</td>
</tr>
<tr>
<td>Corridor without feeding</td>
<td>275 cm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Feed kitchen; required dimensions feed blocks</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Shape</td>
<td>Straight cut blocks</td>
</tr>
<tr>
<td>Max. depth (grabber width)</td>
<td>105 cm</td>
</tr>
<tr>
<td>Feed</td>
<td>Well-cut or shredded product, advise feed length between 10 and 20 cm.</td>
</tr>
</tbody>
</table>

- **Vertical mixer auger**
  Ensures superb mixing. The counter-blade makes it possible to mix straw hay as well as other feed types.

- **Emergency stop and pause button**
  To stop or switch off the system immediately if necessary.

- **Load cells**
  Compile the right ration and to determine the right amount of feed to dose.

- **Collision bumper**
  Ensures that the system stops immediately if it encounters an obstacle.

- **Rotatable skirt**
  Pushes the feed towards the feeding fence.

- **Adaptor**
  Connects perfect to charging station.
Distributor
Distributes the feed along the feed fence. The amount of feed will be determined by the driving speed.

Antenna
For wireless communication between components of the Lely Vector system.

Ultrasound sensor
Ensures that the mixing and feeding robot follows the feeding fence at pre-determined distances.

Sliding door
Opens for distributing the feed (the door is closed when the robot is only pushing the feed).

Feed height sensor
Measures the amount of feed at the feed fence and determines where and when fresh feed is needed. This way there is always enough feed available for the cows.
Lely Vector – treats your feed with the highest care possible

Feed kitchen
The feed kitchen is the area in which the feed is stored, selected, picked and loaded in the robot for mixing. In the kitchen, a crane construction with a feed grabber is installed which moves above the kitchen to the right block of feed. Depending on the width and depth of the kitchen it can easily stock feed for three days. The feed kitchen is easy to clean with a tractor or skid steer because it is an open storage area without obstacles.

Safety features
In developing the Lely Vector system extensive attention is paid to safety. The total system meets stringent international standards. The feed kitchen itself will only be opened when it needs to be filled. Depending on the situation a safety door and/or a safety fence can be installed.

Feed grabber
Selects and picks the feed and loads it in the mixing and feeding robot. It surveys the sector of the feed storage area that was marked out for a particular type of feed, where it fetches this feed from the highest point.

Mineral and additive dispenser
Minerals and additives can also be mixed through the roughage in smaller quantities.

Concentrate dispenser
Controls the dosing of the concentrates which are stored in bulk. Quantities can be determined and dosed in the forage with utmost precision.

Console E-link touch
User interface with a touch screen to be used for setting up the feeding plan and feeding kitchen. Furthermore it is possible to programme the rations and view various reports.
Lely Vector automatic feeding system

Flexible
- Flexible in feeding strategy.
- Flexible in your daily routine.
- Flexible for every farm and future expansion.

Fresh
- Fresh from the clamp.
- Fresh from the kitchen.
- Fresh at the feed fence.

Feeding
- Feeds well balanced rations.
- Feeds according to needs.
- Feed well spread at the fence.

Results in
- No stress in the herd.
- More cow activity.
- High feed intake.
- High feed efficiency.
- High milk production.
Farmers who helped us test the Lely Vector automatic feeding system

Like all Lely products the Lely Vector system is thoroughly tested by farmers at numerous farms in various countries and under different circumstances. These farmers are tremendously important for Lely’s product development. Their experience has made it possible for us to offer you an effective and reliable automatic feeding system with really unique benefits.
Cees Baan, Molenaarsgraaf, the Netherlands
“I feel the best advantage of the Lely Vector system compared to other feeding methods is the energy saving. We used to operate a trailed mixer feeder wagon but this new system is much cheaper to use. I have made a calculation to compare all annual costs for both systems and most of all I was surprised by the energy savings.”

“Based upon feeding only one group of cows we save no less than half an hour each day; for colleagues who feed two or more different rations, labour savings will be huge.”

“Another benefit of the Vector system is the precise rationing. My cows receive an exactly measured ration of fresh feed according to their needs, several times a day. In addition to that, changing rations only takes a few minutes.”

Kees Overbeek, Benschop, the Netherlands
“Some years ago we operated a railed feeding system in our previous barn and compared to that, this system is so much more flexible. Using the Lely Vector system, we can even feed the cows in the barn of our neighbour.”

“We feed four separate groups with the Vector: milk cows, young stock, dry cows and a start-up group. The cows in each group receive their own different feed ration and this would be impossible with a traditional mixer feeder wagon.”

“I think we save around one hour of feeding time per day. Moreover, when the kitchen is filled before the weekend, you don’t have to spend any time on feeding for two or even three days.”

Hans Beenackers, Molenschot, the Netherlands
“To my mind, the accuracy of the system is the major benefit. I used to feed with a mixer feeder wagon, making precise feeding a very difficult operation. Deviations of more than 100% were normal, whereas with the Vector system this has been reduced to just a few per cent.”

“I am sure my herd’s milk production will increase thanks to the Lely Vector automatic feeding system. Especially during the summer, constant fresh feeding is a huge benefit which will definitely pay back.”
Innovation has always been our strongest competitive benefit and it will always remain the core of our company. The history of Lely clearly shows that each decade we have been able to introduce a product into the sector with a significant impact on methods of working in the agricultural sector. It is the appreciation of our customers that motivates us to take it one step further. Every day we are challenged to find solutions for the issues in dairy farming. We listen carefully to the things that are on your mind, allowing us to create concepts that are a great help to you as a dairy farmer.
Lely’s unique range of equipment: from grass to glass

The quality and quantity of fodder determines to a great extent how healthy and efficiently milk can be produced. As the true innovator of agriculture Lely is the only manufacturer who offers a complete range of forage harvesting machines as well as milking, feeding and barn equipment. With decades of experience in developing products covering the entire way from grass to glass we have specific knowledge about fodder and feeding methods. Of course this experience helped us developing the Lely Vector system in many ways. Especially our knowledge of processing cut forage types was essential.

Durable solutions

All Lely products distinguish themselves through unrivalled durability. The use of only first-class materials as well as the thoughtful designs, guarantees a long lifetime and a significant trade-in value. Even today you can still find the finger wheel rake – Lely’s first invention in the middle of the last century – on many farms all over the world!

Lely Center concept

For research and development of new concepts and improvement to our existing products it is essential that suppliers and customers are close to one another. To ensure that all relevant information will be shared we introduced the Lely Center concept. The Lely Center facilities are situated close to the dairy farmers in its region and are totally focussed on sales and service functions while controlling the overall quality of product, service and brand. The formula embraces close to 200 self-contained companies spread across Europe, North America and Australia/New Zealand; numbers are still growing. The Lely Center is your local point of contact – an efficient, compact and easy to approach organisation that boasts the required knowledge and expertise on Lely products.
Lely directs all its efforts towards creating a sustainable, profitable and enjoyable future in farming.

**Sustainable**
Preserving the environment for generations to come. This means acting as a company in a responsible way, making cow and man key in all we do, developing long lasting products, saving energy resources and helping the farming sector to develop into a lifecycle neutral operation.

**Profitable**
Providing innovative products and concepts to enhance traditional farming. To sustain and ultimately improve our customers’ income through cost savings, low running costs and higher efficiency.

**Enjoyable**
Developing products that are reliable, easy to operate and well designed. Robust machines ensure unrivaled productivity, providing sheer working pleasure to contractors and dairy farmers alike.

It is our mission to inspire people to create innovative solutions that help our customers excel in sustainable milk production, forage harvesting and energy sourcing.

For almost 65 years, Lely has been acquiring unique expertise of the agricultural chain and has introduced products which have changed traditions in agriculture. Today, we continue to offer our customers an unrivalled product portfolio and the company is committed to doing so in the future.