KPI Calculations: the numbers explained

Dashboard KPIs

When you open the Horizon app you start on the dashboard, which provides a quick snapshot of the current farm's performance. The dashboard is updated every 20 minutes to show the latest values. A KPI is presented in different ways: as the current value, the weekly average and a trend line. Here is a breakdown of where these values originate:

Current value: This indicates the KPIs performance over the past 24 hours since the last update (which is when the dashboard is opened and refreshed every 20 minutes).

Weekly average: This indicates the KPIs performance over the past 7 days, excluding the today value.

Trend line: The trend line shows the values of the past 7 days per 24 hours (00: to 00:00), excluding today's value, which reflects the past 24 hours to today (the same as the current value). Keep in mind that updating KPIs starts at 00:00, and then updates each KPI one by one, therefore some KPIs are updated at 00:07 and others are 00:01, but the time interval is always 24 hours, so from 00:07-00:07 or 00:01-00:01.

Click-through

By clicking through, you get access to more recent data, as calculated when opening the KPI. This allows a deep dive into the specific KPI and ensures that you stay informed about the most up-to-date values.

The first click-through level provides 2 values: the value and the average. The value represents the calculation of the last 24 hours, and the average represents the calculation of the last 168 hours (7 days).

If you click through to the second level, new values appear. The value shows the calculation in 24-hour increments, for example if it is 4pm, the values are 4 PM- 4 PM- 4PM. The average (color in dark green) shows the calculation of the last 168 hours (7 days). If indicated in red, there is a deviation from the averages, this threshold differs for each KPI and is explained on the Lely Horizon Help page.
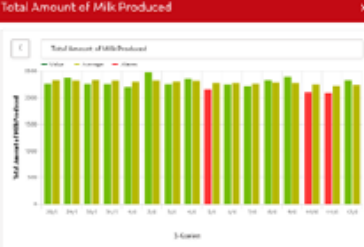
KPI	Number of refusals (Refusals) (measured in average refusals/cow)
Definition	The average number of refusals by the Astronaut per cow.
	Refusal is when a cow enters the robot, but does not have permission to milk, so is then let out (see additional info below for reasons). The robot "refuses" to milk her.
Metric	~1 average refusals
Additional information	There are multiple reasons for refusal:
	1. Milking Not Allowed
	2. Block Time
	3. Cancel By User
	4. Cancel By Timeout (happens when cow is set to 'milk under supervision' but nobody accepted the milking at E-link. After 5 minutes the visit is cancelled by timeout
	5. Other
	6. Milk Interval Not Passed (most common)
	7. Milk Settings Not Found
	8. Milk Visit Not Found

KPI	Number of Failures (Failures) (measured in failures per robot)
Definition	The average number of failed milkings per Astronaut.
Explanation	**A failed milking is an unsuccessful milking.** The cow was recognized and has milking access, but the robot was unable to connect the teat cups or finish the milking. Count of all failures divided by the number of Astronauts.
Metric	· **if > 5 then red** otherwise **if < 3 green** otherwise orange.
	The lower the better
Additional information	This can be cow- or robot-related. The farmer should check whether the failures are frequent for the same cow or robot and take action.

KPI	Milk speed (Milk Speed) (measured in lbs/minute)
Definition	**Average lbs of milk obtained per minute for the last 24hrs.** This is calculated by taking the milk yield for each milking and dividing it by the duration in seconds for the quarter that took the longest to milk. The average of all milking is then calculated and multiplied by 60 to get the milk speed in lbs per minute.
Related variables	· Milk yield · Milk duration
Explanation	· Milk yield per milking divided by the milktime duration for that milking. The average of all milkings is milk speed. · Milk time duration is the duration in seconds for the longest milking quarter, from attaching teat cup to take-off.
Additional information	· Milk time duration is the longest milking quarter. This is not equal to the 'Milk time' in reports. Milk time is the total time needed for milking, from first teat attached until last teat cup taken off.

KPI	Number of connection attempts (Connect Attempts)
Definition	The average number of connection attempts for all teat cups per milking in the last 24hrs. This is calculated by summing all the connection attempts for all teats and all visits divided by the number of teat cups and visits.
Related variables	· Attachment of teat cups.
Metric	· if **>1.3 red else green**. **Ideal: <=1.3**

KPI	Average Boxtime / Visit (Boxtime/Visit)
Definition	Boxtime is calculated from the moment the robot recognizes the cow, until the moment the cow leaves the box. The average boxtime is then calculated by the sum of all boxtimes divided by the number of visits. Refusals are excluded.
Related variables	· Boxtime
Misunderstanding	Training visits and failed milkings are included.
Metric	No set number - high boxtime impacts free time that could be spent milking another cow

KPI	lbs rest feed Concentrates
Definition	Robot feed that will not be dispensed to the cow 1. Not visiting enough 2. Too much programmed
Related variables	· Rest feed
Explanation	· Summation of all the rest feed. · All rest feed feeding in the Robot.

KPI	Free Time %
Definition	Average percentage per day that the astronaut robots are free and available to milk a cow
Related variables	· Free time robots

Explanation	· Summation of all free time
	
	· Actions that do not count towards free time:
	
	    o Refusing
	
	    o Milking time
	
	    o Cleaning
	
	    o Alarm

Metric	10-15%

KPI	Treatment time
Definition	· The time that the robot is recognizing the cow till the moment the teat cup is attached
Metric	· **<3 minutes** Includes pre-treatment time

Definitions of the milking process:

Treatment Time Pre   Time from the moment the arm starts to move until brushing is finished

Connection time   Time from first scan until last teat cup is connected

Dead milk time   Period when there is no milk flow detected by the MQC2 at the beginning of milking. Average time from successfully connected teat cup until milk flow is detected per quarter for the first attachment

Box time   Box time is calculated from the moment the Astronaut recognizes the cow until the moment the cow has left the box.

Milk time   Time from first teat cup successfully connected until last teat cup taken-off

Milk time duration   Duration of the longest milking quarter, from attaching teat cup to take-off.

Treatment time   Box time minus milk time duration- this includes post spray time

Other dashboard KPI Metrics:

Number Milkings/cow/day -   **> 2.6**

Rest feed % -   **5% or less**

Lbs concentrated per 100 lbs of milk -   **10-14 desired range**

Rumination activity Lactating cows -   **450-575 desired range**

Other KPI metrics not on Horizon Dashboard:

Short Interval low yield: **< 3%**

Long interval high yield: **< 8%**

Irregular interval: **10% goal**

Take off reason- end of milk flow: **> 90%**