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LEAP WIRELESS SENSOR SYSTEM

PRODUCTION DOWNTIME COUNTER

QUICK START

AND USER MANUAL

Document# 53-100205-00

Revision 3.2

Contents

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1. About this Manual

This user manual will explain the special features of the Leap Production Counter and Downtime monitor Device Node. Please consult the main Leap User Manual for the complete system functionality.

1.1 Audience

This manual assumes that you are already familiar with the Windows operating system and are responsible for performing installation and monitoring of the test system.

2. Operating the Wireless Sensor System

2.1 Special Power Switch and Power to the Sensor Node

Because the Production Counter Sensor Node utilizes break-beam sensors that must be powered-on at all times, this device node is not battery powered. Power is supplied to the Sensor Node (and the break-beam sensors) using the wall transformer that plugs into the Sensor Node. Use the wall transformer labeled, "Sensor" to power the Sensor Node.

2.1.1 Power Switch – No LEDs

Because this Sensor Device Node is wall powered, the power switch does not have the red and green LEDs integrated like other Leap Sensors.

2.1.2 Wall Transformer to Sensor Node

Connect the wall transformer labeled "Sensor" to the Production Counter Device Node prior to turning it on.

2.2 Count Reset Button

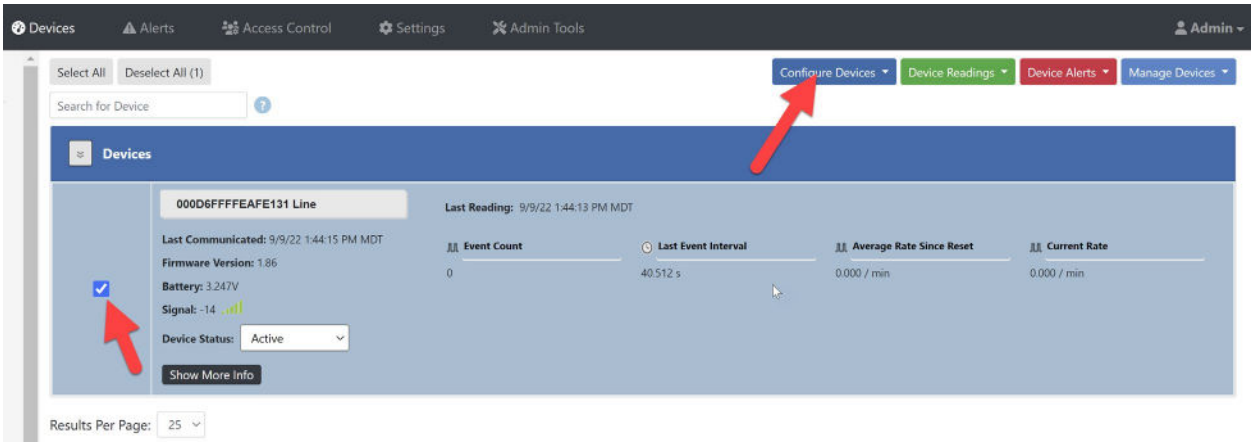
The silver push-button on the top of the enclosure will zero-out the count after it is pushed. The count reset button is one of several ways to reset the count. See count reset configuration options for more details.

2.3 Understanding the Data – Counting, Timing, Transmitting, Resetting

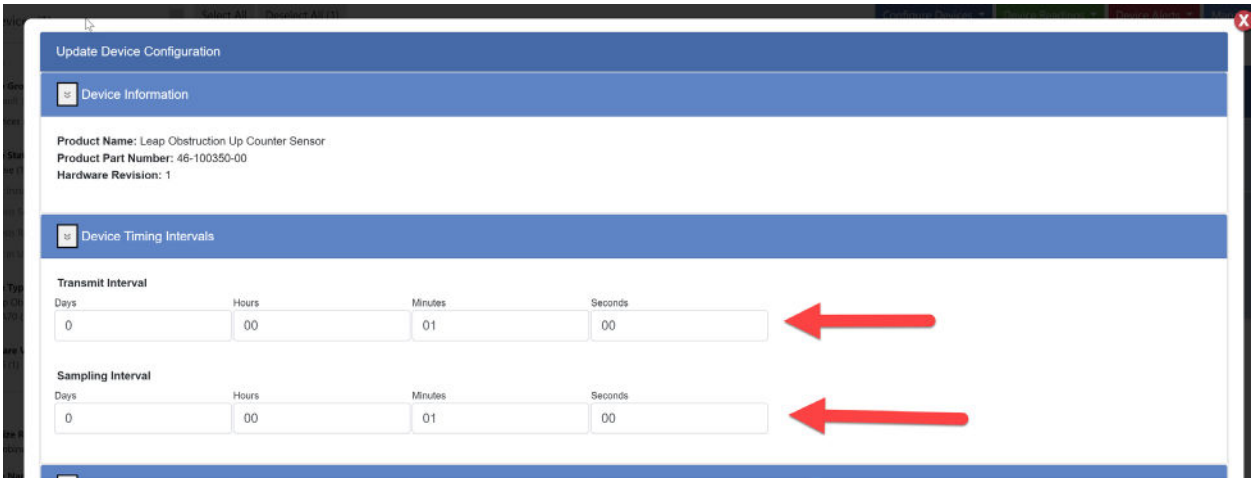
2.3.1 Transmit Interval – How Often Data Is Updated

The Production Counter Device Node will transmit the latest count data at the "Transmit Interval" that is set for the device. Typically, this is set to 10 minutes. The transmit interval works with the "Sampling Interval" and "Transmit Mode" settings to manage what triggers the device node to sample and transmit data. Before changing the transmit or sample intervals, make sure to understand the impact of the "Transmit Mode" setting. To change the transmit interval, do the following:

- Click on the check box to the left of the sensor device to select it.
- Click on "Configure Devices" button

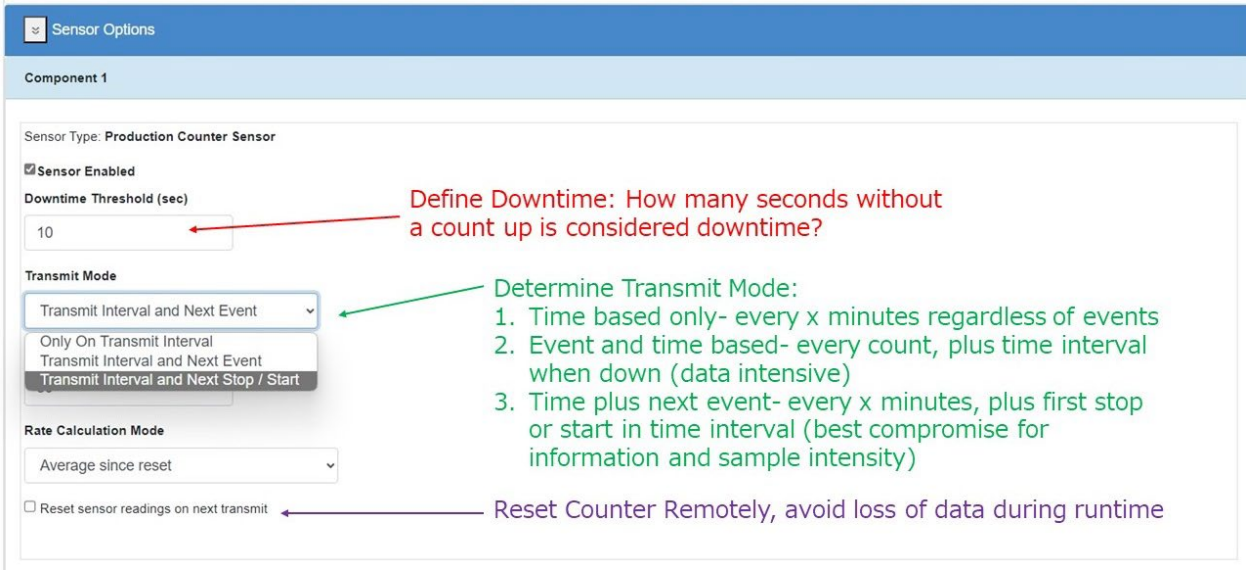


- Click on "Edit Configuration"
- Edit the Transmit Time. Set Sample Time to the same value. CLICK SAVE at the bottom of the screen



2.3.2 Transmit Mode – When Data Is Updated

While the Production Counter Device Node will transmit the latest count data at the "Transmit Interval" that is set for the device, it can transmit based on events that occur as well. The transmit and sampling interval works with the "Transmit Mode" settings to manage which triggers the device node uses to sample and transmit data. Before changing the transmit or sample intervals, make sure to understand the impact of the "Transmit Mode" setting. To view or change the transmit mode, view "Sensor Options" further down the configuration screen:



There are three transmit modes to choose from: the default is to only transmit on the time interval plus the next stop/start for the counter (default interval is 10 minutes). The three choices are:

a. "Only On Transmit Interval" - Only transmits on the configured transmit interval. You'll get a count update and data update on each interval and only then.
b. "Transmit Interval and Next Event" - Every time the beam is broken it will transmit (usually don't want this if rate is over 10 products per minute because it will be too much data and flood the gateway and server with too much data). If the line is down, you'll still get a sample every interval, so the interval time can be a little longer because it only comes into play when the line is down with this option.
c. (**Recommended**) "Transmit Interval and Next Stop/Start" - On the normal interval and the first time a change in state happens between detecting start/stop conditions. This is a good balance between the

other settings and will allow you to capture exact times of long downtime periods as well as long run periods. You won't get the timing of every product made, but do you really need to?

It is recommended that most customers should use option C above unless there is a compelling reason not to. This option catches exact timing of all long runs and stops, plus keeps an accurate count of products and stops. Option A is too little data, and Option B is too much. Option C for most is just right.

2.3.2.1 Transmit Event Limit

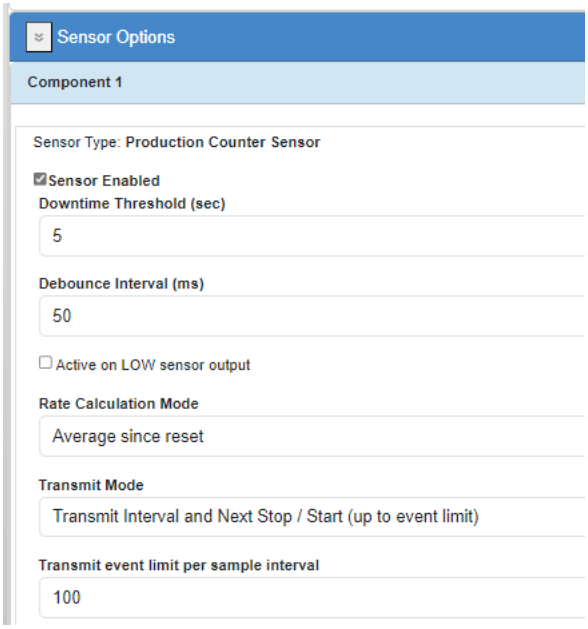
To avoid overwhelming the Leap Data server with too much data, there is a limit to the number of downtime or count events that can be recorded per transmit interval. Generally, this limit should never come into play. However, if a customer sets the transmit mode to "every event," and the line speed is fast enough to count more products in the transmit interval than the event limit, the node will continue counting, but not transmit individual events until the next transmit interval is reached.

For example, a line is running at 25 products per minute and has a transmit interval of 5 minutes. If the transmit mode is set to every event (every count up), and the transmit event limit is set to 100, if is both possible and likely that there will be periods where over 100 products are counted in less than 5 minutes. In this case, the first 100 products will have their individual counts transmitted and the rest will be counted, but not transmitted. Perhaps at the 5 minute mark, the count will jump by as much as 25, with an additional minute of uptime for the events that were not transmitted.

The same can happen when transmit mode is set to every stop and start. This can be less likely as lines don't start and stop so frequently as to trigger an event limit, but it is possible.

If a line is missing event data due to hitting the transmit event limit, there are several ways to address this. If you are using the "every event" mode, consider switching to "every stop and start" mode. You may also want to increase the event limit, or reduce the sampling and transmission interval. Just be aware that this event limit is in place to protect your system from becoming overwhelmed with too much data.

For most customers this setting should not be a concern, and the default of 50 should be fine.



2.3.3 Defining Downtime

On the above screen shot, notice the setting for "Downtime Threshold." This is the amount of time seen after a count that will start counting downtime if another product doesn't arrive. This should set be to a time slightly longer than the typical

time between products. We recommend somewhere between 1.5 and 2.5 times the normal production gap between products. For example, if your line typically makes a product every 6 seconds, maybe set the downtime threshold to 9 seconds so that running at a slow rate doesn't count as downtime. If operators or the process sometimes removes a product from the conveyor before it is counted, perhaps the time of 2.5 products would be more appropriate to avoid counting downtime for a single missed product.

However, we recommend that this threshold not be set too high, or the data will miss many of the minor stops that could be occurring on the production line. Often many lines suffer significant losses from minor stops- minor jams and other faults that are quickly resolved and re-started. Being aware of the number and length of these minor stops can often bring attention to these losses. With proper investigation and fixes, elimination of minor stops can have a big impact on overall results, on the amount of effort operators spend fighting problems, and often on the quality of product from more steady consistent production.

2.3.4 Adjusting Sensor Sensitivity with Debounce Time

Debounce time is the amount of time that a sensor can flicker on or off before it counts another product. If your sensor flickers when products pass by, you may want to increase this time substantially. If your rates are extremely fast, this time may need to be small. If your counts from the sensor aren't matching the physical counts, adjust your sensor settings and adjust the de-bounce rate.

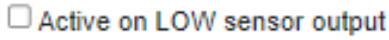
In addition, the sensors themselves have adjustment for sensitivity. This adjustment is particularly helpful on sensors that don't utilize a photo-eye. Using the lights on the eye, adjust sensitivity so that products are easily distinguishable from no product.

2.3.5 Rate Calculation Mode

Another setting is "Rate Calculation Mode." You can set it to calculate rates since the last count reset, or over recent sampling intervals. It is recommended to use the average rate since the last count reset, unless there is some compelling reason to select more recent sampling intervals. Some customers find it helpful to see rates over more recent sampling intervals to see if rate in recent data is on target or has drifted up or down. Since you can always look at downloaded data yourself (count, uptime, and downtime) over any time frame and do your own calculations, think of the rate calculation as a viewing preference- what is best for your situation?

2.3.6 Adjusting Photo-eye Active State

The configuration screen offers a check box to switch the active state of the photoeye sensor. The default is for this to be unchecked.

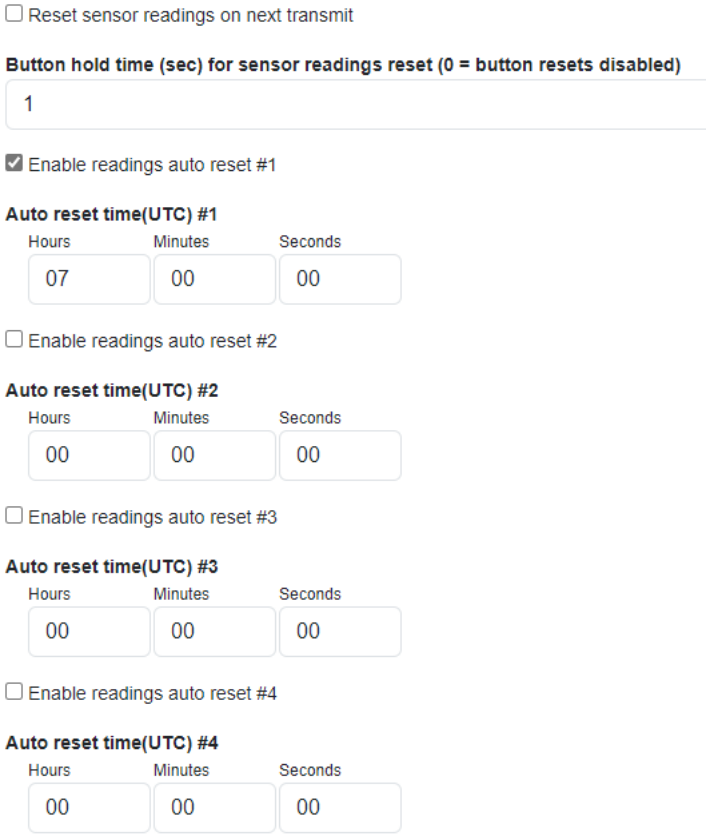


In most situations the sensor sends an active or TRUE or "1" value to the node when the eye is blocked, and counts up when the eye is blocked. If for some reason the eye is counting when the eye becomes unblocked, and you'd like to switch it, simply check this box. For counter nodes this difference is minor, but could cause a count when the sensor is reset if in the wrong state. If you immediately get a count of 1 after a reset and no product was present to be counted, consider switching this setting.

Most users will not need to ever change this setting.

2.3.7 Reset Options

The configuration screen allows you to determine how the counts are reset, either manually or automatically. From these choices, you can influence resetting the count three ways.



1. Check the box to reset reading on next transmit. Once you check this option and save it, the software will send a message to the production count node to reset its count during the next transmit sequence. This is a helpful option when you need to reset the count, but are not physically near the sensor to manually reset it. If you have purchased the Modbus TCP option, you can write to this value remotely by setting up a Modbus register for this setting, allowing you to use another system to reset the count.

2. Hold down the reset button on the production count node to reset it. Some customers in environments with lots of vibration have found that counts can accidentally reset from motion from the surrounding environment. Because of this we default the setting of the reset button that it be held down one second for the count to reset. Once the button is released, the node will update the count and all calculations and send them to the Leap Server and then reset all values back to zero. No data is lost, and counts start over when the button is pushed.

   For operations that don't want the push button used for resets for what ever reason, set the hold time to zero, and the reset button will be disabled. The hold time can be made longer as well.

3. You can set up to four different automatic resets per day. Simply check the box for each reset you want to use and enter the hour, minute and second for the reset to occur.

   For example, some customers may want to reset the count at the beginning of every shift as well as at midnight.

Others may want to reset the count just once a day at a specific time. Others never want to reset the count.

Note that the reset time is based on the UTC time. In the US, time zones vary from UTC-4 for EDT to UTC-9 for Hawaii. Daylight savings time causes a need to change this setting. For example, if you are on Pacific time and want the reset to occur at midnight every day, you would pick 7 (see above) for daylight savings time, and 8 for standard time. If you happen to be in Indiana, Arizona, or Hawaii, then you don't have to worry about changing settings twice a year because you have no daylight savings time.

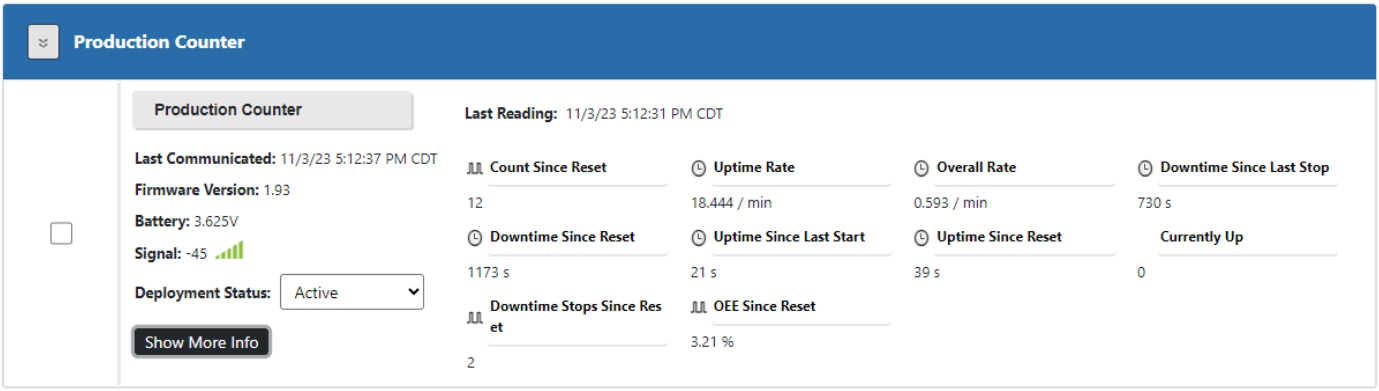
Below is an example of data being reset at midnight. Notice the final reading stamped 11:59:59 PM and a zeroed reading stamped at 12:00:00 AM

Reading Timestamp	Received Timestamp	Count Since Reset	Uptime Rate (/ min)	Overall Rate (/ min)	Downtime Since Last Stop (s)	Downtime Since Reset (s)	Uptime Since Last Start (s)	Uptime Since Reset (s)	Currently Up	Downtime Stops Since Reset	OEE Since Reset (%)
Sep 20, 24, 12:40:38 AM	Sep 20, 24, 12:40:40 AM	0	0.000	0.000	2438	2438	0	0	0	0	0.00
Sep 20, 24, 12:25:38 AM	Sep 20, 24, 12:25:40 AM	0	0.000	0.000	1538	1538	0	0	0	0	0.00
Sep 20, 24, 12:10:38 AM	Sep 20, 24, 12:10:40 AM	0	0.000	0.000	638	638	0	0	0	0	0.00
Sep 20, 24, 12:00:00 AM	Sep 20, 24, 12:00:12 AM	0	0.000	0.000	0	0	0	0	0	0	0.00
Sep 19, 24, 11:59:59 PM	Sep 20, 24, 12:00:12 AM	11	190.861	0.008	31356	79197	3	3	0	1	0.00
Sep 19, 24, 11:55:38 PM	Sep 19, 24, 11:55:40 PM	11	190.861	0.008	31095	78936	3	3	0	1	0.00
Sep 19, 24, 11:40:39 PM	Sep 19, 24, 11:40:40 PM	11	190.861	0.008	30195	78036	3	3	0	1	0.00

The received timestamp may vary slightly from the reading timestamp. However, notice that the timestamp of the reading is the one that matches with the reset values, just before and after the values are reset based on the reset times in the configuration settings.

2.3.8 Understanding the Data

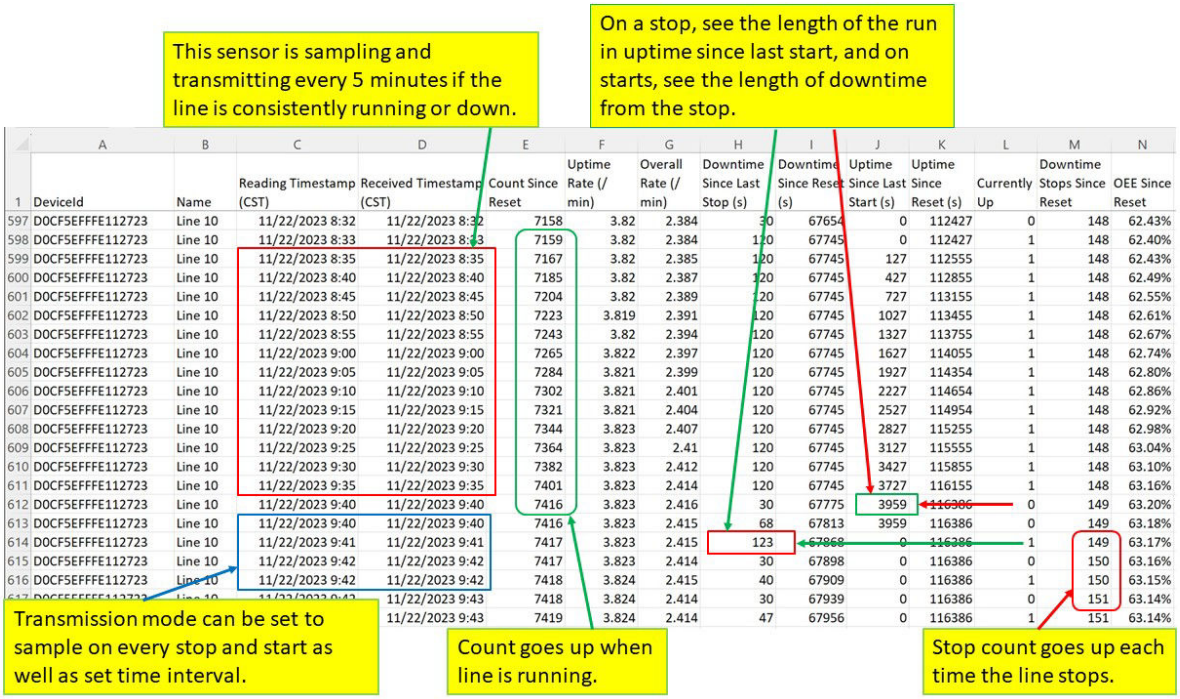
The main display screen will show these ten data points.



1. Count since Reset- just like it sounds- how many products have been counted since the last time the counter was reset.
2. Uptime Rate: When the line has been running, how fast was it going in products/minute?
3. Overall rate: Since the last reset, what is the rate based on count over the total time (all uptime and downtime)
4. Downtime Since Last Stop- From the last stop, how long was the line down before it re-started?
5. Downtime Since Reset- This is a tally of the total time the counter has determined that production has been down since the last count reset.
6. Uptime Since Last Start- From the last start, how long was the line up before it stopped?
7. Uptime Since Reset- This is a tally of the total time the counter has determined that production has been running since the last count reset.
8. Currently Up: This is 1 if the line is currently running and 0 if the line is down.
9. Downtime stops since reset. How many times has the line stopped since the count was reset?
10. OEE Since Reset- This is a calculation based solely on time up and down since the last reset. Some customers may have more elaborate ways of calculating OEE, but this measure will give users a good idea of how well things are running.

2.3.9 Interpreting the Count and Downtime Data

Using the Method shown below, the data can be downloaded and analyzed with a program such as Excel. This data was collected from a line set to transmit with every stop and start.

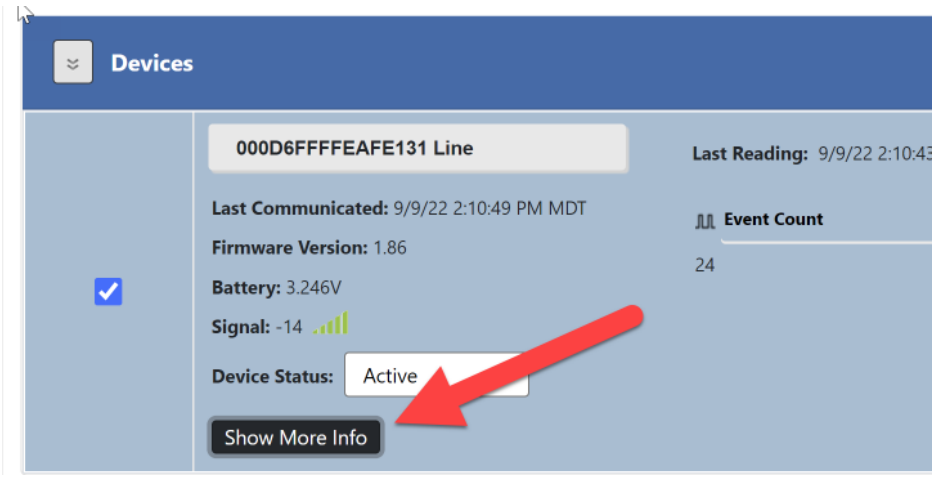


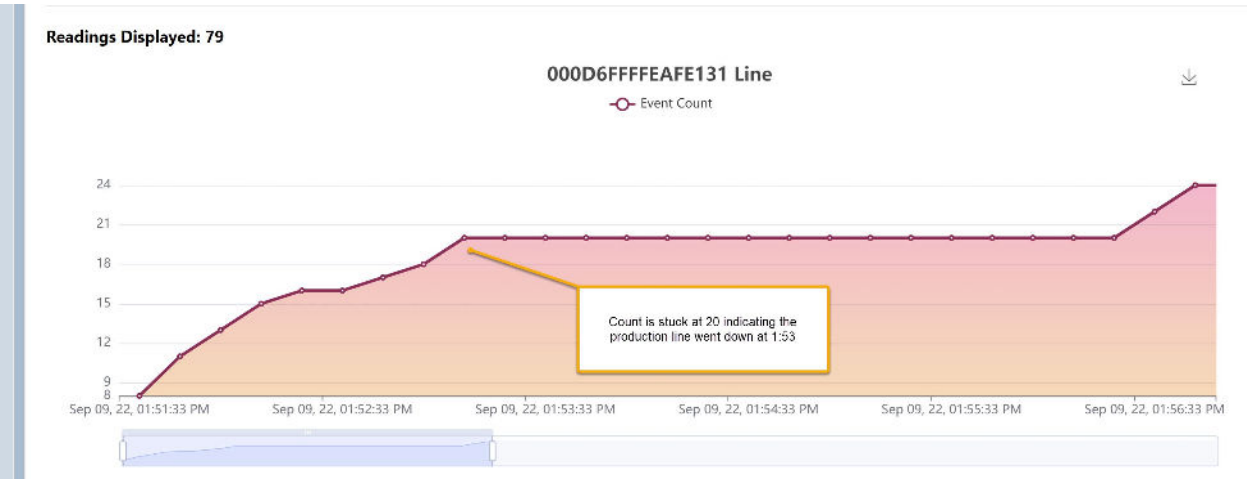
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	DeviceId	Name	Reading Timestamp (CST)	Received Timestamp (CST)	Count Since Reset	Uptime Rate (/ min)	Overall Rate (/ min)	Downtime Since Last Stop (s)	Downtime Since Reset (s)	Uptime Since Last Start (s)	Uptime Since Reset (s)	Currently Up	Downtime Stops Since Reset	OEE Since Reset
597	D0CF5EFFFE112723	Line 10	11/22/2023 8:32	11/22/2023 8:32	7158	3.82	2.384	30	67654	0	112427	0	148	62.43%
598	D0CF5EFFFE112723	Line 10	11/22/2023 8:33	11/22/2023 8:33	7159	3.82	2.384	120	67745	0	112427	1	148	62.40%
599	D0CF5EFFFE112723	Line 10	11/22/2023 8:35	11/22/2023 8:35	7167	3.82	2.385	120	67745	127	112555	1	148	62.43%
600	D0CF5EFFFE112723	Line 10	11/22/2023 8:40	11/22/2023 8:40	7185	3.82	2.387	120	67745	427	112855	1	148	62.49%
601	D0CF5EFFFE112723	Line 10	11/22/2023 8:45	11/22/2023 8:45	7204	3.82	2.389	120	67745	727	113155	1	148	62.55%
602	D0CF5EFFFE112723	Line 10	11/22/2023 8:50	11/22/2023 8:50	7223	3.819	2.391	120	67745	1027	113455	1	148	62.61%
603	D0CF5EFFFE112723	Line 10	11/22/2023 8:55	11/22/2023 8:55	7243	3.82	2.394	120	67745	1327	113755	1	148	62.67%
604	D0CF5EFFFE112723	Line 10	11/22/2023 9:00	11/22/2023 9:00	7265	3.822	2.397	120	67745	1627	114055	1	148	62.74%
605	D0CF5EFFFE112723	Line 10	11/22/2023 9:05	11/22/2023 9:05	7284	3.821	2.399	120	67745	1927	114354	1	148	62.80%
606	D0CF5EFFFE112723	Line 10	11/22/2023 9:10	11/22/2023 9:10	7302	3.821	2.401	120	67745	2227	114654	1	148	62.86%
607	D0CF5EFFFE112723	Line 10	11/22/2023 9:15	11/22/2023 9:15	7321	3.821	2.404	120	67745	2527	114954	1	148	62.92%
608	D0CF5EFFFE112723	Line 10	11/22/2023 9:20	11/22/2023 9:20	7344	3.823	2.407	120	67745	2827	115255	1	148	62.98%
609	D0CF5EFFFE112723	Line 10	11/22/2023 9:25	11/22/2023 9:25	7364	3.823	2.41	120	67745	3127	115555	1	148	63.04%
610	D0CF5EFFFE112723	Line 10	11/22/2023 9:30	11/22/2023 9:30	7382	3.823	2.412	120	67745	3427	115855	1	148	63.10%
611	D0CF5EFFFE112723	Line 10	11/22/2023 9:35	11/22/2023 9:35	7401	3.823	2.414	120	67745	3727	116155	1	148	63.16%
612	D0CF5EFFFE112723	Line 10	11/22/2023 9:40	11/22/2023 9:40	7416	3.823	2.416	30	67775	3959	116386	0	149	63.20%
613	D0CF5EFFFE112723	Line 10	11/22/2023 9:40	11/22/2023 9:40	7416	3.823	2.415	68	67813	3959	116386	0	149	63.18%
614	D0CF5EFFFE112723	Line 10	11/22/2023 9:41	11/22/2023 9:41	7417	3.823	2.415	123	67868	0	116386	1	149	63.17%
615	D0CF5EFFFE112723	Line 10	11/22/2023 9:42	11/22/2023 9:42	7417	3.823	2.414	30	67898	0	116386	0	150	63.16%
616	D0CF5EFFFE112723	Line 10	11/22/2023 9:42	11/22/2023 9:42	7418	3.824	2.415	40	67909	0	116386	1	150	63.15%
				11/22/2023 9:43	7418	3.824	2.414	30	67939	0	116386	0	151	63.14%
				11/22/2023 9:43	7419	3.824	2.414	47	67956	0	116386	1	151	63.14%

Seeing the data organized into events like this, many customers build reports using formulas to identify and calculate key times and additional metrics. Simply copy and downloaded data into a sheet with formulas for reports on the latest data each day or week.

2.3.10 Graphing the Data

To graph the data click on “Show More Info”, then the Chart Tab.





2.4 Download Readings

Exporting data from the Gateway or server to a local PC is possible with the "**Download Readings**" action under the "**Device Readings**" button. First, select the list of devices you wish to download data from. Then, click "**Download Readings**" from the "**Device Readings**" button. The Download Readings window will appear as shown below (FIGURE 1).

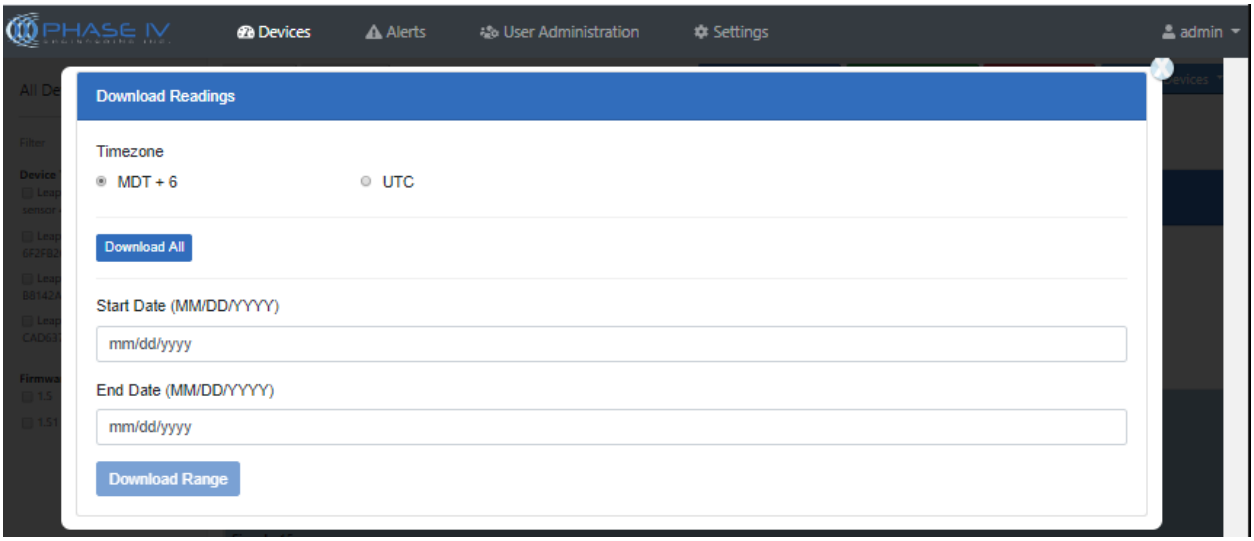
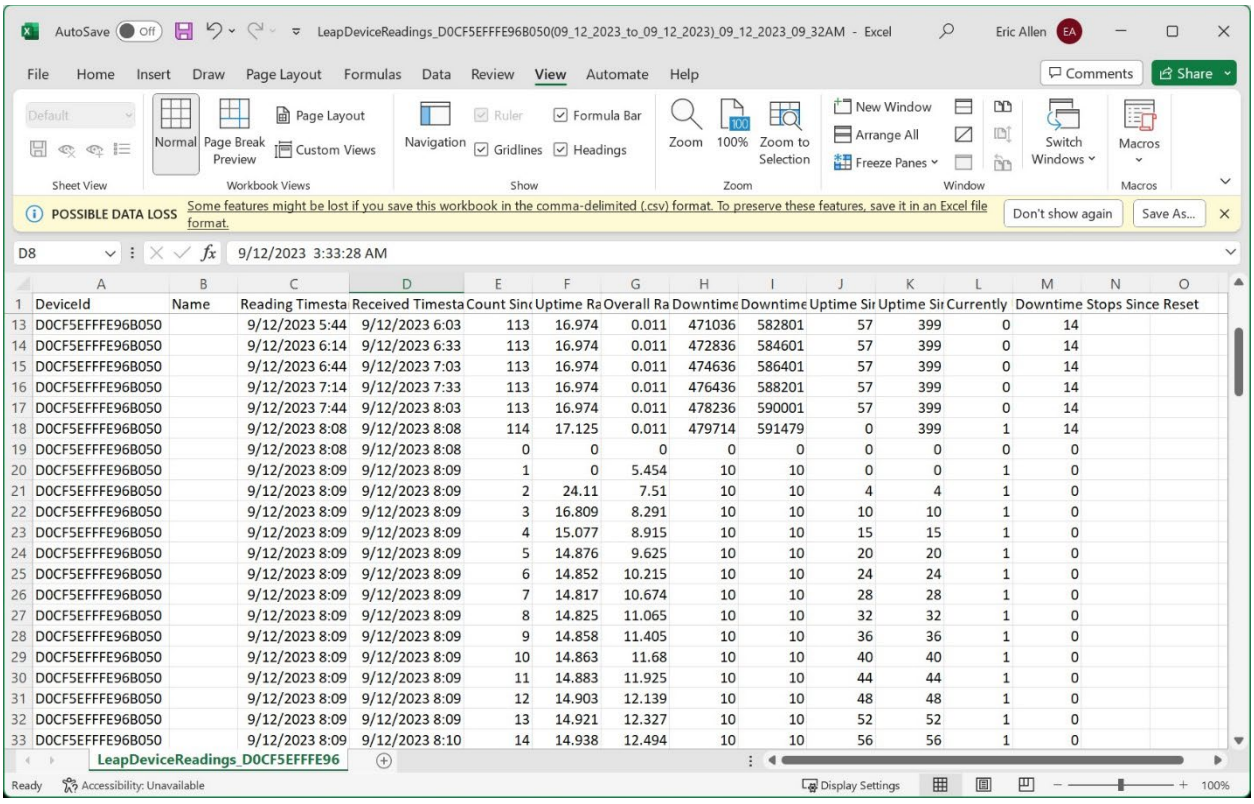


Figure 1: Download Readings Window

Edit the date range you want to download data from, then click the "**Download Range**" button, or select "**Download All**" to download all the data available for the selected device(s). A Comma Separated Values file (csv) file will be generated and will be saved by the web browser (like downloading any file on the internet) to the default 'downloads' folder of your web browser.

If you wish to view the downloaded CSV file in Microsoft Excel, just double click on the file from your filesystem. Excel will open the file.

NOTE: Times and dates in the spreadsheet are displayed in the time zone specified when downloading the data (your local time zone by default, or optionally UTC time).



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	DeviceId	Name	Reading Timesta	Received Timesta	Count Sinc	Uptime Ra	Overall Ra	Downtime	Downtime	Uptime Sir	Uptime Sir	Currently	Downtime	Stops Since Reset	
13	D0CF5EFFFE96B050		9/12/2023 5:44	9/12/2023 6:03	113	16.974	0.011	471036	582801	57	399	0	14		
14	D0CF5EFFFE96B050		9/12/2023 6:14	9/12/2023 6:33	113	16.974	0.011	472836	584601	57	399	0	14		
15	D0CF5EFFFE96B050		9/12/2023 6:44	9/12/2023 7:03	113	16.974	0.011	474636	586401	57	399	0	14		
16	D0CF5EFFFE96B050		9/12/2023 7:14	9/12/2023 7:33	113	16.974	0.011	476436	588201	57	399	0	14		
17	D0CF5EFFFE96B050		9/12/2023 7:44	9/12/2023 8:03	113	16.974	0.011	478236	590001	57	399	0	14		
18	D0CF5EFFFE96B050		9/12/2023 8:08	9/12/2023 8:08	114	17.125	0.011	479714	591479	0	399	1	14		
19	D0CF5EFFFE96B050		9/12/2023 8:08	9/12/2023 8:08	0	0	0	0	0	0	0	0	0		
20	D0CF5EFFFE96B050		9/12/2023 8:09	9/12/2023 8:09	1	0	5.454	10	10	0	0	1	0		
21	D0CF5EFFFE96B050		9/12/2023 8:09	9/12/2023 8:09	2	24.11	7.51	10	10	4	4	1	0		
22	D0CF5EFFFE96B050		9/12/2023 8:09	9/12/2023 8:09	3	16.809	8.291	10	10	10	10	1	0		
23	D0CF5EFFFE96B050		9/12/2023 8:09	9/12/2023 8:09	4	15.077	8.915	10	10	15	15	1	0		
24	D0CF5EFFFE96B050		9/12/2023 8:09	9/12/2023 8:09	5	14.876	9.625	10	10	20	20	1	0		
25	D0CF5EFFFE96B050		9/12/2023 8:09	9/12/2023 8:09	6	14.852	10.215	10	10	24	24	1	0		
26	D0CF5EFFFE96B050		9/12/2023 8:09	9/12/2023 8:09	7	14.817	10.674	10	10	28	28	1	0		
27	D0CF5EFFFE96B050		9/12/2023 8:09	9/12/2023 8:09	8	14.825	11.065	10	10	32	32	1	0		
28	D0CF5EFFFE96B050		9/12/2023 8:09	9/12/2023 8:09	9	14.858	11.405	10	10	36	36	1	0		
29	D0CF5EFFFE96B050		9/12/2023 8:09	9/12/2023 8:09	10	14.863	11.68	10	10	40	40	1	0		
30	D0CF5EFFFE96B050		9/12/2023 8:09	9/12/2023 8:09	11	14.883	11.925	10	10	44	44	1	0		
31	D0CF5EFFFE96B050		9/12/2023 8:09	9/12/2023 8:09	12	14.903	12.139	10	10	48	48	1	0		
32	D0CF5EFFFE96B050		9/12/2023 8:09	9/12/2023 8:09	13	14.921	12.327	10	10	52	52	1	0		
33	D0CF5EFFFE96B050		9/12/2023 8:09	9/12/2023 8:10	14	14.938	12.494	10	10	56	56	1	0		

Figure 2: Dates and Times are displayed in the time zone specified when downloading the data. The time zone used for the data is also present at the end of the "Reading Timestamp" and "Received Timestamp" columns in the spreadsheet.

2.4.1 Steps to Display Seconds with Time Stamp Data in Excel Spreadsheets

By default, Excel does not display the seconds in the time stamps in the "**Reading Timestamp**" and "**Received Timestamp**" columns. To force Excel to show the seconds, follow these steps:

1. Right-click on a cell with a time stamp – such as cell B2 above.
2. Click on "Format Cells", then "Custom" under the "Category" area.
3. Modify the fields as shown in Figure 3.
4. Finally, use the Format Painter tool to apply this to each column with a time stamp.

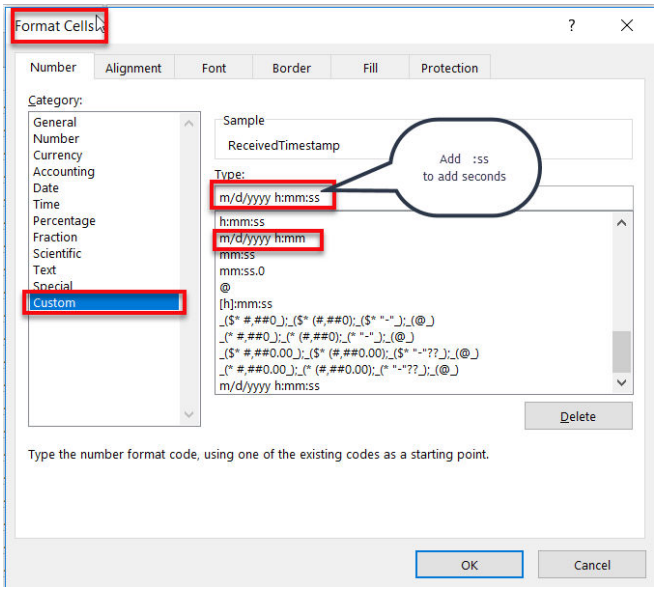
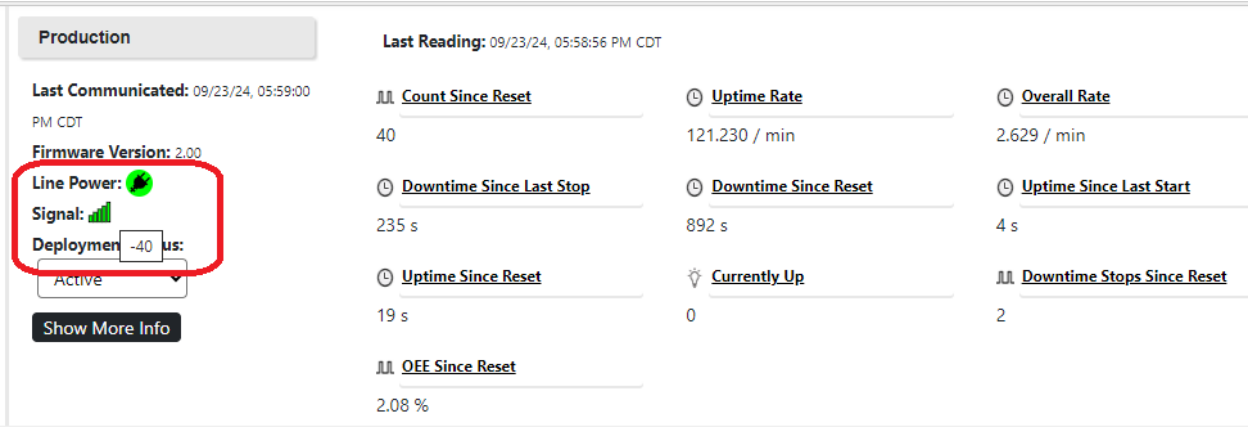


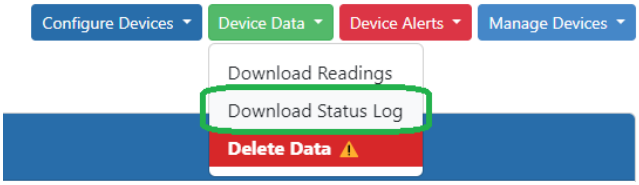
Figure 3: How to Display Seconds with Timestamps within Excel

2.4.2 Additional Diagnostics from the Leap Interface

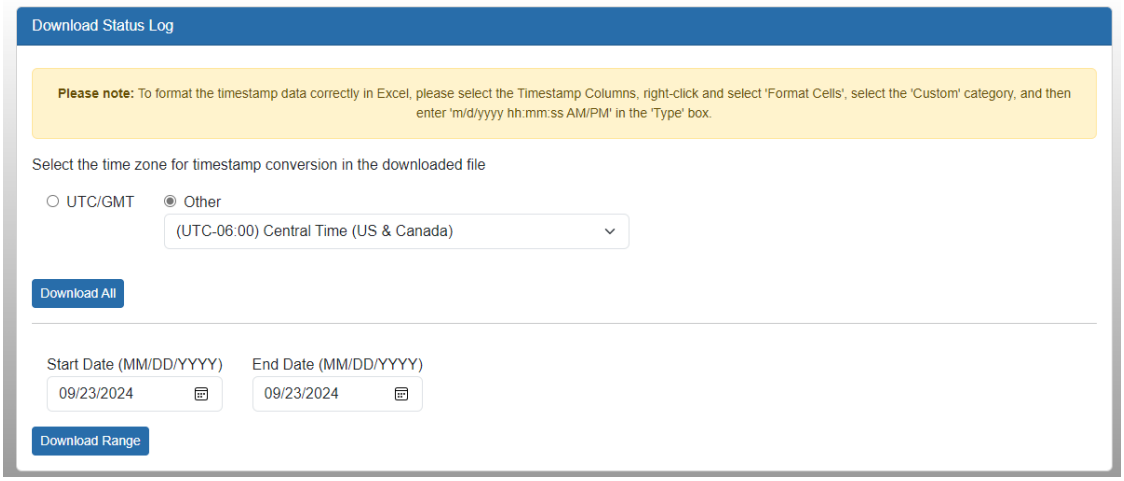
On the device screen there are two icons to share the status of the electrical status of the node and the signal strength of the data transmission. Since the production count node is a powered node, it should show a power plug icon. When hovering over the icon, the text will read "device is line powered."



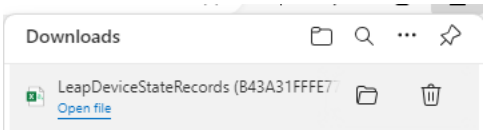
The signal strength icon is similar to the signal strength indicator on a phone. However, our software will tell you a little more. If you hover over the icon, it will give you a numerical measure in dB for the signal strength. For example, this screen shot shows a value of -40 dB, which is very strong, which is why we show all green bars. The number will almost always be negative, and values that get more negative than -85 dB indicate a weak signal that needs to be addressed. Signal strength can be improved by re-positioning the node or the gateway, or changing the orientation of the node. You may also want to add a range extender between the node and the gateway. Ask Phase IV for help if you can't get a good signal.



Another diagnostic feature is to download the "Device Status Log." This allows users to view key node readings over time. To access, select the checkbox of the node to download data for, click the green Device Data button, then select the "Download Status Log" option. Another box will open, just like with the download data option discussed above in Section 2.4. Pick the dates you want to view and click "Download Range."



A CSV file will download to your computer which you can open in Microsoft Excel by clicking Open File.



The data should look something like this:

	A	B	C	D	E	F	G	H	I	J	K	L
1	Id	Name	Timestamp (Centra	Battery Leve	Boot Timestamp	Clock Error	Storage Fu	Received Signal	Configura	IsLinePower	InternalTemperature	
2	B43A31FFI	B43A31FFI	9/23/2024 0:07	3279	9/18/2024 10:57	-0:00:01.1098025	0	-38	D071781C	TRUE	21.9	
3	B43A31FFI	B43A31FFI	9/23/2024 0:17	3279	9/18/2024 10:57	-0:00:01.0529651	0	-38	D071781C	TRUE	21.4	
4	B43A31FFI	B43A31FFI	9/23/2024 0:27	3279	9/18/2024 10:57	-0:00:01.0629333	0	-38	D071781C	TRUE	21.9	
5	B43A31FFI	B43A31FFI	9/23/2024 0:37	3279	9/18/2024 10:57	-0:00:00.9410222	0	-38	D071781C	TRUE	21.5	
6	B43A31FFI	B43A31FFI	9/23/2024 0:47	3279	9/18/2024 10:57	-0:00:01.0224347	0	-38	D071781C	TRUE	21.5	
7	B43A31FFI	B43A31FFI	9/23/2024 0:57	3279	9/18/2024 10:57	-0:00:01.0833917	0	-38	D071781C	TRUE	21.5	
8	B43A31FFI	B43A31FFI	9/23/2024 1:07	3279	9/18/2024 10:57	-0:00:01.0205993	0	-38	D071781C	TRUE	21.4	
9	B43A31FFI	B43A31FFI	9/23/2024 1:17	3279	9/18/2024 10:57	-0:00:00.4344284	0	-38	D071781C	TRUE	21.7	
10	B43A31FFI	B43A31FFI	9/23/2024 1:27	3279	9/18/2024 10:57	-0:00:01.2575273	0	-38	D071781C	TRUE	21.7	

LeapDeviceStateRecords (B43A31F

The data you will see includes the ID and Name of the node. Then there is a column for a timestamp of each data transmission received. For each transmission the following data will be displayed:

D. Battery Level- This is the level of the battery or external power supply, measured in mV. In this example, the value of 3279 mV could also be understood as 3.279 Volts.

E. The Boot Timestamp- This is the last time that the node was power cycled and rebooted. This can be helpful to determine if values are resetting due to a reset button or a power loss.

F. Clock Error: With each transmission, the Leap Server and the node compare times and the time of the node is periodically adjusted to keep the node time accurate. You can view how far off the time difference is from this entry.

G. Storage Full Percent: If a node has been storing a lot of data due to being out of range of a gateway or Leap Server, this value shows how full the node is with data. Most nodes can hold up to 40,000 data points, so it can take some time for a node to send all of its data to the Leap server. Normally, when everything is working right, this number will be zero.

H. Received Signal Power: This is the level of signal received from the node in dB. This value can be used to determine if conditions are changing that impact signal strength.

I. Configuration Hash: This is a value that conveys current configuration of the node back to the Leap Server. Use this to see if the configuration was changed at any point.

J. Is Line Powered: If the power for the node comes from an external power source, the value is TRUE, if the power for the node comes from battery, the value is FALSE.

K. Internal Temperature: This is the temperature of components inside the node in degrees Celsius. This data may be helpful for determining issues in extreme weather conditions or if something is causing the node to overheat.

The Status Log can give users insight into behind the scenes data when troubleshooting performance. This data is only available with Leap Servers version 3.0 or higher used with nodes installed with firmware versions 2.0 or higher.

2.5 Optional Add On Features

The LEAP Production Counter has many features that customers can use to better understand the performance of production lines. The built-in features are sufficient for most situations. However, Phase IV does offer some additional features and services that can make the experience even better.

2.5.1 Text, Phone, or Email Alerts

With the purchase of Alert notifications to your users, you can set alerts based on any of the ten sensor values that are part of your production count sensor. You can notify users when a value gets too high like total downtime, or when a downtime event has gone too long, or when a stop count is too high. You can notify users if a value is too low, like OEE. You can determine how many times to alert users when these situations occur, and can set up different users with different alerts and have different alerts on different devices. You can also set device alerts to let users know if a node has stopped sending data, which may be for a variety of reasons that need to be investigated.

2.5.2 Sharing Data through Modbus TCP

With the purchase of a LEAP Modbus TCP Server extension, your system can provide data to other data systems, like data historians, PLCs, or operator interfaces. Modbus TCP is an extremely common protocol used often in factory automation for sharing data between different types of hardware and software using only Ethernet.

2.5.3 Share data using the Leap API

With purchase of the Leap API, users can connect data from the Leap system to other systems using our software API. Often, software programmers use our API to connect to other systems at the software level. Our Rest API uses industry standard protocols for ease of connecting data between applications.

2.5.4 Build Custom Dashboards for displaying data

With the purpose of our configurable dashboards, you can make dashboards that look the way you want them to look. You can make different dashboards for different audiences or departments. You could make a dashboard to display on a monitor in the production area with counts and OEE with an up/down chart. You could make a dashboard with key metrics for several lines to be used by supervisors on their tablets or phones. Dashboards are configured how you want them, built from multiple available configurable widgets, so it's up to your creativity to make exactly what you want. If the feature you isn't currently available with an existing widget, just ask and we'll quote what it will take to make the feature available.

3. Technical Support

For more information about our products and services, or for technical assistance:

Visit us at: www.phaseivengr.com
Tel: +(303) 443 6611 (USA – MST 8:00 a.m. to 5:00 p.m., Mon.-Fri.)
E-Mail: support@phaseivengr.com

If you need assistance, please provide the product part number, product serial number, and product version.