TrackIt® Web Console

TrackIt Delivery Cycle Monitoring

Version: 1.0

Hardware & Software Installation Guide

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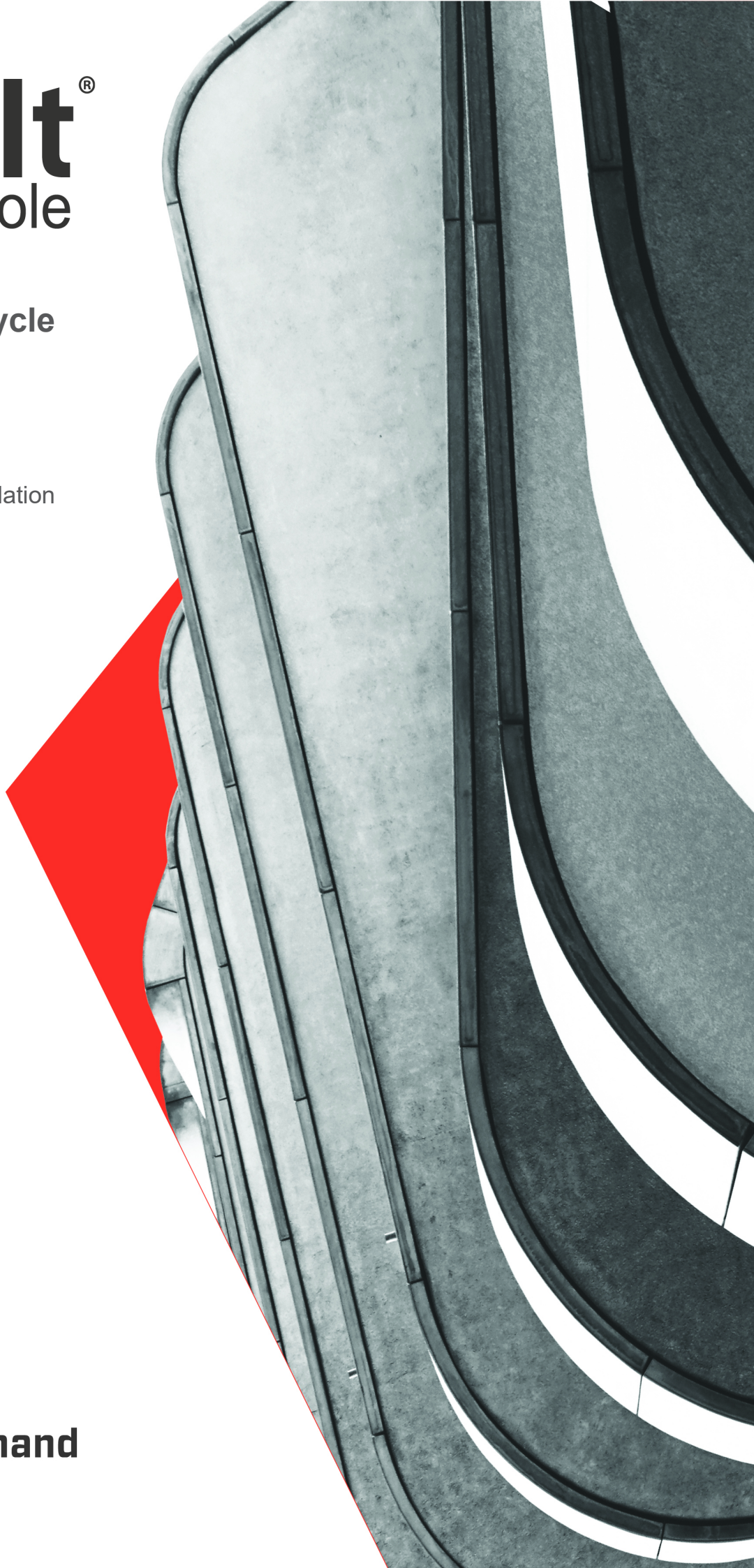


Command Alkon

TrackIt Delivery Cycle Monitoring Installation Guide

Thank you for choosing Command Alkon Incorporated for your TrackIt Delivery Cycle Monitoring assembly. This assembly provides invaluable batch monitoring, auto-statusing, and reporting to ensure quality concrete and job delivery.

The following guide includes both the Hardware and Software Installation and Configuration for the TrackIt Delivery Cycle Monitoring system. These instructions should be considered best practices for installation to prevent safety issues and to ensure your system retrieves the most accurate data for reporting and maintenance.

TrackIt Delivery Cycle Monitoring Hardware Installation

TrackIt Delivery Cycle Monitoring is a hardware and software configuration setup used on concrete trucks to gauge drum rotation speeds and direction. Installation of the sensors occurs around the flange of the hydrostatic transmission for the drum. The hardware is then configured using the TrackIt Web Console and TrackIt Android apps. Upon successful setup, the rotation speed and direction of the drum may be tracked, logged, and adjusted via TrackIt.

The following is an outline of the steps required to complete the hardware installation:

1. Meet the hardware and software requirements
2. Install the Sensor Link
3. Install the Drum Rotation Sensor and magnet assembly
4. Install the Water Flowmeter (optional)

Hardware & Software Requirements

This system consists of the Sensor Link interface box, Drum Rotation Sensor, drum magnets, cables, and mounting equipment. The TrackIt Delivery Cycle Monitoring hardware is all provided as part of the same kit. Optional components, like water flow meters, are not included or supported by Command Alkon Incorporated.

Minimum compatibility requirements

The tablet is shipped with the required hardware and software configurations in place.

For troubleshooting purposes, the following requirements exist:

- Android OS 6.0.1+
- Android System WebView 62+
- Event Service Manager (ESM) v2.0.3+
- TrackIt Android v14.4.46+
- Tablet with cellular
- Full MDM or TrackIt Remote Support
- Sensor Link application 5.5.7.10+

TrackIt Delivery Cycle Monitoring assembly components

This TrackIt Delivery Cycle Monitoring assembly consists of three main elements: the Sensor Link interface box, Drum Rotation Sensor, and drum magnets.

Component *Sensor Link Interface Box*

Description

- The central component that all sensor pieces connect to. This powers the Drum Rotation Sensor and routes all communication between the sensor and magnets.

Component *Sensor Link Power Cable*

Description

- M12 connector

Component *Drum Rotation Sensor*

Description

- Senses passing magnets attached to the truck drum to retrieve data for calculating speed and direction of the drum rotation
- Attaches to the mounting bracket with two bolts and connects to the Sensor Link

Component *Mounting Bracket*

Description

- Includes two pre-attached pieces for mounting to the concrete truck. The TrackIt Delivery Cycle Monitoring is attached to the truck via the mount.
- Compatible with other sensors, such as DOT sensors.

Component *Bolt Magnets*

Description

- Four (4) Bolt magnets are included in a basic kit
- Four (4) Disc magnets may also be used
- If magnets have previously been installed, these may vary in shape and number

Component *Drum Rotation Sensor Cable*

Description

- Current available length(s) of cable: 10m
- Attaches to the Drum Rotation Sensor and feeds into the Sensor Link

Component *Waterflow Meter Cable (optional)*

> ⚠ The TrackIt Delivery Cycle Monitoring assembly is not shipped with a water flow meter, but the assembly is compatible with water flow meters via this cable.

Description

- Current available cable length(s): 10m
- Connects the flow meter and Sensor Link
- Compatible with flow meters with a 5-pin M12 connector

Required tools & equipment

Use the following additional tools and equipment to install the TrackIt Delivery Cycle Monitoring assembly:

- Cable ties for securing the assembly cables
- 3/4" deep socket and 3/4" shallow for bracket mount
- 6" extension and ratchet to clear the bracket depth and get into the nook of the drum transmission support
- 10mm socket for bracket hardware
- Flush cutters
- Electrical tape
- Tape measure
- Pry tools of fiber or plastic for mounting magnets
- Wire crimpers
- Wire strippers
- Any other tools required to mount the sensor and magnets

Install the Sensor Link

The Sensor Link is used as a communication interface between the various electrical devices on the truck, and wirelessly shares signal data to the driver tablet interface.

Installing the Sensor Link

The Sensor Link interface box should be located inside the cabin of the truck, as it is not designed to be exposed to the elements. Ideally, it should be located behind or under a seat. Otherwise it should be installed at an easy access location, preferably on the back wall of the cabin and with the reset button located on the top.

Install the Sensor Link and secure it using appropriate fasteners. Its cable configuration is detailed in the following section.

The Sensor Link utilizes multiple cable connections to facilitate communication between devices. The following connections must be made to properly utilize the DRS:

- To power the Sensor Link interface box, connect the cable to the top-right connector (`Power`) and then to the truck's fuse box.
- To connect to the Drum Rotation Sensor, utilize the bottom-middle connector (`Flow 2 (4)`).
- To connect to an optional flowmeter, connect the cable to the bottom-right connector (`Flow 1(3)`).

Power connection to the truck

For the power connection, we use the Sensor Link Power cable with M12 connector as displayed below.

Wire connections should be as follows:

Wire Color	Function
Black	GND
Red	+12V to 24V (with in-line 5A fuse)
White	Ignition Input

Install the Drum Rotation Sensor

Installation of the Drum Rotation Sensor consists of two components: the sensor magnets and the sensor itself. One is installed on the drum, whereas the other is attached to the hydrostatic transmission case. The process of installing these components is quite straightforward and described further below.

> ⚠ Position the Drum Rotation Sensor Assembly independent from any other existing sensors on the truck. Sometimes other sensors and magnets interfere with the Drum Rotation Sensor Assembly.

Installing the magnets

Typically, four (4) magnets are installed with even spacing around the flange. These are often done between existing bolts on the flat flange surface as shown above.

Three types of magnets may be used with the Novotron sensors.

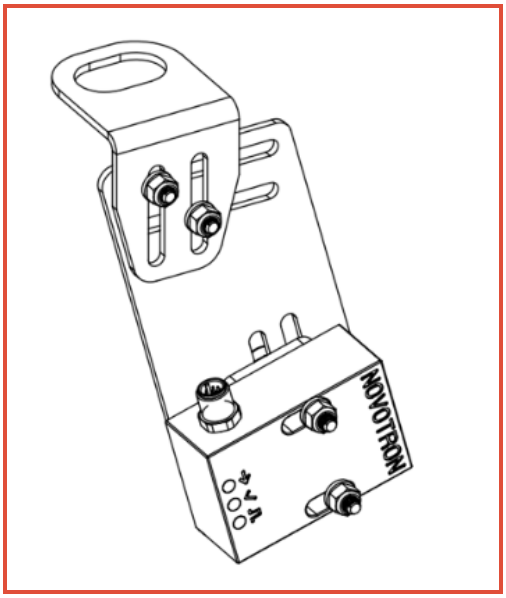
- Bolts: Three (3) magnets instead of the typical four (4)
- Existing: Include different mounts

- Disc magnets: Four (4) magnets

Magnets are provided to signal speed and direction of the drum. As these magnets pass in proximity to the sensor, the sensor is able to determine rotation and speed. These magnets should be installed evenly around the flange of the hydrostatic transmission for the drum.

Installing the sensor bracket

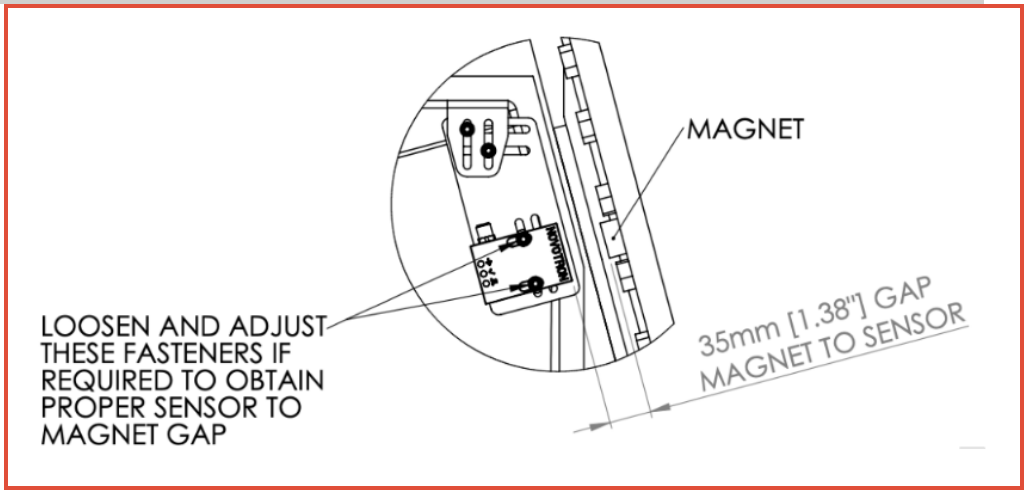
Once the magnets are installed, you should now install the drum rotation sensor.



When installing the sensor, we suggest that you position the sensor in proximity to the magnets on the drum flange.

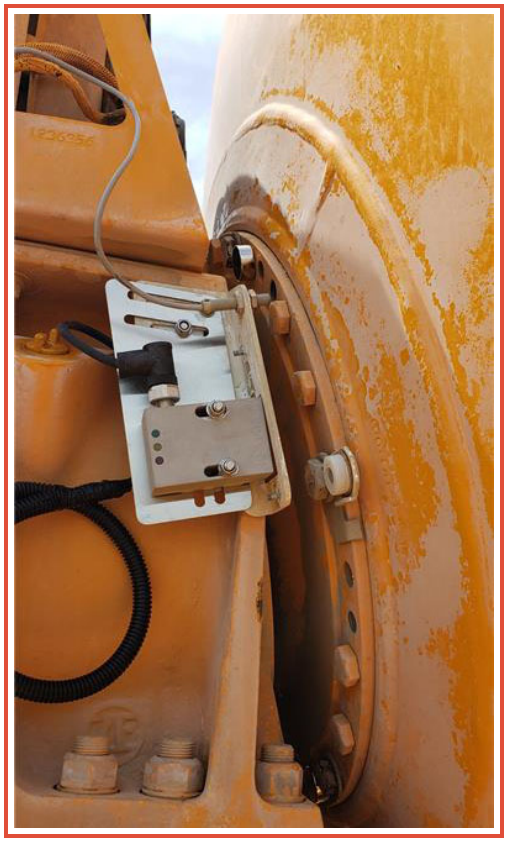
To install the sensor bracket

1. Remove the bolt from the transmission case.
2. Install the bracket below the case.
3. Reinstall the existing washer and hex nut to attach bracket to case, leaving loose enough to adjust the sensor's position.



4. Slide the upper bracket in or out to position the center of the magnetic sensor in line with the magnet path.
5. Re-tighten the large nut to hold the bracket in position.
6. If needed, loosen the small hardware to adjust the lower bracket so the long edge is parallel to the drum.

Bolt Magnet installation with pencil sensor



Attaching sensor to bracket

Before tightening the sensor to the bracket, loosely attach the sensor to the bracket arm, mount the bracket tightly, and check spacing as specified below. This will give you more flexibility as you find the optimal position for the sensor.

Spacing the sensor from the magnets

It is important that the spacing between the sensor and the magnets be set correctly. If the sensor is positioned too far away from the magnets, it may not pick up the magnets. Position the sensor too close and contact may occur between the sensor and magnets under extreme conditions.

The table below outlines the ideal proximity between the sensor and magnets.

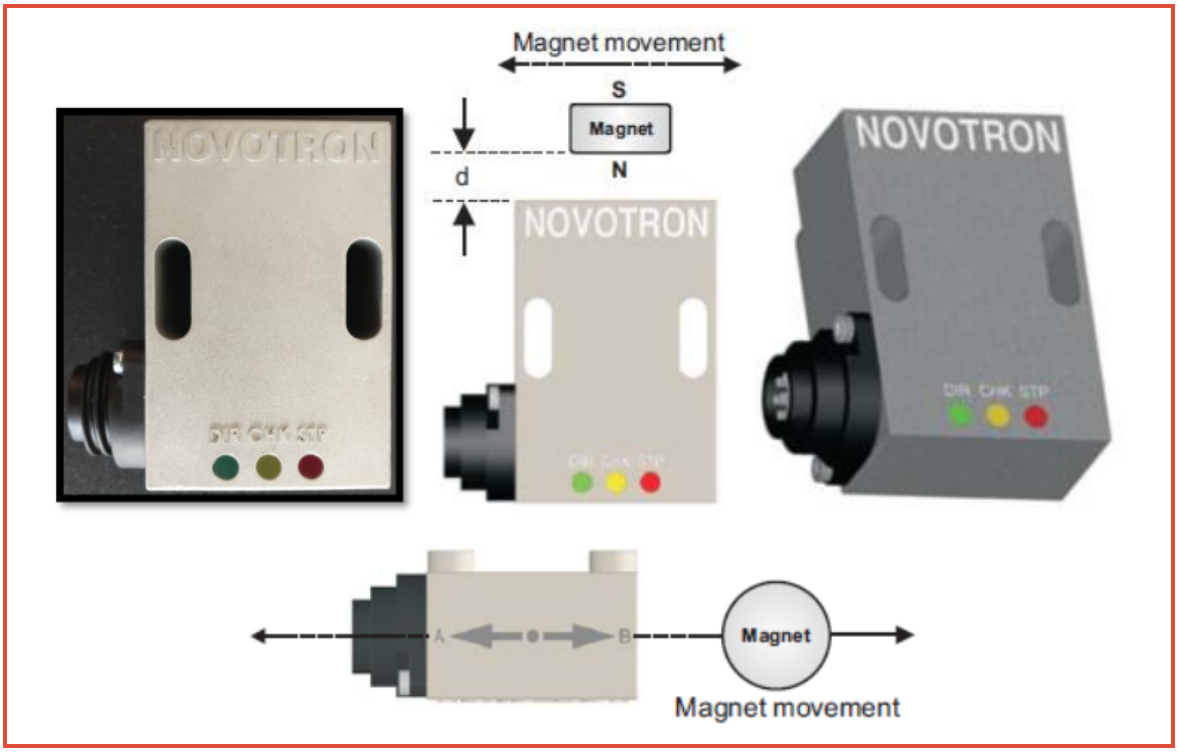
	Bolt Magnets	**Disc Magnets**
Compatible Sensor	Novotron V2	Novotron V1
Ideal Space	1" (25mm)	1-3/8" (35mm)
Minimum Space	5/8" (15mm)	7/8" (20mm)
Maximum Space	1 3/8" (35mm)	1-9/16" (40mm)

Ensuring power to the sensor

After connecting the Drum Rotation Sensor and cabling, make sure it is powered by turning on the truck ignition. You may then confirm functionality of the sensor using the magnet and the three LED's on the sensor as follows:

- One side of the sensor is marked by an arrow and the letters `A` and `B`. When moving a magnet along the arrow, the sensor will detect the magnet moving direction and switch the output relay `DIR` accordingly. The green LED `DIR` (direction) will indicate the current output state.
- Each time the magnet passes, the output relay `STP` (stop) provides a one-second pulse.
- If the magnet passes close enough to the sensor close to generate a safe signal amplitude, the yellow `CHK` (check) will be switched on for one second.

Make sure that the magnet's center moves aligned with the arrow marking on one side of the sensor, and that the `CHK` LED switches on when the magnet passes.



Install the Water Flowmeter Cable

While the TrackIt Delivery Cycle Monitoring assembly is compatible with certain water flow meters, a flow meter is not included with the assembly. Customers must supply their own. If you have a water flow meter that is not compatible with the Sensor Link, Command Alkon Incorporated recommends you replace them with compatible flow meters.

You may also wish to monitor water added to a load after it leaves the plant. Water flow meters are available to measure water added, and send electrical pulses to a measurement system (e.g., 100 pulses per gallon). The Sensor Link can also receive these signals and report water added to the driver as well as web reporting services.

A common flowmeter is the CX8 series from Universal Flow Meter, with a 5-pin M12 connector. A 5-pin M12 connector is required if you choose to use a different type of flowmeter.

For proper installation the flowmeter must be installed and mounted inline with the drum water feed. Do not install in the wash water feed.

To install the flowmeter

1. Run the water flowmeter cable between the flowmeter and the Sensor Link inside the vehicle cabin.
2. Ensure the Sensor Link power cable is connected to the Sensor Link. Power is provided to the flowmeter from the Sensor Link box at the same voltage wired to the Sensor Link's power input.

Troubleshooting the Drum Rotation Sensor

The following section describes common and uncommon behaviors along with steps to solve any problems that may arise while using the Drum Rotation Sensor.

How do the sensor lights normally operate?

With the drum turning, each time a magnet passes the magnetic sensor, the LEDs should light up as follows:

POWER (ON)	YELLOW is ON solid, and blinks while the magnet passes
DIRECTION A > B	RED and GREEN both flash ON while magnet passes
DIRECTION B > A	RED flashes ON while magnet passes

Why aren't the sensor lights on?

If no lights are blinking on the sensor, we suggest that you check the Sensor Link Power LED to confirm that vehicle power is present. If power is flowing to the Sensor Link, then the yellow light should be on. Additionally, check to make sure the Sensor Link to Drum Rotation Sensor cable is plugged in at both ends.

How do lights on the Sensor Link function?

If the cable connections are properly connecting the sensor to the Sensor Link, then the LEDs for both FLOW 2 and FLOW 4 should flash when a magnet passes by the sensor.

What's next?

Now that the hardware assembly is installed, it must be configured to communicate with the TrackIt Web Console and TrackIt Android. Instructions regarding this process are found in the TrackIt Delivery Cycle Monitoring Software Configuration Guide

TrackIt Delivery Cycle Monitoring Software Configuration

Once you have installed the TrackIt Delivery Cycle Monitoring hardware on a truck, the software components need to be configured to properly retrieve and interpret data from the system. To configure the TrackIt Web Console for your web users and TrackIt Android for your drivers, do the following:

1. Add licenses & sensor settings
2. Set up the Sensor Link with the tablet
3. Create alerts and monitor reports
4. Complete the installation checklist

Assign licenses

Performing this step enables the web and tablet components to display the correct pages for further configuration. You can add licenses to equipment individually or add in bulk.

> ⚠ The following settings are typically only available to those with Admin permissions within TrackIt.

To add licenses to equipment in bulk

> ⚠ While the TrackIt Delivery Cycle Monitoring License, Sensor Type, and Drum Type can be added in bulk, the Flow Meter Volume Per Pulse, Water Units, Sensor Link MAC Address, and Magnet's Count must be entered for each piece of equipment in the TrackIt Android application.

1. Navigate to **Settings > Licenses > Licenses**.
2. Select the Delivery Cycle Monitoring license from the **License** drop-down menu.
3. Use the State, Plants, Equipment Types, and Equipment Groups to filter your equipment and click **Apply** Apply.
4. Check the box next to each piece of equipment that needs a Delivery Cycle Monitoring (DCM) license.
5. Click **Save** Save. You will now need to choose a sensor type for each piece of equipment.
6. Navigate to **Settings > Equipment > Equipment Bulk Update**.
7. Check ☑ the DCM Sensor Type box.
8. Choose `Novotron 1` or `Novotron 2` from the drop-down menu.
9. Click **Save** Save +.

To add licenses to equipment individually

1. Navigate to **Settings > Equipment > Equipment**.
2. Click **Edit**  next to the piece of equipment that needs a license.
3. In the *Edit Equipment* dialog screen, select the *Licenses* tab.
4. Find and check  the box for the Delivery Cycle Monitoring. The *Sensors* tab will appear.
5. Click **Save**  .

Configure Sensor Settings: Drum Type, Status Changes, System Settings

After adding a license for TrackIt Delivery Cycle Monitoring to your truck, the **Sensor** Settings need to be properly configured before the Sensor Link and tablet are paired.

To enter system settings

1. Navigate to `Settings > Sensor > System Settings`.
2. From each drop-down menu, choose the desired units for each value.
3. Click **Save Settings** 

when finished.

To enter drum type

1. Navigate to `Settings > Sensor > Drum Type`.
2. Select **Add Drum Type** 

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3. Enter a drum type **Name**.
4. In the *Drum* tab, enter Drum Circumference (Yard) and Mixing Direction.
5. In the *Unloading* tab, enter **Volume When Fully Loaded**, **Turns Required to Start Pouring**, **Turns Required to Fully Unload**, and **End Pour Trigger Threshold (%)**.
6. Click **Save & Close** 

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To enter Status Changes

1. Navigate to *Settings > Sensor > Status Changes*.
2. Select your TrackIt Delivery Cycle Monitoring status type.
3. From each drop-down menu, select the status that will trigger in your ticketing system when the automatic statuses are triggered.

> ⚠ The Loading status meaning must be In Service, Arrive Plant, or Ticketed for the auto-statusing feature to work properly with this status.

> ⚠ Fully Mixed is not currently supported with TrackIt Delivery Cycle Monitoring.

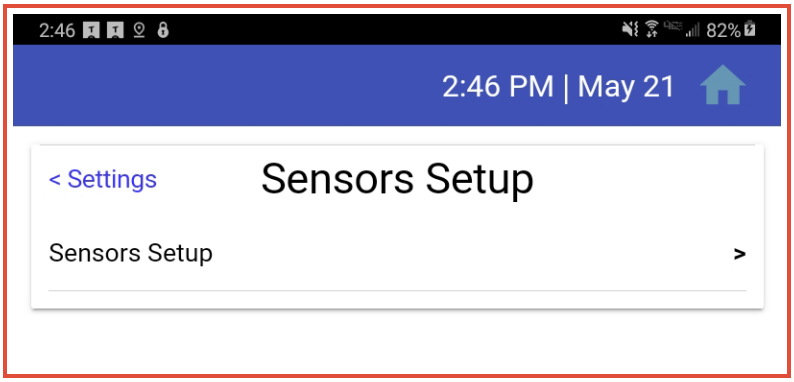
4. Click **Save Settings**  when finished.

Connect the Sensor Link to the Sensor app

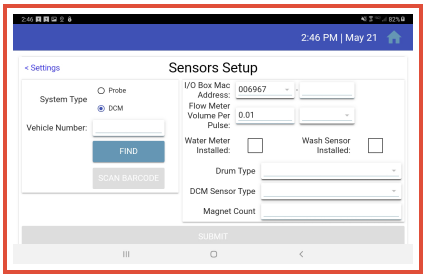
The Sensor Link and the equipment tablet need to be properly linked for hardware data retrieval. You will link the tablet and Sensor Link for each truck with the TrackIt Delivery Cycle Monitoring hardware installed. During this step, you will also set the vehicle's drum type, sensor type, and magnet count.

To connect the Sensor Link and tablet

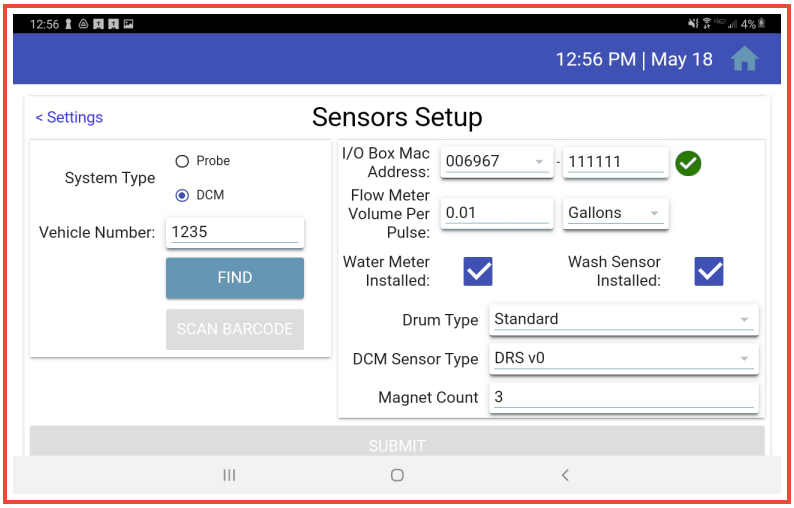
1. Enable the tablet's Bluetooth signal and data.
2. Open the TrackIt Android application.
3. Tap the gear icon in the top right.
4. Select **Sensors** from the menu, then tap **Sensors Setup**.



5. Tap the **DCM** radio button.



6. Enter the Vehicle Number or tap **FIND**.
7. Tap **SCAN BARCODE** to scan the Sensor Link bar code or QR code. This will populate the I/O Box Mac Address field.
8. Choose a **Drum Type**.
9. Choose a **DCM Sensor Type**.
10. Enter the installed **Magnet Count**.



11. Tap **SUBMIT**.

Reports

After the TrackIt Web Console and TrackIt Android are configured with TrackIt Delivery Cycle Monitoring assembly, the Web Console can generate reports based on the data received. Once trucks with the assembly are ticketed and begin their normal workflow, these reports will provide invaluable insight into various aspects of the fleet's job performance. These reports are the **Batch Summary**, **Load Properties**, **Unauthorized Pour**, **System Health History**, and **System Health Summary** reports.

Batch Summary Report

The **Batch Summary** report is intended to help batchers receive feedback on loads and ensure quality concrete. With the TrackIt Delivery Cycle Monitoring assembly, you can view typical ticket info along with the batch Water/Concrete (W/C) ratio, status time stamps, and End Pour Age.

Tips for viewing this report

- Ensure the water flowmeter (if used) is installed properly to retrieve Water Added data
- Monitor error messages to prevent future issues
  - Driver Error
  - Data Loss
  - Status Problem
- Use the Include Voided Tickets filter to investigate rejected loads
- Click the Load Properties icon next to a ticket to view a graphed time line of the load
- Use the Info icon to access more detailed status and ticket information

Load Properties Report & Load Properties Graph

The Load Properties report provides a detailed, timestamped record of each load. With the TrackIt Delivery Cycle Monitoring system, the Load Properties reports includes detailed drum direction and turn values. The Load Properties graph displays detailed graphs of ticket and equipment data over a single day. The graph allows for a large overview and the ability to dig deeper into the details of the data.

Tips for viewing the Load Properties graph

- Highlight/filter by only the values you want to display on the graph to simplify the graph appearance.
- Scroll with your mouse to adjust the equipment or ticket time range.
- Highlight a time frame to zoom in on the selected length of time.
- Long, curvy lines means data is missing from the Sensor Link.
- Gaps in data occur when the graph is filtered by vehicle. The gaps represent a vehicle between loads. The graph does not display gaps like this when the graph is filtered by ticket.
- Click the Chart context menu button to download or print the graph.

Tips for viewing the Load Properties report

- Click the **Export Report** Export Report button to export the detailed report to a spreadsheet.
- When filtering by vehicle, take into account differences in data for gaps between the tickets.

- Each line of data accounts for as little as a few seconds to as much as a few minutes of data received. This supplies detailed information but is not easily digestible information. Try the Load Properties graph for more digestible data.

Unauthorized Pour Report

The Unauthorized Pour report displays ticket information from pours that occur outside of the designated Job Hotspot listed on the ticket. Administrators can use this report to monitor pours more closely and adjust Job Hotspots or destinations if needed.

Tips for viewing this report

- Use the filters to narrow your search by date, Equipment, Employee, Last Plants, Customer, Jobs, and Distance Threshold from the ticket destination.
- Adjust the Distance Threshold to view pours that occurred outside of a reasonable distance from the intended location.
- You may adjust the Distance Threshold in decimal increments of a mile.

System Health History & System Health Summary Reports

The System Health History displays tables listing the your system's health statuses with timestamps. The same information listed in detail here is displayed in the System Health Summary in less detail. The System Health Summary displays a pie chart called the DCM Health aspect to provide a quick view of your trucks with TrackIt Delivery Cycle Monitoring.

These reports display data about the health state of devices and systems installed in your fleet. The DCM Health aspect will display how many trucks may be experiencing the following states:

- DCM Malfunction
- DCM Good
- No IO Box Address
- COMMANDassurance Malfunction
- ESM malfunction
- DCM No Magnet Signal
- Wiring Pulse Error

If your vehicles display these states and you have questions, contact TrackIt Customer Support at trackitsupport@commandalkon.com or (800) 624-1872, Option 2 then Option 9.

Tips for viewing the System Health Summary

- Filter your Health Aspect Selection to include only the DCM Health aspect to focus your results.
- The pie chart displays the most recently reported state from the device. The System Health History report will display every state a device experiences throughout the filtered time frame.
- Hover your mouse over each piece of the pie chart to display how many trucks are experiencing that state. You will see the number and then the percentage of trucks (e.g. 6 (3%)).
- Click a section of the pie chart to display the System Health Detail dialog window, which includes additional details about the equipment and driver.

Tips for viewing the System Health History

- Filter your Health Aspect Selection to include only the DCM Health aspect to focus your results.
- Keep in mind each device may display multiple states throughout the day. The most recent state will display on the System Health Summary.

Add the DCM Health Alert

Adding a health alert is optional but advised. Using alerts will help you monitor the TrackIt Delivery Cycle Monitoring system for any issues that may arise.

To add the DCM Health Alert

1. Navigate to *Settings > Alerts*.
2. Click the **Add Alert** 

button.
3. In the *Add Alert* dialog window, select Health Aspect Alert from the drop-down menu.
4. Enter a Name for the alert. Ex: **DCM Health Alert**
5. Check  the health aspect(s) the alert will monitor.
6. Enter the Filter criteria, Driver Messages, and Notification.
7. Click **Save & Close** 

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Installation checklist

Review the following to ensure you have completed the installation properly.

☐ The Sensor Link is installed in the truck's cabin, is receiving power, and is properly connected to the other hardware components.

☐ The Drum Rotation Sensor is installed and connected to the Sensor Link.

☐ The Drum Rotation Sensor is securely mounted to the supplied bracket and is within the ideal range of distance from the magnets.

☐ The Drum Rotation Sensor lights are operating as expected.

☐ (Optional) The water flowmeter is installed inline with the drum feed and connected to the Sensor Link.

☐ The tablet installed and mounted in the truck's cabin has been licensed for TrackIt Delivery Cycle Monitoring

☐ The tablet has been connected and configured with the Sensor Link via TrackIt Android.

☐ The DCM Health alert is active and reports receive data after tickets are assigned.

Congratulations! You have completed the installation for TrackIt Delivery Cycle Monitoring. If you have any questions or concerns, contact TrackIt Customer Support at trackitsupport@commandalkon.com or (800) 624-1872, Option 2 then Option 9.