

Sensei Smart Oiler – EX Model
Intrinsically Safe for Hazardous Locations



38120 - Sensei, Intrinsically Safe, #5 8oz Closed System Unit
38121 - Sensei, Intrinsically Safe, #5 8oz Vented System Unit

Revision	Affected Pages	Description of Change	Effective Date	Approval
A	All	Initial Release	3/26/2021	Justin Kolterman

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THE SENSEI RELIABILITY SOLUTION

The Sensei Smart Oiler is intended to keep you informed near real-time to the amount of lubricant available in the Trico Opto-Matic reservoir as well as help understand how much lubricant your piece of equipment is consuming. In typical practices, a lubrication technician will make a daily or weekly walk-down of the equipment checking to see if the oilers need to be replenished. If an oiler is empty the technician will fill it up and typically does not keep track of it being refilled. In addition, there is not a good way of knowing how long the oiler may have been low and therefore the equipment could have been starved of lubricant. With the Sensei Smart Oiler, all this information is captured automatically and at the instant the oiler level hits a critical level a notification is sent to those who have subscribed so they can react. In addition, the system keeps track of the number of alerts by equipment so that anyone can easily see where to direct maintenance activities.

Trico Corporation's first release of the Sensei Platform of wireless, cloud based, analytic sensing equipment provides real time monitoring of your constant level oiling devices. This product utilizes infrared technology to continuously monitor the oil level in your original Trico Opto-Matic Oiler or Closed System Opto-Matic Oiler. A two-piece clam shell assembly affixes directly to the world recognized Trico glass reservoir in any new applications and most existing installations. Simply replace the glass reservoir with this product. Welcome to the next level of practical monitoring.

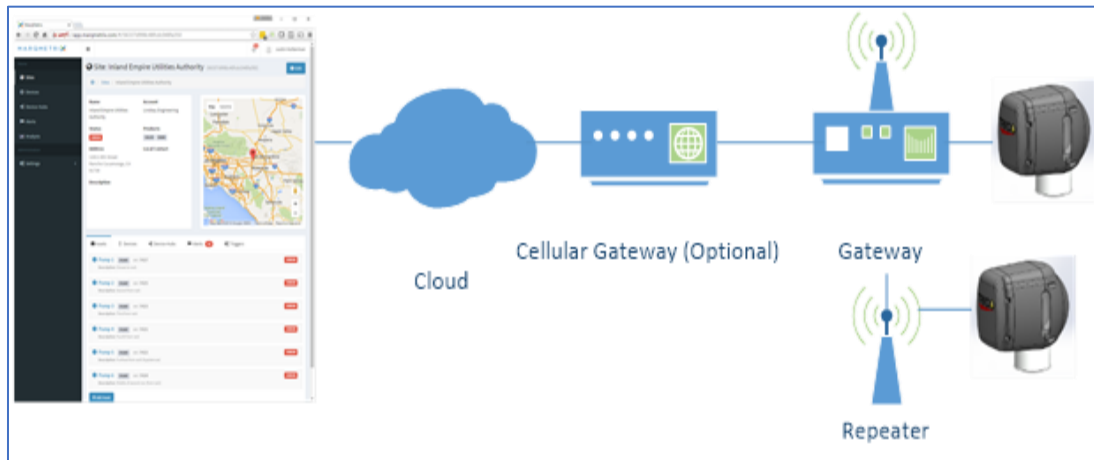
Why would I want it? The number one issue facing reliability and maintenance personnel is the lack of time and resources to complete everyday tasks. Our goal is to help our customers utilize their resources more efficiently by providing them the tools necessary to retrieve instant data related to the operation of their critical equipment without having to be there.

- Instead of wasting countless hours per week running lube routes topping off oil applications, this product will communicate which machines need attention and when.
- Instead of finding out the pump you checked just yesterday failed because a leak developed and starved the bearing of lubrication, your team can be alerted immediately there is an issue to attend to.
- Instead of checking a bad actor in some remote location every day, allow this product to monitor the asset lubrication requirements for you, allowing travel only when necessary.

Easy Configuration and Installation

The solution was designed from the ground up to ensure the system would be easy to implement and maintain. The minimum hardware requirement to get Sensei up and running is a Sensei Gateway connected to the internet. Depending on the number of devices and the physical size of the plant, the installation of Sensei Repeaters may be required to carry the signal further. Sensei Repeaters will either connect directly to the Sensei Gateway or they will connect to other Sensei Repeaters in a wireless mesh.

Sensei Infrastructure Components



Infrastructure Notes

- Sensei Repeaters are **NOT** required. They are only used if there are more than 64 devices connected to the network; or the distance from the Sensei Gateway to the end point is greater than 300 feet; or the signal strength is low from interference from noisy equipment, metal, etc.
- The absolute maximum distance between a Sensei Repeater and Sensei Gateway, or a Sensei Repeater to another Sensei Repeater is 300 feet.
- Sensei Repeaters can connect to other Sensei Repeaters or directly to the Sensei Gateway.
- Sensei Repeaters and Sensei Gateways can be connected to 5-24 VDC. They will come with the 120 VAC connection out of the box.
- The maximum number of devices on the network is untested but the system works reliably at 250 devices. If an installation is too large for the network, which would be determined by performance, an additional gateway can be added.
- The Sensei Gateway can be connected to a customer's IP Ethernet network or cellular gateway. The requirement is a path to the internet to access <https://sensei.tricocorp.com> on port 1883.

SENSEI SMART OILER – EX HAZARDOUS LOCATIONS INFORMATION

ATEX Directive Compliance

Trico complies with ATEX directives to ensure a safe working environment when working with equipment in potentially explosive atmospheres. The Sensei Smart Oiler – Ex device is compliant to the ATEX Directive under Certification ITS-I21ATEX29214X and is suitable for use in Class I, Zone 0 AEx ia IIC T4 Ga or Non-Hazardous locations only.

Special conditions for safe use

The Sensei Smart Oiler must be only used in a fixed location. The installation must be installed with conductive piping to a machine that is grounded with <1GOhm impedance to maintain the metallic enclosure to be grounded. Do not install in high charge areas.

Replacement batteries must be not changed where an explosive atmosphere is present and be replaced with SAFT Part #LS-17330. The battery cover screws must be tightened to 0.21 N-m.

The product contains a non-metallic materials enclosure. Caution must be used when handling or cleaning the product so there is no static charge buildup. Do not wipe off the oil level monitor with a dry cloth. Use only water damp cloth and allow to air dry for cleaning of the product.

Class I, Division 1 Groups A, B, C, D Hazardous Location Statement

The Sensei Smart Oiler – EX is suitable for use in Class I, Division 1 Groups A, B, C, D, T4 or Non-Hazardous locations only.

Certifications

North America and Canada

CSA Cert#: ETL20CA104506996X

Class I Zone 0 AEx ia IIC T4 Ga

Class I Division 1 Groups A, B, C, D T4

Ex ia IIC T4 Ga

-20°C ≤ Ta ≤ 50°C

IECEX Cert#: IECEXETL21.0011X

Ex ia IIC T4 Ga

-20°C ≤ Ta ≤ 50°C

ATEX Cert#: ITS-I21ATEX29214X

Ⓔ II 1G Ex ia IIC T4 Ga

-20°C ≤ Ta ≤ 50°C

UKEx Cert#: ITS21UKEX0048X

Ingress Protection: IP65

Contains FCC ID: 2SJWF-METRIX01

Contains IC: 21890-METRIX01



SENSEI OILER HARDWARE SPECIFICATIONS

Power	Internal – 2 replaceable Lithium 2/3 AA 3.6V batteries
Battery Life	Minimum 3-year battery life based on data transmission rates of 4 times per hour at a nominal temperature of 68 F
Mechanical	
Trico Product Integration	The sensing product is mounted on a Trico #5 glass bulb
Dimensions	5" X 3.25" X 4"
Enclosure Material	LUPOY HI5002A
Seal Material	Sarlink 3160, EPDM/Neoprene/SBR Foam
Weight	
Status LEDs	Network Lost, Ready for Pairing
Measurements	
Ambient temperature	-40 C – 100 C
Oil level in reservoir	+/- 5%
Data Transmission	
Wireless	2.4 GHz 802.15.4
Wireless range	100+ meters line of sight
Data Protocols	MQTT
Feedback	LED provides feedback regarding network connectivity
Environmental	
Installation	Indoor or outdoor
Enclosure Rating	IP66/67
Operating Temperature	-20 to 50 C
Hazardous	Class I, Zone 0 Class 1, Div 1
Wireless Security	
Device Level Authentication	AES-128 encrypted network joining scheme Pre-shared key and rotating session key AES-128 encrypted secure data transmission
Approvals	
Safety	<p>Hazardous Locations:</p> <ul style="list-style-type: none"> UL/CSA 60079-11:2013Ed.6+R:28Mar2014 UL/CSA 60079-0:2019 Ed.7 <p>Ordinary Location</p> <ul style="list-style-type: none"> UL/CSA 61010-1:2012Ed.3+R:29Apr2016 <p>ATEX Standards</p> <ul style="list-style-type: none"> Protection Method: (Ex II 1 G) A/Ex ia IIC T4 Ga EN 60079-0:2018 EN 60079-11:2012 Directive 2014/34/EU
Emissions	<ul style="list-style-type: none"> FCC Part 15 Subpart C Section(s) 15.207 & 15.247 Industry Canada RsSS-247 Issue 1 (DTS 2400-2483.5 MHz)

OILER INSTALLATION

The Sensei Smart Oiler must be only used in a fixed location. The installation must be installed with conductive piping to a machine that is grounded with $<1G\Omega$ impedance to maintain the metallic enclosure to be grounded. Do not install in high charge areas.

The following steps assume that the Sensei Infrastructure has been installed and is connected to the cloud.

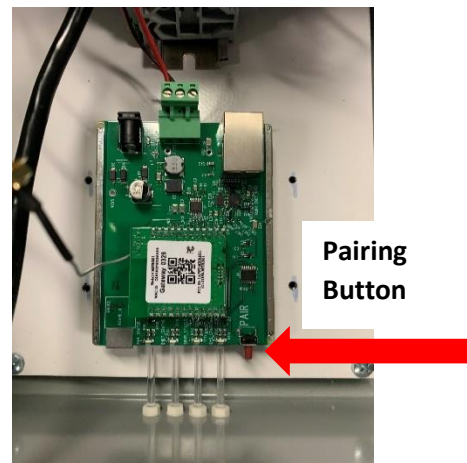
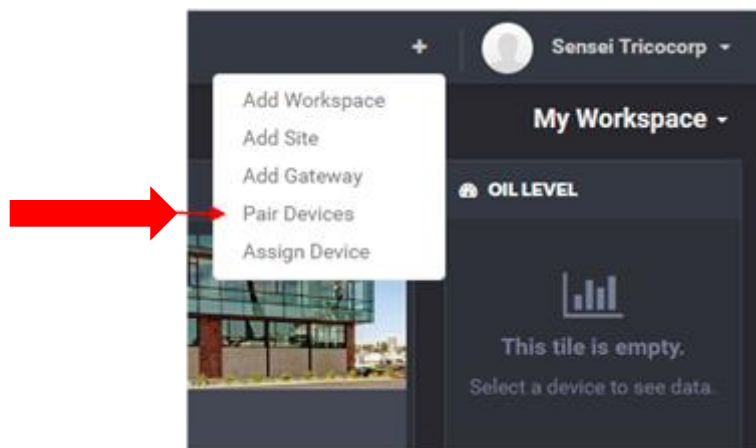
1. With a small Phillips head screwdriver, remove the battery covers 4 screws and pull off the battery cover.



2. Remove pull tabs from batteries.
3. Press the pairing button. Blue light will turn on briefly to confirm oiler is in pairing mode.



4. Put the Sensei Gateway or Sensei Repeater in pairing mode. This can be done through the Sensei application or by pressing the pairing button on the Sensei Gateway/Repeater.



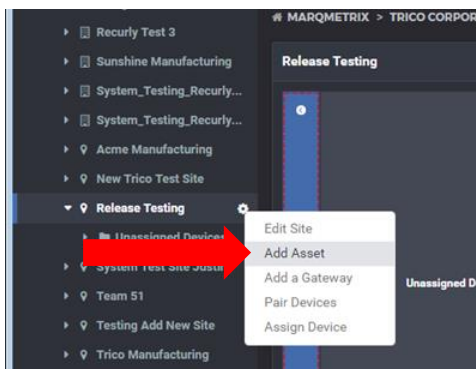
- When the Blue LED stops blinking, pairing is complete.
NOTE: The device may not show up on the Sensei website for 15 minutes. The system randomly assigns slots of time to the device in which they can communicate to minimize overwhelming the network in the event they are all trying to connect at the same time.
- Replace the oiler battery cover.
- Tighten down cover with provided screws. The battery cover screws must be tightened to 0.21 N-m when reappplied.
- Install oiler in desired location per Opto-Matic documentation.
NOTE: The Sensei Smart Oiler must be only used in a fixed location. The installation must be installed with conductive piping to a machine that is grounded with <math><1\Omega</math> impedance to maintain the metallic enclosure to be grounded. Do not install in high charge areas.
- Place extra oiler id sticker next to asset on your asset list.

SETTING UP THE CLOUD

The Sensei application is structured to let you organize your equipment in a way that makes sense for your operation. When you first log into the application the only thing that will be present is your site. At this point you will want to add assets which includes physical locations, such as a building or lines, as well as pieces of equipment. Locations are used to group equipment into logical groupings that resemble your plant.

Create a Location

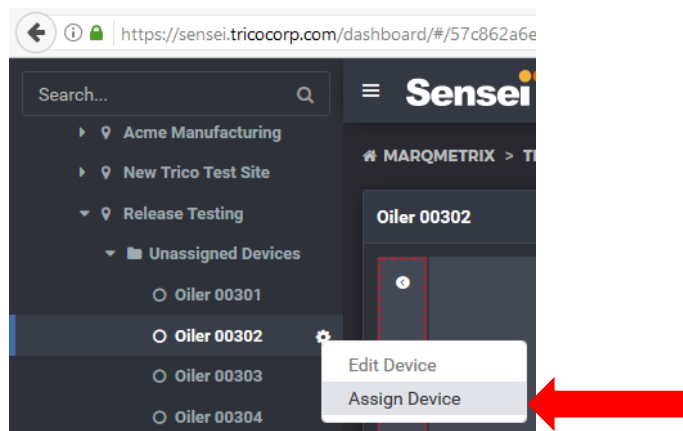
- When an account is initially set up the only items available in the left navigation panel will be the account and site. To organize the site, add locations to logically group the equipment that will have the oilers attached to. Click on the gear icon to the right of the site name and select “Add Asset”.



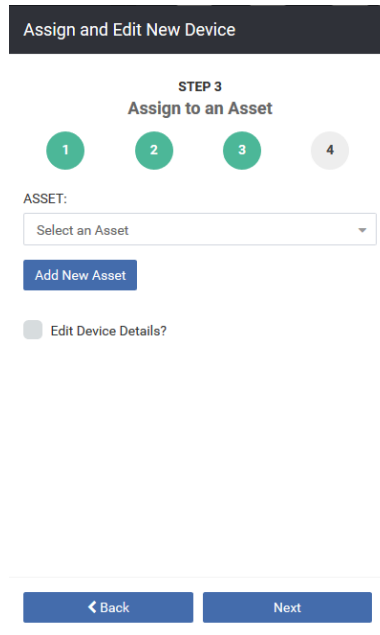
2. Enter the asset name (location name) and select the asset type “Location”. Enter any relevant information about the area that you are adding.

3. Next enter equipment that you will assign the oilers to by going through the “Add Asset” menu and picking machinery instead of location.
4. Select “machinery” from the Asset Type dropdown.

5. Click the settings/gear icon next to the ID of the oiler you would like to assign from the “Unassigned devices” folder and click “Assign Device”.



6. Click next until you get to the “Assign and Edit New Device” screen. Select the asset you would like to assign this oiler to and click next. If the asset has not been created, you can add a new asset from here by clicking the “Add New Asset” button.



The screenshot shows a mobile application interface for assigning a device to an asset. At the top, a dark header reads "Assign and Edit New Device". Below it, a progress indicator shows four steps: 1, 2, 3, and 4. Step 3 is highlighted in green and labeled "STEP 3 Assign to an Asset". Underneath, there is a section labeled "ASSET:" with a dropdown menu containing the text "Select an Asset". Below the dropdown is a blue button labeled "Add New Asset". At the bottom of the form is a radio button labeled "Edit Device Details?". At the very bottom of the screen are two blue buttons: "< Back" and "Next".

7. The oiler is now assigned to the asset and you are ready to begin capturing data.

WARRANTY

Trico Corporation warrants each new product to be free from defects in materials and workmanship under normal use and service for a period of twelve (12) months from the date of sale to the original end user. If within the applicable warranty period any Trico Corporation product that shall be proved to Trico Corporation’s satisfaction to be defective, shall be repaired or replaced at Trico Corporation’s sole discretion.

Trico Corporation’s warranty obligation shall be limited to repair or replacement of determined defective products. This obligation shall not include any of the user’s costs of labor, whether for product removal, reinstallation or otherwise, and shall be conditioned upon Trico Corporation receiving written notice of any warranty claim within thirty (30) days after defect discovery. This remedy is exclusive and shall not be deemed to have failed of its essential purpose so long as Trico Corporation is willing and able to repair or replace the parts in question or issue a credit to the user within a reasonable time after the user has establish that a warranty claim exists.

Exceptions and Exclusions

This warranty shall not apply to products which have been subjected to unauthorized use, alteration or modification, user’s negligence, an accident, damage due to shipper’s handling, storage conditions or any neglect, breakage, unauthorized or improper modifications or tampering, use in an unsuitable physical environment, use with a marginal power supply, or

use with other inadequate facilities or damage caused by circumstances beyond Trico Corporation's control. Reasonable care must be taken by the Customer to avoid such hazards. This warranty also shall not apply to products that are used or operated improperly, improperly maintained or improperly installed. There are no warranties which extend beyond the description contained within this document.

Exclusion of Consequential Damages and Disclaimer of Liability

Trico Corporation's liability with respect to breaches of warranty shall be limited as provided in the section "SENSEI PRODUCT WARRANTY" hereof. With respect to other breaches of contract, Trico Corporation's liability shall in no event exceed the purchase price of the subject goods that were purchased from Trico Corporation. Trico Corporation shall not be subject to and disclaims: (1) any other obligations or liabilities arising out of breach of contract or of warranty, (2) any obligations whatsoever arising from Tort claims to include without limitation, negligence and strict liability with respect to products sold by Trico Corporation, or any undertakings, acts or omissions relating thereof, and (3) any and all consequential, incidental and contingent damages of any nature. Without limiting the generality of the foregoing, Trico Corporation specifically disclaims any liability for penalties (including administrative penalties), special or punitive damages, damages for lost profits or revenues, damages for loss of use of products or any associated equipment, cost of capital, facilities or services, downtime, shut-down or slowdown costs, or for any other types of economic loss.

Return Material Authorization

The customer must obtain a return material authorization (RMA) number from Trico Corporation before returning any products for repair or replacement. All customers are requested to contact the Customer Service department at Trico in advance for return authorization of any product for any reason. Contact can be made, using the contact information listed below, via mail, email, phone or fax. To expedite this process, please have the product serial number available. The serial number can be found on the top of the product. No products will be accepted by Trico Corporation which do not have an RMA number.

Trico Customer Service
1235 Hickory St.
Pewaukee, WI 53072
800-558-7008 or 262-691-9336
Fax: 262-691-2576
www.tricocorp.com

Warranty Repair

The customer may return a product that is covered by warranty for repair after obtaining an RMA number. Any product covered by warranty is repaired or replaced, free of charge. All repairs carry a 90-day warranty or the remainder of the initial warranty period, whichever is longer, which begins the day the repaired item is shipped back to the customer. Returned items

must be accompanied by proof of purchase denoting purchase date, a written description of the defect, and the RMA number issued by Trico Corporation. The end-user shall return the defective product to Trico Corporation, at the above address, freight, customs, and handling charges prepaid. End-user agrees to accept all liability for loss of or damages to the returned product during shipment. Trico Corporation shall repair or replace the returned product, at its option and return the repaired or replaced new product to the end-user, freight prepaid, via method to be determined by Trico Corporation. All returns must include an RMA # on the packaging. If the product is not defective, customer is responsible for outbound shipping costs. International customers are responsible for both inbound and outbound freight charges, customs and duties on returns.

Non-Warranty Repair

The customer may return a product for repair that is not covered by warranty. A standard repair fee, specific to the product, is charged for any product that is repaired outside of the warranty period. Repairs performed on products out of warranty also carry a 90-day warranty, which begins the day the repaired item is shipped back to the customer. The customer will be charged for all repair costs, labor, diagnostic fees, and shipping. A repair quote will be provided upon request. If the customer chooses not to have the unit repaired after receiving the quote, a request can be made to have the unrepaired product shipped back. This request must be made within 30 days or returned products will be disposed of.