Voyantic

Tagsurance 3

Machine Integration Guide

02/2025

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1 Introduction

The Tagsurance 3 system is a turnkey solution for testing UHF and HF RFID tags in tag production machines. It is optimal but not limited to being used in chip attachment, label converting, and final personalization stages.

Voyantic delivers the Tagsurance 3 system with stations conducting tag testing. The trigger signal to the system can come either from the machine or from a trigger sensor delivered by Voyantic. Depending on the use case, we strongly recommend connecting the trigger sensor to Tagsurance 3, as trigger filtering features, such as pattern filtering, are then available. Tagsurance 3 comes with its own rotary encoder for location sensing. All IO signals necessary for operating the system are handled within the system itself and do not need interfacing with the machine.

The purpose of this document is to describe the integration of the Tagsurance components in detail, helping you to make the installation a success. The focus is on mechanical integration since I/O and network integration are not necessary.

While some of the information is also shared in the Tagsurance 3 manual, this document does not replace it. We recommend that you also read the Tagsurance 3 manual for the integration. The Tagsurance 3 manual is available from *https://voyantic.com/download/*.

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2 Overview

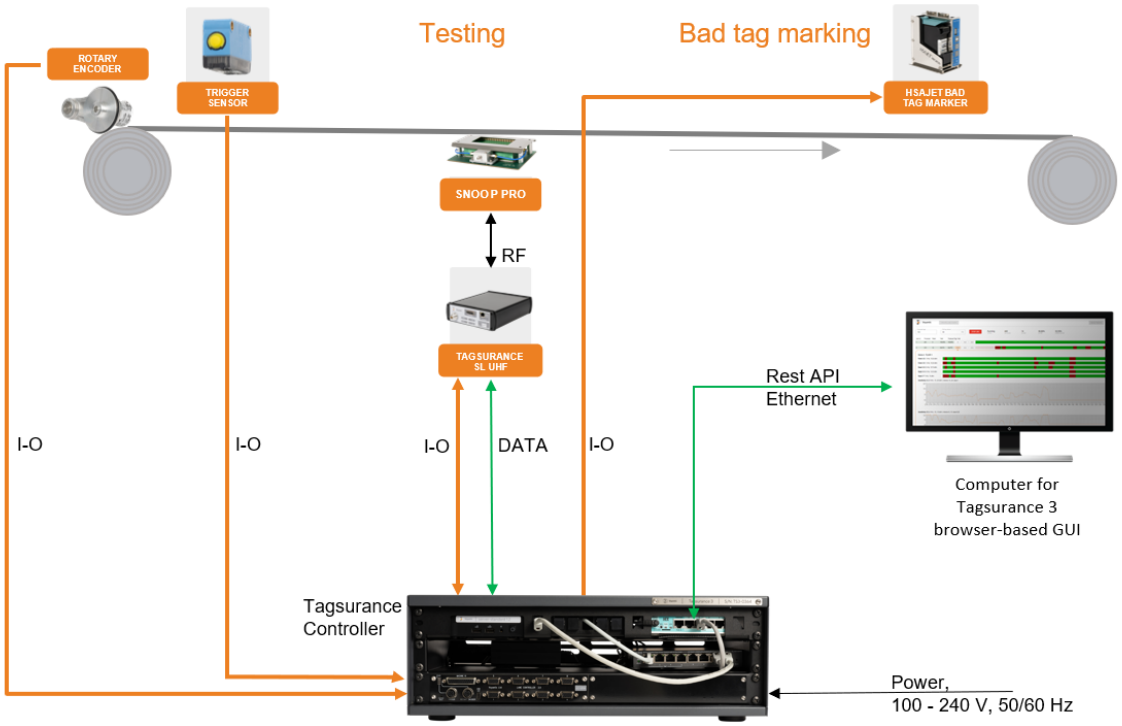

Figure 1. Overview of a 1-lane Tagsurance 3 system

Figure 1 shows the overview of a typical 1-lane Tagsurance 3 system. We will use this as an example.

Having more than one test device and Snoop Pro coupling element per lane is possible. For instance, if multiple tests for each tag are needed and the tests must be done simultaneously to achieve the necessary machine speed.

Voyantic also sells multi-lane systems, in which case the rack will contain more lane controllers, and the “Testing” and “Bad tag marking” components are multiple as well (Trigger sensor and Rotary encoder are always singular).

The 1-lane Tagsurance 3 system’s main components are:

1. General:
   - Tagsurance 3 controller rack with one-lane controller
   - API/GUI for operating the system
2. Lane movement and location sensing:
   - Rotary encoder
   - Trigger sensor
3. RF Testing:
   - UHF or HF Snoop Pro coupling element
   - Tagsurance tester
4. Bad tag marking:
   - Puncher or marker

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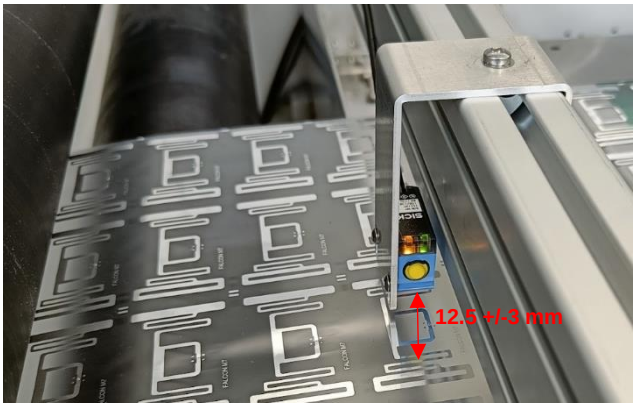
3 Mechanical integration

While each manufacturer has its own accessories for mounting its sensors, there is also a choice of generic mounting solutions. Some examples:

- Aluminium profiles offer an easy way to create custom mounting solutions. They are available from a wide selection of vendors.
- **Balluf** has a flexible mounting system that we have seen used successfully by some of our customers: *https://www.balluff.com/en-de/products/areas/A0017/groups/G1706/products/F17610?page=1&perPage=10*
- **SICK** offers generic mounting solutions: *https://www.sick.com/il/en/accessories/c/accessories#g113368*

3.1 Standard trigger sensor installation



The trigger sensor must be placed before the test stations (snoop coupling element). The installation height (from the liner material) must be 12.5mm +/- 3mm.
The liner distance from the trigger sensor to each operating station in millimeters [mm] is set in the Lane Configuration. A 4-pin M12 connector is used for the trigger input. The cable between the trigger sensor and the Tagsurance 3 rack is 5 meters (15 feet).

Figure 2. Trigger sensor: SICK KTM-WP11172P

The product datasheet, mounting accessories, and other integration accessories for this sensor can be found here:

https://www.sick.com/ch/en/contrast-sensors/ktm-prime/ktm-wp11172p/p/p455245

TIP:
To support easy triggering setup on different layouts, mount the trigger sensor so that you can easily change its lateral position on the liner (generally front to back on the machine) without changing any other distances.

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3.2 Alternative trigger sensor selection

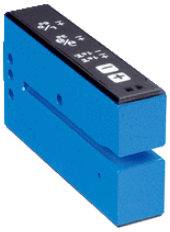
While the standard trigger sensor has been selected for its ease of use and versatility, some liner materials might need a different trigger sensor. We have tested several trigger sensors, all of which can be connected directly to the Tagsurance 3 controller without special cabling.

- **The standard trigger sensor** *(SICK KTM-WP11172P Part nr. 1082138)* is always delivered with the Tagsurance 3 system. This is an easy-to-set-up contrast sensor with a light spot size of 1.5 x 6.5mm.

- **Color contrast triggering:** this is offered by the *KTS-WB9114115AZZZZ* from SICK (part nr.: 1078126) or also available from Voyantic (part nr. TS3-AC-KT4). Through TwinEye-Technology, this sensor works more reliably with glossy and/or jittering materials. It can also detect more details through a smaller light spot size (0.9x3.8mm) and color recognition. More information here: *https://www.sick.com/ch/en/contrast-sensors/kts-prime/kts-wb9114115azzzz/p/p505059*

- **SICK WF Fork sensors** are a very good option if you have (full or semi) transparent liner material that needs very precise object recognition (for instance, detailed pattern recognition) since this optical sensor can detect objects as small as 0.2mm. We have tested with the *SICK WF15-40B41CA00 (Part nr. 6058596)*, but other sizes will probably also work. Be aware that the liner material needs to have enough "look-through" contrast for this sensor to function properly. More information can be found here: *https://www.sick.com/ch/en/fork-sensors/wf/wf15-40b41ca00/p/p417055*
  Note: This sensor has a 4-pin M8 connector. You will need a "female 4-pin M8 to 4-pin M12 cable" to connect it to the Tagsurance 3 trigger input.

- **Capacitive triggering:** We have tested the *Lion Precision LRD6300C*. This is a very good option when you have no visible marks on your material. It senses material changes within the liner. **This sensor has an accuracy of 0.05mm.** Please note that the liner material needs to go through a gap of 0.8mm with this sensor! So, special care should be taken, especially with exposed ICs on naked liners. More information on this sensor can be found here: *https://www.lionprecision.com/products/label-sensors/lrd6300/*
  Make sure you order the correct version with the 4-pin connector: LRD6300**C**.



- **Ultrasonic detection sensors** like the *SICK UFN3-70P415 (Part nr. 6049679)* are another good option for liner material with no visible marks. With a fork opening of 3mm, it can detect labels or gaps between labels of 2mm or greater. More information: *https://www.sick.com/ch/en/fork-sensors/uf/ufn3-70p415/p/p291692* This sensor needs a 4-pin female M8 to 4-pin M12 cable to connect to the Tagsurance 3 trigger input.

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3.3 Rotary encoder installation

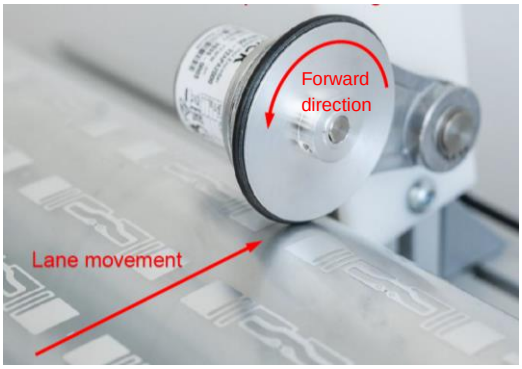

Figure 3. Rotary encoder

Place the Rotary Encoder against a roll that rotates at the liner speed. Check that both the Rotary Encoder and the liner do not slip against the roller.
Figure 3 shows the forward rotating direction. You can also configure the “Reverse” direction in the Tagsurance 3 Lane configuration, so you are free to install the rotary encoder in any way that suits you best.
As long as there is no slip between the roller and liner, you can position the rotary encoder directly against the roller or against the liner.
The cable between the rotary encoder and the Tagsurance 3 rack is 5 meters (15 feet).

TIP:
We recommend using a measuring wheel with a larger surface area for rubberized rollers to prevent the wheel from pushing too deep into it.
For example, the *SICK BEF-MR08200AP*.

TIP:
The Rotary Encoder has a spring-loaded mount which helps to keep the rotary encoder pushed against the roller. Make sure that this is installed correctly:
https://youtu.be/e30oN7FJsfc?t=50

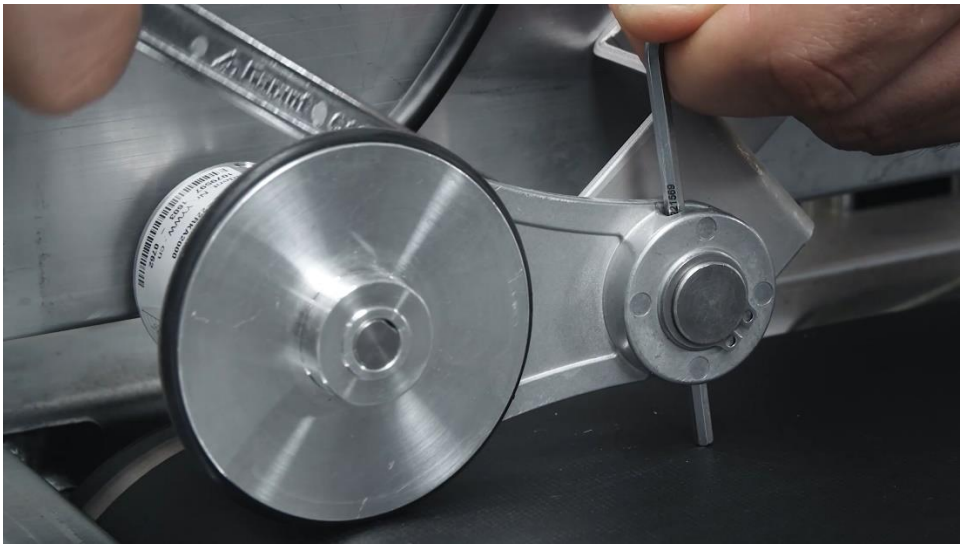

Figure 4. Mounting of the rotary encoder

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3.4 Snoop Pro coupling element installation

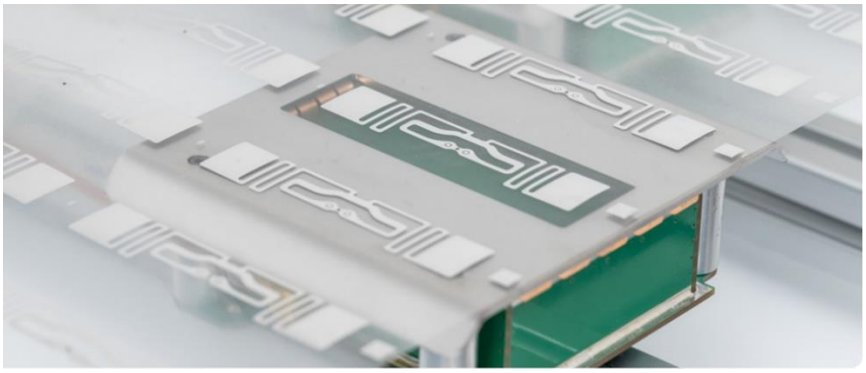

Figure 5. Snoop Pro coupling element mounted under the liner.

Recommendations and considerations when installing a Snoop Pro coupling element:

- The center line of the inlay coupling element should cross the Snoop Pro coupling element's center line (as in Figure 5).

- It is recommended to have the area above the coupling element free (or have a minimum) of conducting materials. The recommended “free” area is a 3-dimensional conical shape area above the coupling element opening:
  UHF: 25 cm (10 inches)
  HF: 10 cm (4 inches)
  It is very important to have a “consistent environment” of conducting and reflecting materials in this area so that measurements are comparable.

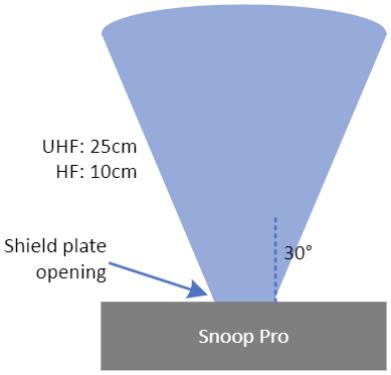

Figure 6. Coupling element shield-plate opening and ideal free area

- The liner with the tags should touch the shielding plate of the coupling element. A gap between the liner and coupling element creates a risk of cross-reading.
  On “naked liners”, to prevent damage to the IC, the IC side of the liner must not be on the coupling element side.

- The cable between the Snoop Pro coupling element and the Tagsurance test device is 1.8 meters (6 feet). The Snoop Pro has an SMA-type coupling element connector. When connecting the cable, make sure to fully tighten it, yet not exceeding 1 Nm torque.

- The Snoop Pro coupling elements are wider than the antennas on the inlay. In multilane applications, coupling elements need to be “stacked” (Figure 7).

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Figure 7. Snoop Pro mini coupling element mounted and stacked under a multi-lane liner.

- Coupling elements can be close to each other (shielding plates touching). But a 15 mm gap is recommended for usability, for making small adjustments, mounting, and dismounting easier.

TIPS: For easy setup of different layout jobs, especially important for multi-lane:

Mount the coupling element(s) in a way that they can easily be moved 90 degrees on the liner direction without changing the other dimensions, such as the distance from the trigger sensor and height.

Adding an indicator showing the coupling element's location enables documenting the location of the coupling elements for each job. This simplifies and speeds up the setup process each time the machine needs to be set up for a similar job.

Document the shielding plate (opening size) you use for each job.

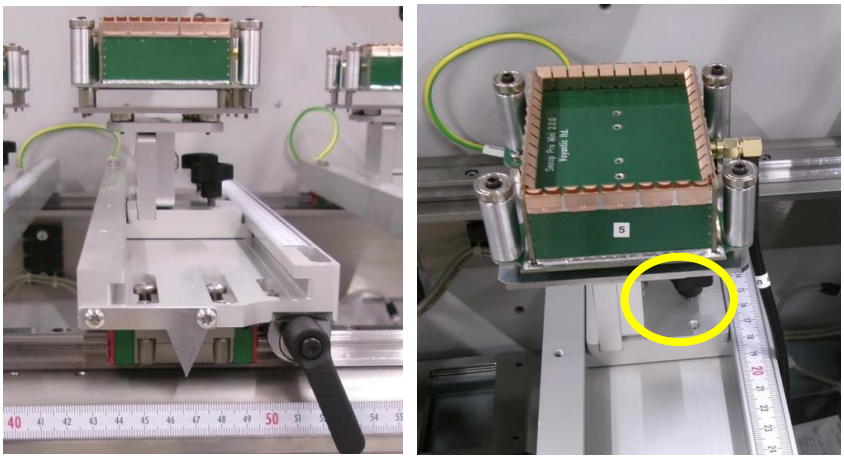

Figure 8. Easy setting up of coupling element positions with location indicators. Pictures taken from the Voyantic Station Installation Kit

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4 User Interface, Network, and Data Integration

To access the user interface, a separate computer needs to have browser access to the Tagsurance 3 server:

- **Direct connection** through port 2 of the router. The ethernet port on the computer needs to "Obtain an IP address automatically" (DHCP). Navigating the browser to *https://10.10.30.10* will access the Tagsurance 3 (password-protected) User interface.

- **Network connection** through port 1 (internet) of the router, where both DHCP and fixed IP networks are supported (settings in GUI). Navigating the browser to the secure IP address "https://" will access the (password-protected) User Interface.
  If the Tagsurance 3 IP address on the network is unknown, connect directly to port 2 and set and/or access the network address from the "settings" button in the operator UI.

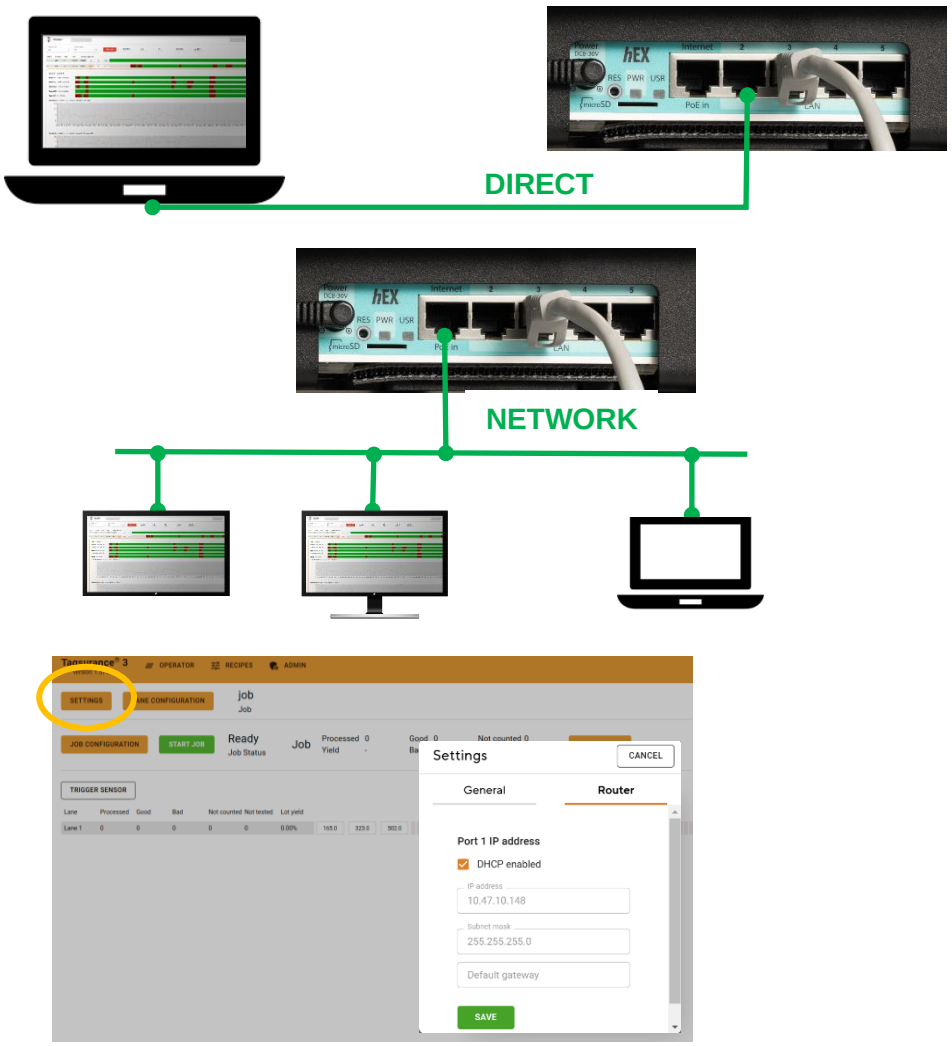

Figure 9. Direct and network connection to external computers, including network settings

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A REST API is available to communicate with the system instead of in parallel with the Voyantic GUI. If you want to utilize the REST API, don't hesitate to contact Voyantic for more information.

5 Electrical

The Tagsurance 3 system comes with a replaceable, locally suitable power cable:

- **Voltage rating:** 110 – 240 VAC, 50/60Hz
- **Maximum current consumption:** 10A in 230VAC, 20A in 115VAC.

There are 4 different power cords available:

Type F, EU:

Type B, US:

Type G, UK:

Type I, China:

6 Automation - I/O Integration

No extra electrical IO is needed for many standard tag/label solutions.

However, the Tagsurance 3 has an additional DB25 connector, “Machine IO”, that can be used for more advanced electrical machine integrations.

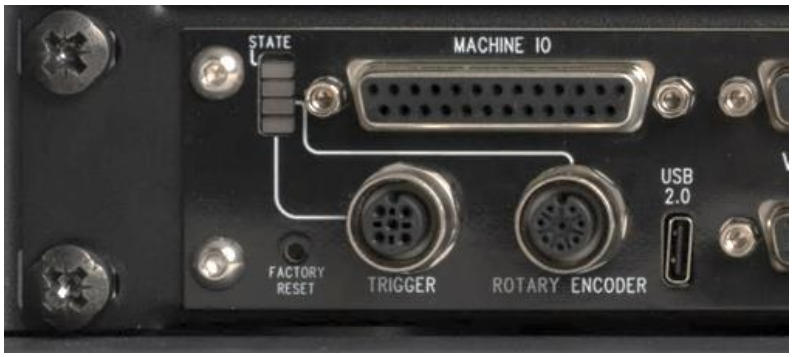

Figure 10. Machine IO connector

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Available signals on the Machine IO connector (both 24Vdc PNP and NPN):

- Tagsurance 3 status: Job running or not running
- Lot ready: Can be determined at a definable position on the line, for instance, splicing table or auto splicer. The machine can be slowed down before this event and stopped at the correct location if needed. (needs extra outputs to the PLC)
- Yield signals: Depending on yield, warnings can be given, and/or the machine can be stopped
- Station status: Ready and Pass/Fail signals coming back from a test station.

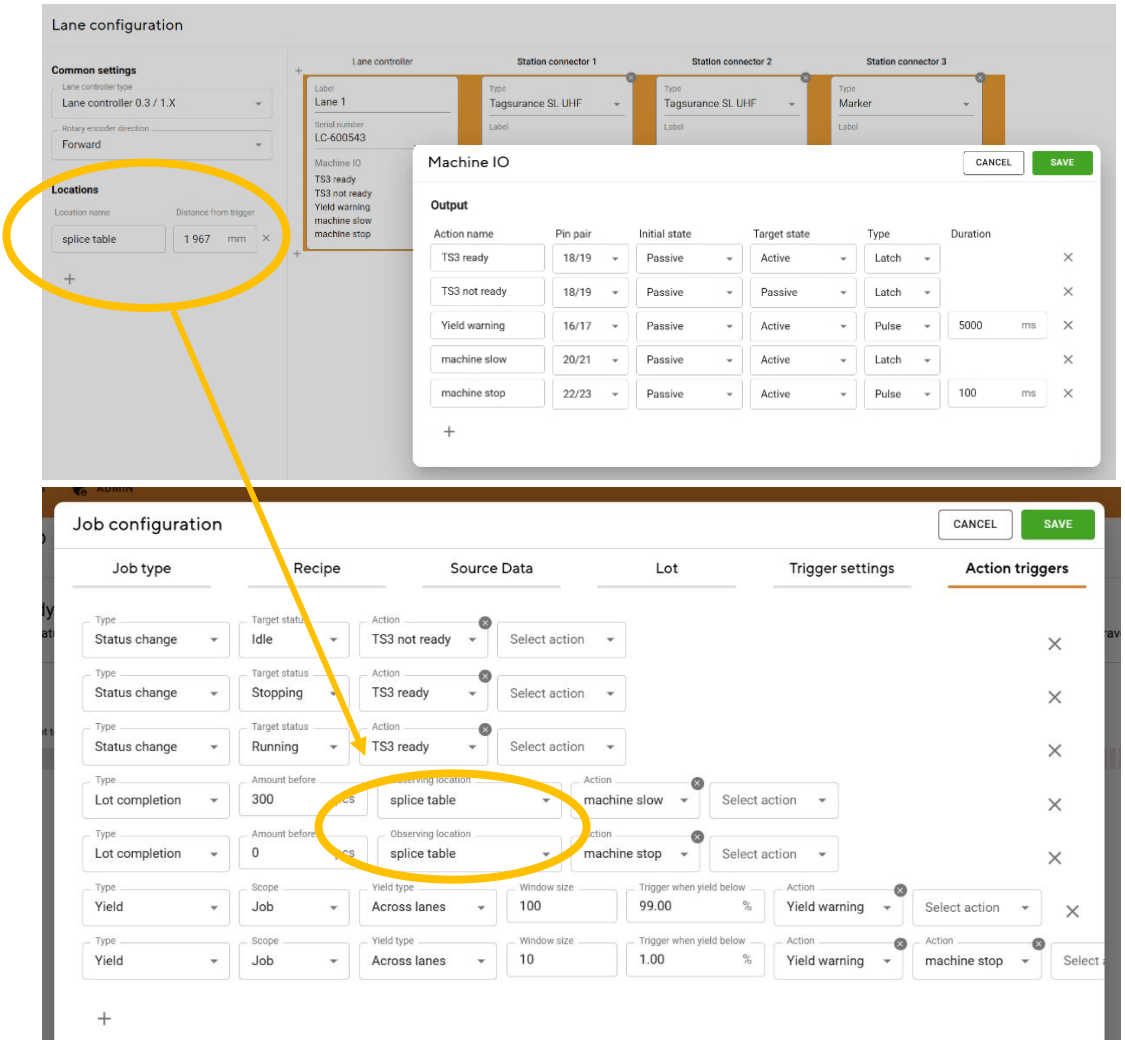

Figure 11. Location, Output definition, and Action trigger settings for the Machine IO

If you are interested in utilizing this, we recommend you read the Tagsurance 3 user manual, which has detailed information about this. You can also contact Voyantic for more information or a demonstration.

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NFC FORUM RAIN RFID aim

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