



**Voyantic**

# **Tagsurance 3**

## **Machine Integration Guide**

**04/2023**

# 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 is not replacing 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/>.

## 2 Overview

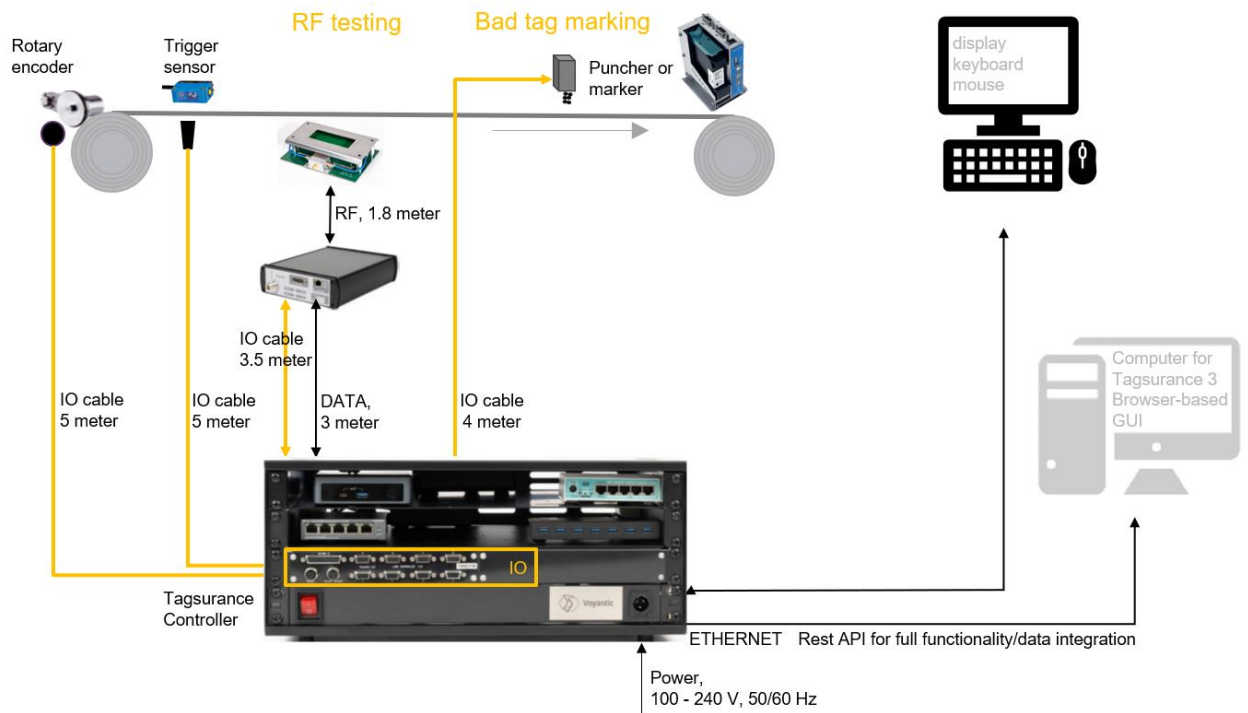


Figure 1. Overview of a 1-lane Tagsurance 3 system

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 a lot of tests for each tag are needed and tests need to 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 and encoder are always singular).

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

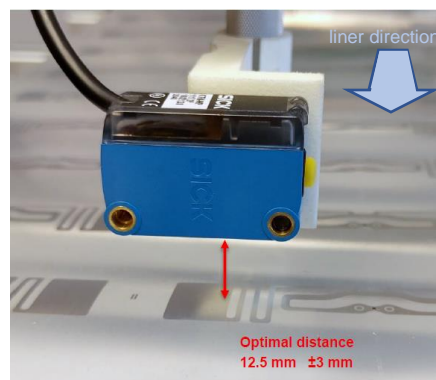
- General:
  - Tagsurance 3 controller rack with one lane controller
  - API/GUI for operating the system
- Lane movement and location sensing:
  - Rotary encoder
  - Trigger sensor
- RF Testing:
  - UHF or HF Snoop Pro coupling element
  - Tagsurance tester
- Bad tag marking:
  - Puncher or marker

### 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 make custom mounting solutions. These 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 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).

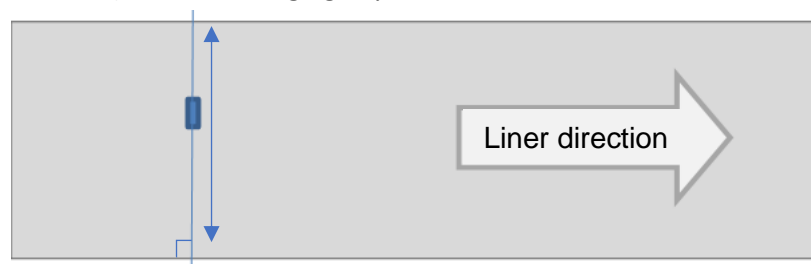
Figure 2. Trigger sensor: SICK KTM-WP11172P

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.



### 3.2 Alternative trigger sensor selection

While the standard trigger sensor has been selected for its easy and versatile usage, there might be liner material for which a different trigger sensor is needed.

We have tested several trigger sensors that all 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.



- Colour 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 colour 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 most probably other sizes will work as well. 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 is sensing 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: LRD6300C.



- Ultrasonic detection sensors like the SICK UFN3-70P415 (Part nr. 6049679) are another good option for liner material that has no visible marks on it. 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.

### 3.3 Rotary encoder installation

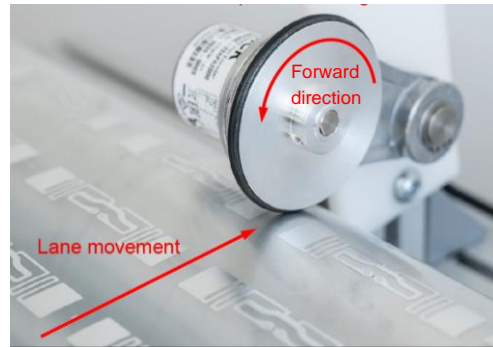


Figure 3. Rotary encoder

Place the Rotary Encoder against a roll, which rotates at the liner speed. Check that both the Rotary Encoder and the liner do not slip against the roller.

The forward rotating direction is shown in figure 3. You can also configure “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).



Figure 4. Mounting of the rotary encoder

**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 functioning well. The spring works well when the rotary encoder is mounted in a way that it is pushed against the roller when you tighten the mounting screw (see Figure 4).

If the rotary encoder is mounted the other way (having the wheel on the right in the image), tightening the mounting nut will push the rotary encoder away from the roller.

SICK offers mounting accessories for the rotary encoder. You can find them here:

<https://www.sick.com/ch/en/encoders/measuring-wheel-encoders/dbv50-core/dbv50e-22apa2000/p/p433200>

### 3.4 Snoop Pro coupling element installation

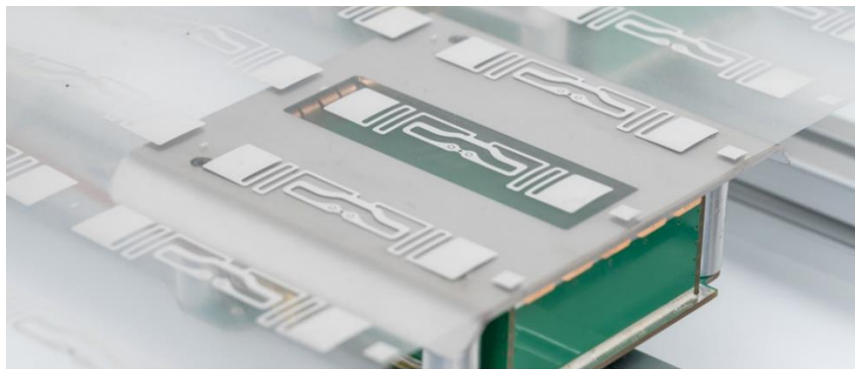


Figure 5. Snoop Pro coupling element mounted under the liner.

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. Recommended “free” area is a 3-dimensional conical shape area above the coupling element opening:
  - UHF: 25 cm (10 inch)
  - HF: 10 cm (4 inch)

It is very important to have a “consistent environment” of conducting and reflecting materials in this area so that measurements are comparable.

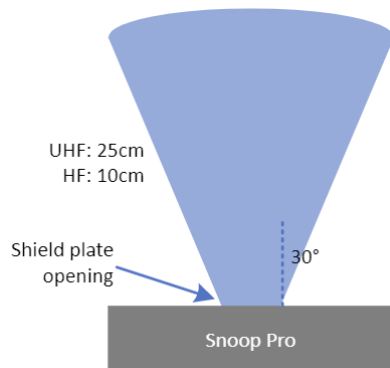


Figure 6. Coupling element shield-plate opening and ideal free area

- The liner with the tags should touch the shield 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 of 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”, see Figure 7.





Figure 7. Snoop Pro mini coupling element mounted 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 like 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 every time the machine needs to be set up for a similar job.

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

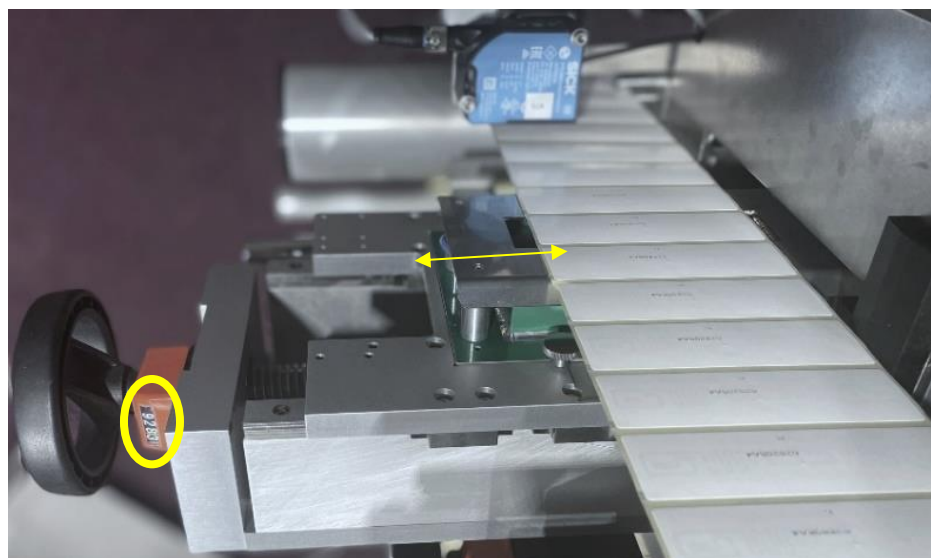


Figure 8. Easy setting up of coupling element position with lateral location indicator



## 4 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:



## 5 Automation - I/O Integration

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

However, if you need to connect to a signal coming to/from the Lane Controller's station connector, we highly recommend the use of a Voyantic IO Breakout. Available signals (both 24Vdc PNP and NPN):

- Trigger signal going from Lane Controller to a station
- Busy/ready signal coming back from a station (where applicable)
- Pass/fail signal coming back from a station (where applicable)



Figure 9. Voyantic Breakout IO

The IO Breakout includes a 1.2 m Lane-controller-to-IO-Breakout cable. The station IO cable is connected to the IO Breakout as it normally would be to the Lane Controller.

The Tagsurance 3 has an additional output connector “Machine IO” that can be used for more advanced electrical machine integration. If you are interested in utilizing this, we recommend you read the Tagsurance 3 user manual, which has detailed information about this.

## 6 User Interface, Network, and Data Integration

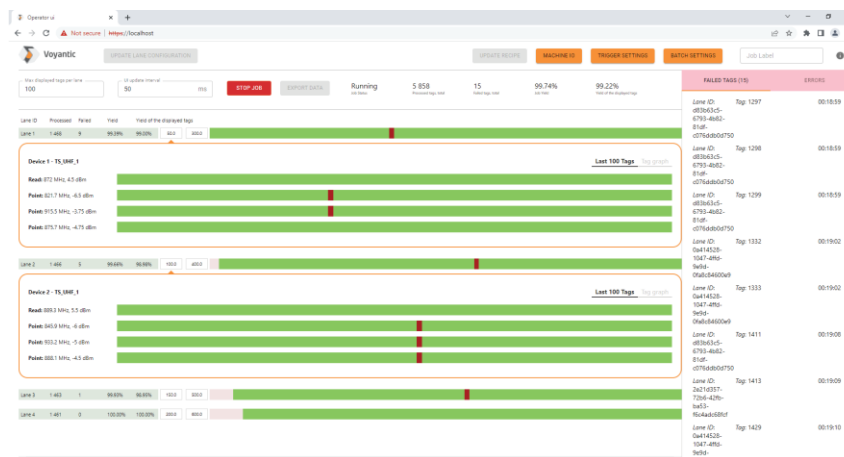


Figure 10. User Interface example

### 6.1 User Interface

The user interface is going through an architectural change. All user interfaces will be moved to the browser and access to the Tagsurance 3 server will be restricted. Currently, the system is still used by accessing Windows and by connecting an HDMI display, a keyboard, and a mouse to the controller.

### 6.2 Network and Data Integration

Currently, the Tagsurance 3 system must not be connected to the internet as it is not hardened for production-grade online use. Windows may download updates and restart when not suitable.

Voyantic will be releasing a major upgrade to the system (planned schedule: during 2023) that will enable connecting Tagsurance 3 safely to the internet which will at that time also unlock online features such as effortless updates and licensing.

The Tagsurance 3 controller can be connected to an outside network via port 1 of the router. Both DHCP and fixed IP networks are supported.

A REST API is available for communicating with the system instead or in parallel with the Voyantic GUI. Please contact Voyantic if you want to utilize the REST API for more information.

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