

# What? Where? How?

Wireless-based identification using RFID is one of the key technologies for smart production processes suitable for Industry 4.0. Turck provides a powerful tool for this with its BL ident RFID solution



Today, RFID is already one of the key technologies for the smart factory of the future

A highly automated, highly flexible and closely networked industrial production requires efficient technologies for identifying systems, tools, workpieces and products. Due to its specific benefits, wireless-based RFID identification technology stands out in comparison to alternative solutions such as optical identification, and is therefore without doubt one of the core technologies for Industry 4.0.

In many places today the implementation of RFID in production processes is often still complicated and time consuming. HF technology is relatively easy to integrate due to the insignificant effect of the spatial and physical environment. However, HF technology has a limited range, so that the UHF band is used in applications requiring greater flexibility and larger ranges. UHF technology is particularly used in cases when the tags are fitted to the product and not to the workpiece holder, remain in place there, are difficult to reach or even leave the production site. Bulk reads are another benefit of UHF technology. Whilst the simultaneous reading of several tags is also possible with HF technology, this is limited to only approx. 20 per read operation. UHF can handle 200 tags here and even

more, depending on the number of antennas. UHF technology is therefore particularly used in logistics applications requiring the simultaneous reading of several tags.

#### UHF RFID: Large ranges and high complexity

Users accept the trade-off between the greater complexity involved with UHF systems and the greater flexibility and larger ranges achieved with UHF technology. Unlike HF technology, UHF communication is not based on inductive coupling in the magnetic near field, but the radiated electromagnetic waves. This enables longer ranges but also results in side effects such as interference caused by the interaction between read/write heads or tags. The reflections of waves on walls, metal objects or objects containing water also present the user with particular challenges. UHF read/write heads are provided with some variables which can be set in order keep these effects in check. For example, the output power of most devices can thus be variably controlled. However, users must also set RSSI filters and other parameters to suit the application.

Do several tags have to be read at the same time? Are the read/write heads or the tags moving? Are read and write operations required, and if so, how fast do the processes have to be? These questions are the basics of a UHF installation and must be answered early on when designing a system. This is also the reason why UHF projects mostly require the involvement of system integrators. The integrators take care of the installation of a middleware that filters, transfers and if required presents the usable information from the RFID for the customer's ERP, SCADA or MES system.

### UHF requires integration know-how

The integration business is mostly unfamiliar territory for conventional manufacturers – at least in Germany. The software know-how as well as the IT system and programming knowledge required are not necessarily part of the core expertise of typical automation companies. This is why Turck has for a long time maintained partnerships with system integrators throughout Germany, who have provided the support for the successful implementation of several UHF projects.

The strategic importance of integration for UHF RFID systems was for Turck one of the reasons it acquired the majority share of an RFID integration partner. The right partner in Vilant was found in 2017. With four subsidiary companies, Vilant has implemented over 1000 RFID system installations in 35 countries in the 15 years of its existence, and is thus a major player in the industrial RFID system business. The company itself was aiming to expand further internationally and is now able to make use of Turck's well established global sales network, which offers access to many international projects. The RFID turnkey solution supplier has been operating under the name Turck Vilant Systems as an independent RFID integrator within the Turck Group since January 2018.

### Versatile software portfolio

Turck Vilant Systems is today already serving the typical focus sectors for RFID system solutions, such as asset tracking, rail, supply chain as well as pulp and paper. The company has software as one of its main focuses. The portfolio contains different software solutions that are suitable for devices with or without a user interface.



**New at the Hannover Messe: Turck's TBEN-L-RFID module with an integrated OPC UA server simplifies the connection of factory automation to the IT world**

While the Vilant Engine is the right choice for devices without a user interface, the Vilant clients, Gate Client, Handheld Client or Forklift Client, are designed for devices with a user interface. The Handheld Clients, for example, are suitable for RFID handheld devices for the manual reading or writing of the RFID tags, Gate Clients are used for automatic tag detection and Forklift Clients on the operator terminals of forklift trucks. Each device software also features direction detection and stray read filtering.

This kind of specific software cannot simply be done in passing – not even by Vilant. The Finns had already gathered a lot of experience in UHF RFID when there weren't even any international standards for the technology. Vilant incorporated these many years of experience from several projects into its solutions. The software was continually further optimized and refined – so that their logistics expertise is now condensed in program code.

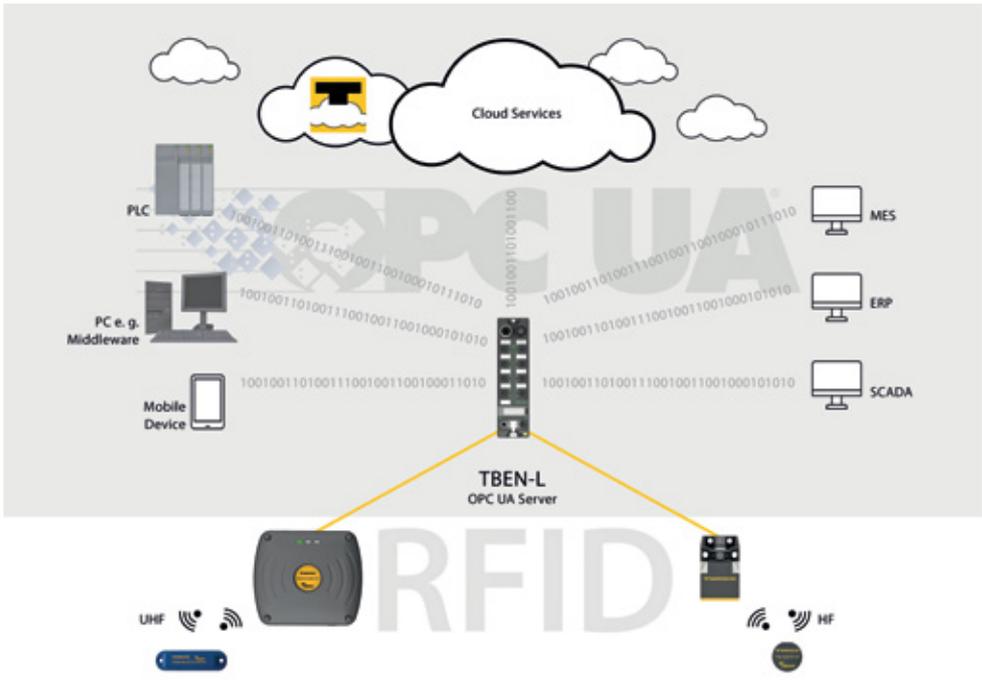
The company shows several examples of its expertise in different sectors on its website [www.turckvilant.com](http://www.turckvilant.com). For example, Vilant helped to increase the productivity at the Finnish ABB plant in Vaas by 60 percent by switching the internal logistics to RFID. Vilant could also contribute its know-how in major projects for Migros, the biggest retail chain in Switzerland, car rental company Sixt, and for several other customers. Its contribution always led to significant performance increases for the customer.

### HF irreplaceable in automation

While UHF is primarily gaining ground in logistics applications, the development of digital production in factory automation will also in future continue to be supported by the installation of HF solutions – partly in combination with UHF technology. Turck's BL ident RFID system is specially suited for these kinds of hybrid applications, as it allows the connection of HF and UHF read/write heads on the same interface modules. The fitting of the interfaces to the controllers is now very easy in many cases. Especially with the new RFID interfaces in the TBEN-S or TBEN-L IP67 block modules, which are fitted with the Universal Interface (UI

## QUICK READ

RFID is a key technology for Industry 4.0. Intelligent production processes are only possible if products, workpiece holders or tools can be identified or located unambiguously. This data can not only be used to optimize the process but also traceability or quality assurance. Optical identification is limited in many application fields where only RFID solutions can still operate effectively, such as Turck's BL ident HF/UHF RFID system.



OPC UA offers a standard language for communication with controllers and IT systems, including authentication and other definitions such as the companion standard for AutoID devices

Interface). The UI interface enables a controller to use the RFID channels as simple inputs. The programming of a user-defined function block for the controller is unnecessary here.

**OPC UA standardized communication**

If RFID interfaces are required to communicate with middleware, SCADA, ERP or MES solutions, the users largely have to accept proprietary solutions or even write their own programs. The platform independent standard OPC UA provides a solution here. OPC UA offers a standard language for communication with controllers and IT systems. Turck has now integrated an OPC UA interface directly on its IP67 RFID interface, the TBEN-L4-RFID-OPC-UA. This enables the interfaces to communicate directly with MES or ERP, or other Ethernet-based systems. Many cloud services also support OPC UA and thus allow the transfer of production data to clouds for monitoring or analysis tasks.

OPC UA also contains an additional specification by which the communication of AutoID devices in particular, such as barcode readers or RFID readers, is standardized. If devices support the companion standard for AutoID devices, the relevant systems can exchange between each other. The companion specification for the AutoID devices also provides the so-called Report mode, which is supported by Turck's read/write heads. The customer can thus start the continuous or time-limited scanning of tags and obtain the read data as event notifications as soon as a tag is located in the field of the read/write head. The customer consequently no longer requires any additional trigger signal, and the read/write head operates autonomously when reporting any new tag to the clients or higher-level systems.

**Secure communication**

Another benefit of OPC UA is the fact that the standard supports security mechanisms for encryption and authentication and thus protects data from unauthorized access, particularly when transferring to ERP and cloud systems. The customer is thus ensured secure data access from any location worldwide. The security of communication via OPC UA was also tested and confirmed by the BSI, the German Federal Office for Information Security. The TBEN-L4-RFID-OPC-UA already offer the necessary data encryption and required support for security certificates and the configuration of access rights via the web server with a suitable secure HTTPS connection.

Both frequency bands, HF and UHF, will continue to have greater importance as Industry 4.0 further evolves. Whatever the case, customers who come to Turck for their RFID project are in good hands as Turck has one thing in common with its BL ident RFID system: It can work superbly with both HF and UHF – also at the same time.

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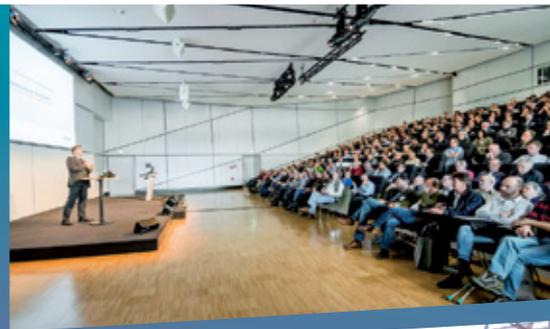
# RFID & WIRELESS IOT TOMORROW 2018



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