

The Sarissa Local Positioning System

Millimeter-accurate position detection of hand-held tools and worker's hands







The Sarissa Local Positioning System

The Sarissa Local Positioning System, or LPS, determines coordinates in 3-D space with millimeter accuracy, thereby providing flawless quality assurance in the workplace.

Common applications of the Sarissa LPS include the positive positioning of tools and/or hands during work processes including assembly, picking, and packaging. Adapted to a specific task, such as the position of a hand tool moving freely in space or of the moving hands of a worker, all movements and positions are monitored and recorded in real-time.

The Sarissa LPS makes a significant contribution to assuring manufacturing quality, which, with this degree of flexibility, is not possible by any other means. The LPS lets you reach your goals: zero defects, zero errors, the highest quality standards, and the elimination of any confusion during complex work processes.

The Sarissa LPS combines advanced ultrasound technology, user-friendly software, and a powerful open-interface architecture. Whether used as a flexible assistance system with operator guidance or merely to provide exact 3-D coordinates for automation technology, the Sarissa LPS is totally unique.

Principle of Operation

The Sarissa LPS consists of one or more receiving units over or near the workplace, along with transmitters integrated with the tool in use or attached by a glove to the operator's hand. The transmitters emit ultrasound signals at millisecond intervals.

The signals emitted are inaudible to humans and physiologically harmless: Please note that the safety of the Sarissa LPS has been confirmed by the Institute for Occupational Safety of the German Social Accident Insurance.



The spatial coordinates sent by the transmitter are identified and localized in real-time by the receiver, in conjunction with complex mathematical algorithms in the software. The system works purely on the basis of ultrasound, without the need for any additional length- and angle-measuring equipment.



Position Determination: Several transmitters send their ultrasound signals into the work environment.

Accuracy and Precision

The accuracy and precision of the Sarissa LPS is unparalleled in the marketplace: the Sarissa LPS is exact to the millimeter. Under ideal conditions, the accuracy and precision of the system is a fraction of a millimeter. The absolute accuracy of locating a transmitter under straight-line-facing conditions is 0.55 mm, with a distance of two meters between the transmitter and the receiver. If the transmitter and receiver are at an angle of 40° and facing away from each other in both horizontal and vertical axes, the localization accuracy of the system falls to 0.96 mm – still less than one mm! The precision repeatability indicates the accuracy with which a certain position can be hit repeatedly. If the transmitter and receiver are two meters apart, the precision is 0.21 millimeters at an angle of 0 °. With an inclination of 40° between the transmitter and receiver, a precision of 0.33 millimeters can be achieved.

The Sarissa LPS delivers millimeter-exact position data.



Ultrasonic Sensory Analysis: The LPS is capable of identifying, locating the associated transmitter, and determining its position within millimeter-precision.

Position detection of hand-held tools

No matter what tool – whether a screwdriver, glue or grease dispenser, welding tongs, punching tool, torque wrench or a special tool – errors due to incorrect positioning, incorrect sequence of steps, or too short or too long a dwell time at a position are all reliably prevented by the Sarissa Local Positioning System.

- Suitable for a wide variety of tools
- Regardless of the tool manufacturer
- Millimeter accurate position detection of the tool tip as it moves in space



Wireless Tool Transmitter – Smart Wireless Triplet



- Smart design (weight: 34 grams)
- Compact quick-release holder suitable for nearly any tool
- Running time of up to 12 hours
- Easy charging via USB-C cable (2 hours)
- Mounting clip for easy attachment to the tool
- Supply voltage 5 Volt / 30 mA





The Sarissa Wireless Triplet is easy to insert into the clip.

For integration into a tool controller, the highlydeveloped electronics and driver software are directly available to tool manufacturers.



Interface between Sarissa LPS and Tools

- Open-Protocol Interface
- Modbus-TCP for digital inputs and outputs

Numerous interfaces, both mechanically and in the software, simplify integration into existing systems. Our transmitters have already been integrated into screwdriving tools from various manufacturers, and they can be easily used with the tool systems from any manufacturer (subject to technical changes).



Position detection of a special tool at BSH Dillingen – Attachment of plug caps in the dishwasher basket



Quality assurance of the positioning of the screwing tool in the axle fitting | BMW AG



Positioning of the Hands of Workers

During manual operations in assembly, as well as during packing and order picking, the positions of the worker's hands are tracked in 3-D space, thus achieving a zero-error rate. The Sarissa Sensor Hand Wrap is a joint product of Sarissa and glove manufacturer Seiz, based in Metzingen, Germany.

Sarissa Sensor Hand Wrap

For small-scale picking positions, the Sarissa Sensor Hand Wrap is used, which can differentiate hand positions to an accuracy of 50 mm. For two-handed operations, the sensor identifies the right and left hands independently. The intelligent sensor, with a weight of only 21 grams, is easily attached with a clip on the hand wrap.

- Hand sensor for manual operations
- Recharging by use of USB-C (2 hours)
- Sensor weight of only 21 grams
- Run time between charging: >9 hours
- Clip closure easily attaches the sensor to the wrap



Sarissa Wrist Sensor

The worker hand-position detection technology is also available as a sensor on the worker's wrist.

- Both of our software variants, Sarissa QualityAssist and Sarissa PositionBox, can be used for the tracking of tools and/or hand positions.
- Sensor with a weight of 27 grams
- ✓ Time between charging >12 hours



The QualityAssist System is a perfect solution for tracking and monitoring hand movements. For example, during the application of primers, the application of adhesives or cleaning operations.

LPS – QualityAssist and PositionBox

Sarissa QualityAssist – the assistance system with worker guidance

Active employee guidance together with real-time work instructions

The Sarissa QualityAssist assistance system combines the processing of position data with an integrated worker guidance system. Using the intuitive user interface, work instructions can be displayed in real time from basic information created by the user's production control team.

An intuitive, modern user interface and user guidance with wizard assistance functions:

- Easy input and clear visualization of positions and complex work instructions
- Parameterize instead of programming
- Extensive software functions including jumps, branches and timers
- Test functions for transmitters and digital inputs and outputs
- Visual work instructions can be supported with audio instructions
- Connects to CAQ and ERP systems
- Documentation logs in PDF or CSV



Worker guidance QualityAssist and quality assurance of the positioning of the screwing tool in the axle fitting | BMW AG



Sarissa PositionBox – a 3-D coordinate sensor

xyz position data for pre-existing worker guidance

If the work station already has on-screen guidance for the worker, then the Sarissa PositionBox can be used. The Sarissa PositionBox acts as an intelligent sensor that communicates with the customer's existing worker guidance system, sending the spatial coordinates – and thus the location of tools or the hands of the worker – to a higher-level controller (PLC).

- ☑ Interfaces PROFINET, EtherCAT or TCP/IP connection
- Communication with the PC or PLC with a real-time data protocol
- Evaluation and representation of the spatial coordinates takes place in the customer system





Compared to worker guidance systems using pick-by-light installations, the innovative QualityAssist assistance system is substantially more cost-effective, especially when six or more action points or positions are needed. Installation and overhead wiring is minimal. In addition, work instructions can be easily created and updated by in-house staff. The QualityAssist system offers much greater flexibility for current and future projects.



At the same work place, several processes can take place at the same time.

On the right the worker, wearing a wrist transmitter, removes specific parts from the Kanban shelf. At the same time, the Sarissa system is monitoring and recording the correct sequence and torque of each individual screw connection performed by the worker on the left via interface with the tightening tool.

Sarissa PositionBox Interfaces

The Sarissa PositionBox has numerous standard interfaces that make data exchange and integration in existing production facilities easy. The interfaces are characterized by their ease of installation, understandable commands and maximum flexibility.

The cyclic process image makes it possible for PLC programmers and system integrators to obtain the position data of the position recognition system with the utmost reliability, and to incorporate that data into the workflow. For communication in high-level language (C#) XML or web services can be used as an alternative.



CMS Service with REST Interface

Using the standard web technology "REST interface," the Sarissa system provides pure position data in a simple way. Sarissa's technology works like an intelligent sensor, sending position data from the sensor on the worker's tool, for example, to ensure all tool positions are reached in a particular order. The Sarissa receiver simply transfers position data to the customer applications via the REST interface. Any number of participants can be added to the network.



Receiver in several groups





CMS Service screen

Applications in Industry

The Sarissa Local Positioning System is already successfully in use in numerous applications in a variety of fields.

Examples of current applications

- High-voltage battery installation for electric cars
- Automotive axle bolts and fasteners
- Installation of dishwasher baskets
- ☑ Undercarriage assembly in flow production
- Communications satellite assembly
- ✓ Large aircraft assembly and drilling jobs
- Hand-picking of furniture hardware fittings
- Manual application of primers
- Quality control and assurance work
- Picking work for diverse jobs
- Correct installation of individual parts
 - While currently in wide use in the automotive industry and with automotive suppliers, in the aerospace industry, and in general industry, the Sarissa LPS is industry independent.

There may be countless applications nobody has thought of or asked for yet. What can Sarissa's technology do for you?

Flow production and moving workpieces

Moving workpieces in flow production can be "handed over" from receiver to receiver as they move. When working on moving workpieces, the tool sensor refers to a moving coordinate system and calculates its position with the highest accuracy.

With only one position receiver using the Ethernet interface, it is possible to simultaneously operate different work processes at several workstations. Each worker can follow the workflow on their own individual workstation screen, each avoiding errors during the value creation process.



For underbody assembly on vehicle chassis, there are numerous safety-relevant screw attach points which are completed correctly on every chassis thanks to the Sarissa LPS.

Connection of the Sarissa LPS assistance system with laser visualization

The combination of the Sarissa LPS with the high quality laser projector from LAP opens up completely new application possibilities. Where previously a screen was needed to display the following step, now a laser projection simply points to the next position to be addressed. The visualization of the worker's guidance is thus replaced with colored laser projections instead of either pick-to-light, projector images, or a representation on a screen. Especially when working in a situation ripe for mix-ups – for example when workers must pick quickly from identical bins – small-scale visual guidance by laser projection is possible. Conversely, the LPS can also provide broad-area coverage through the laser projector, far beyond the immediate assembly station.



Detecting the position of a data matrix code

Even applications in which the position of an item is to be determined instead of the position of the tool can be realized with the Sarissa LPS. The tool transmitter from Sarissa is mounted on a code reader. Using the code reader, the LPS determines whether an item with a data code applied to it is in the right place. This technology is used, for example, when installing bearing shells. After the worker places the bearing shell in the bearing receiver, they scan the data matrix code printed on there with the code reader. The LPS uses that code to determine if the bearing shells have been installed in their proper positions.



Identification of the position of a single part: here, of a row of bearing shells

Exact positioning, in every position and at any angle

In order to reach screwdriver positions more ergonomically, larger products such as battery modules must be swiveled to various angles.

Yet regardless of the position or angle of the product to be worked on, the Sarissa LPS provides corresponding coordinates for each tool position.

The tool is locked into or released from a controlled position, or it receives different parameter sets.



Operator guidance by a laser projector



Screwing of battery models in every position



Exact positioning at any angle

Position detection of electric drilling systems

Sarissa's Local Positioning System is used in the aerospace industry, providing millimeter-accurate position monitoring of electric drilling systems (manual and semi-automatic ADUs).

During drilling, the data from the drilling process is logged and archived along with the exact coordinates of the hole, thus preventing a second drilling in the existing hole.



Position monitoring in the assembly of communications satellites





Millimeter-accurate position monitoring of electric drilling systems

Quality Assurance in Aircraft Drilling

User benefit of the Sarissa Local Positioning System

Error prevention during the value creation process

The worker decides. The tool thinks along. The Sarissa LPS supports the worker in the decision-making processes. The information provided by the Sarissa LPS assures that manual work processes are error-free, every time. A highly flexible control of the production of products according to customer requirements, even a lot size of one, is possible.

Gone are human errors caused by inattention or mix-ups. There is always one primary goal: That man and machine combine their strengths through an intelligent division of tasks. Human workers should not be replaced, but their technical skills and flexibility should be digitally supported.





10 good reasons to use the Sarissa Local Positioning System

- Incredibly high accuracy of around 1 mm
- Avoidance of common or random errors
- No interference from ambient light or audible sound waves
- Quality assurance during value creation
- Reduction of costs and liability risks
- Faster turnaround times
- Easy, fast installation and simple integration into any project
- Suitable for all industrial use; suitable for even a harsh production environment
- Pick-to-light becomes superfluous through visualization with the laser projector
- Numerous standard interfaces

Our strengths

- Innovative products
- Personal contact to our customers
- Reliable after-sales support

Customer Testimonials



"All the system requirements that we have set for ourselves and have put to Sarissa have been wonderfully fulfilled." Thomas Grob, BSH Hausgeräte GmbH

> "The Sarissa LPS is very innovative; it reliably fulfills all of our requirements. Our inquiries are always processed quickly and satisfactorily by the staff at Sarissa." *Lionel Colomb, Latésys SAS*

"It works." Kai Thorsten Vogelsang, Hettich-Heinze GmbH & Co. KG

> "The Sarissa LPS works perfectly and meets our requirements fully. It is always on duty. It's the perfect solution to avoiding ever letting defective products leave our workplace."

Rainer Horneburg, Isringhausen GmbH & Co. KG

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