

The Intelligent Transport Box

Intelligent Automation



AUTOMATISERINGS
PRISEN **2019**





Assuring sample material quality

By introducing automatic **temperature monitoring** and tracking of samples from the general practitioners to analysis at the laboratory, the **patient safety** and **quality of the diagnosis** is increased. The **wireless transmission** of data optimizes the workflow and **reduces the need of manual handling**.

The robotic solution **relieves staff** from manual tasks by automatically unpacking and sorting samples, which ensures an **improved working environment**.

The solution is built in **modular robotic cells**, which contributes to a highly flexible system that can be continuously expanded with new modules.

The automation **increases efficiency, capacity and quality** in the preanalytical phase.

The complete solution consists of a number of smaller solutions which **can be combined and arranged to fit your specific needs**. The smaller solutions are described and illustrated individually on the following pages.

Click to
[watch the case story](#)
from Aalborg University Hospital

“Already after a few weeks, we must say, this is a great success.”

Annebirthe Bo Hansen,
Chief physician and Ph.D.
Department of Clinical Biochemistry
Aalborg University Hospital
Denmark



Reserves the right to any price changes.



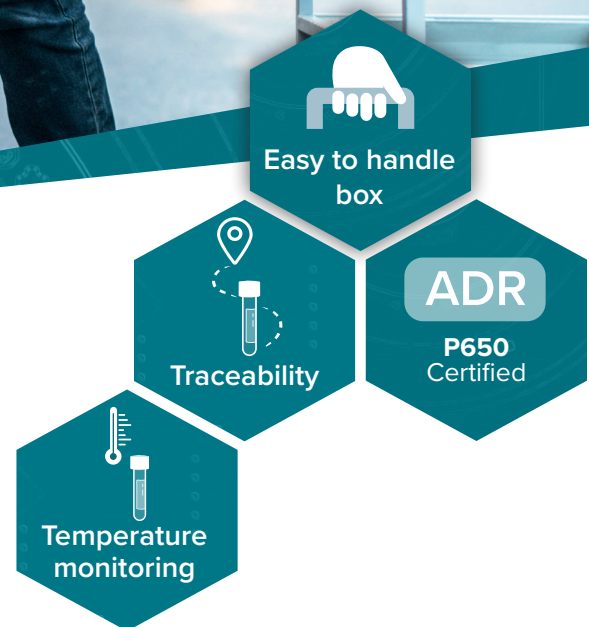
The Transport Box

The transport box is easy to handle and is designed for automated emptying in the system for automatic handling of boxes. The transport box consists of 2 plastic boxes with inserts made of shock-absorbing foam, which retains and protects the samples from shock during transport.

- Inner box – 9 liters: 295 x 230 x 185 mm
- Outer box - 16 liters: 361 x 274 x 212 mm

Tested and approved

The box is designed to live up to applicable rules for transport. It is tested and approved in accordance with the ADR Convention package instruction 650 applicable to the carriage of biological material. The shock absorbing inserts in the box can be adjusted as needed for transport of different samples.



Prepared for sample monitoring

The shipping box can be equipped with a data logger for traceability and temperature monitoring of the samples during transport. This makes it possible to monitor the sample after it is collected from the patient until it is analyzed on laboratory.

Cleaning

The parts can be separated and cleaned individually. The shock absorbing foam parts are loose in the box and can be easily pulled out. All parts are machine washable:

- Foam inserts up to 40°C
- Boxes up to 100°C

Price per Transport Box

The price applies to a standard solution, and changes with modifications of the solution

from 165 EUR



Temperature monitoring

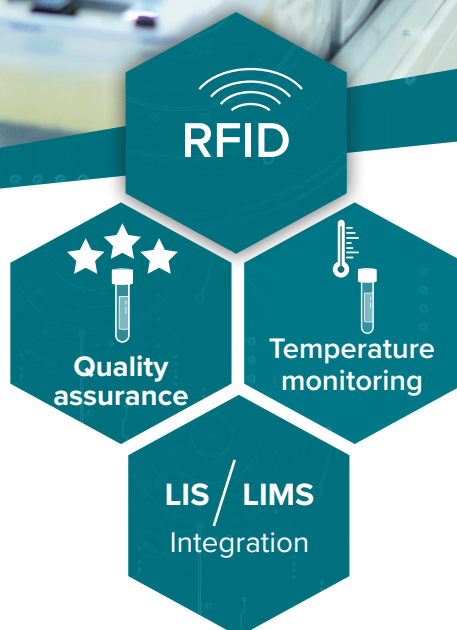
Temperature monitoring ensures that the sample material always complies with the defined quality parameters. This leads to increased patient safety.

Wireless reading

Data from the temperature loggers are sent wirelessly via RFID to a cloud-based surveillance system when the box enters the lab and data is immediately made available, which provides insight into the flow of material. This reduces errors in the pre-analytical phase, thus providing the best basis for an accurate analysis.

Intelligent monitoring system

The temperature data is made available to the intelligent monitoring system and robotic solution. The system warns if the transport does not comply with set parameters and notifies the automated sorting systems, that the box must be rejected for manual handling.



The rejection data is presented to the staff, who can assess the transport box, so quality and patient safety is increased.

Registered in the system:

- Temperature
- Timestamp for temperature
- ID for box and logs

Price for temperature monitoring

The price applies to a standard solution, and changes with modifications of the solution

from 40.000 EUR



Traceability

Via RFID and barcodes, the sample flow can now be traced from the general practitioner, until arrival at the laboratory for analysis. The full traceability visualizes the entire flow and provides a unique quality boost.

When scanning the box following is registered:

- Driver or user
- Scanner
- Vehicle
- Route
- Location (medical center, car, laboratory)
- Box ID
- Time of registration

Intelligent monitoring system

The intelligent monitoring system collects and handles temperature and traceability data to provide the full overview. All data is automatically synchronized with the cloud-

based solution, and allows to follow the movement of the sample material in real time, the status of the box is visible:

- Delivered to clinic
- Collected from clinic
- Located by car
- Arrived at the laboratory
- Picked up at the laboratory

Price for traceability

The price applies to a standard solution, and changes with modifications of the solution

from 45.000 EUR



Data reports



Alarms

Workstation and visualization

Real-time production and quality data can be visualized via the workstation. This gives a full overview of the flow of the samples and contributes to the optimization of work processes and quality.

Reporting

Data reports are prepared automatically on the basis of set criteria and data extractions can be used for quality assurance of the sample material as well scientific purposes. The intelligent monitoring system can prepare reports on a daily, weekly, monthly and annual basis.

Alarms

Alarms and notifications can be set to fit your needs. This contributes to optimizing the flow by visualizing where and when the samples have not been stored according to set criteria. This enables you to find and target the parts of the flow, where

quality and efficiency can be improved. Notifications and alarms are given via lamp or audio as well as SMS and email.

Workflow

With visualization of data, a quick overview of workflow efficiency and as well as options for optimization is created. This allows for early detection of errors in the handling process, as well as correcting these errors quickly and efficiently. At the same time, it provides ability to optimize the entire workflow, thus ensuring a quick analytical response to the patients.

Fastly visualize data

The workstation is setup to be as automatic as possible. This means the box is easily placed on the marked area and data is automatically read and becomes visual.

Price for workstation and visualization

The price applies to a standard solution, and changes with modifications of the solution

from 72.000 EUR



Automatic handling

Automatic unpacking and emptying of transport boxes ensure an efficient flow in the pre-analytical phase.

Improving the working environment

The automation contributes to improving the working environment by freeing staff from repetitive tasks. Staff can thereby be allocated to other tasks with less strain, creating greater value for both staff and laboratory.

Unpacking

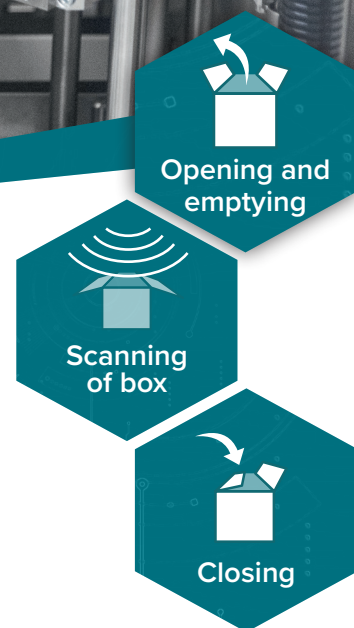
The samples are unpacked by the robot removing the lid of the outer box, after which the inner box is lifted up and placed in a fixture. From here the lid on the inner box is removed, and samples are extracted.

Emptying

The location of the blood samples in the box is detected using vision technology. If the contents of the box are deemed unsuitable for automatic handling or if errors or omissions are detected, the box is sent out to manual inspection.

Approved boxes are emptied by the robot and samples are placed in a module for sorting or a bulk loader.

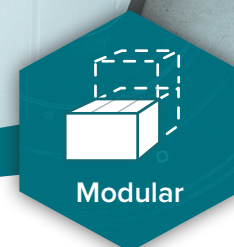
When the box is empty it is automatically reassembled and made ready for transport.



Price for automatic handling

The price applies to a standard solution, and changes with modifications of the solution

from 220.000 EUR



Box buffer

The automatic buffer improves the workflow for the transport boxes on arrival at the laboratory.

Better use of resources

With the box buffer, the boxes are automatically registered, which minimizes the need for human monitoring and interaction. Thus, resources can be allocated for other tasks.

Modular construction

The box buffer is built in modules, which ensures an easy adjustment to the location of the robot.

Each module has an in- and out-lane which can be assembled into a straight track or include one or more turns.

The modules can be assembled as desired, so that the capacity of the buffer tracks is

increased, and at the same time, ensure an optimal utilization of floorspace.

Box storage

In case of need for large capacity when receiving transport boxes, an automatic box storage system can supplement the buffer. The boxes are stored vertically and the box storage capacity can be fitted to individual needs.

In this way the entire room is utilized optimally and the boxes are fed in automatically in the system, minimizing the need for human resources.

Price for box buffer (for 10 transport boxes)

The price applies to a standard solution, and changes with modifications of the solution

from 50.000 EUR



1400
samples/hour

Sample sorting

The automated sorting of samples saves resources on manual handling and eliminates the risk of human error. This increases the quality of the work while freeing up resources for other tasks.

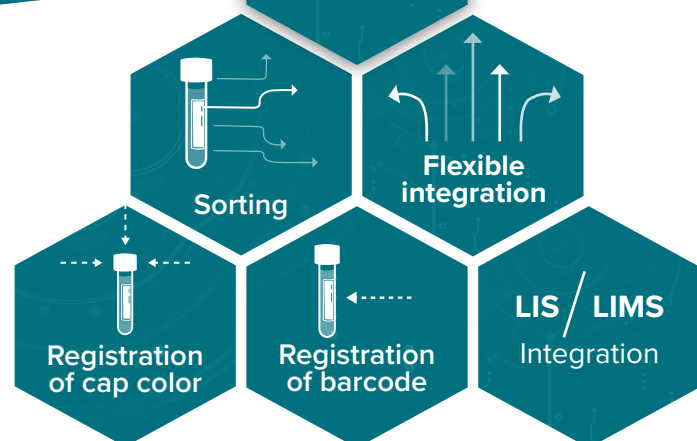
With a standard capacity of 1,400 samples per hour, the systems contribute to a quick analytic response to the patients.

Sorting on several parameters

The samples are sorted automatically based on several criteria and parameters, thus relieving the pressure on the lines to the analytic equipment.

The automatic sorting can be based on:

- Cap color
- Barcode/information from LIS/LIMS



Furthermore when integrated with LIS/LIMS:

- Samples are sorted for ordered analyzes
- Temperature measurement and history included in data.
- Flow is detected automatically
- Disposal/sorting is done automatically

Integration to output

The sortation can have several different outputs to fit the needs and analytic equipment. The samples can e.g. be placed in racks or directly on the track in pucks or cars. It is also possible to integrate to pneumatic tube systems, which makes the location of the robotic system further flexible.

Price for sample sorting

The price applies to a standard solution, and changes with modifications of the solution

from 125.000 EUR



Box lift

A fully automatic box lift contributes to increase productivity and reduce the cost in the sample reception.

Effective delivery

The box lift transports the boxes directly into the laboratory. These are simply placed in the elevator which automatically lifts the boxes up to the reception. This optimizes work processes and frees up resources.

Fast and secure

Delivering the transport boxes without entering the hospital or laboratory saves valuable time and improves the working environment by making the delivery fast and ergonomic. The solution reduces waiting time and removes bottlenecks through fast and efficient handling.

The elevator can only be accessed with a personal key card, thus ensuring that only authorized personnel can operate the elevator.

Contactless delivery

The box lift enables contactless delivery and emptying of the box. Boxes are simply delivered by the carrier in the elevator outside the laboratory and empty boxes are sent out to the carrier the same way.

This contributes to a cleaner and more efficient environment in the laboratory.

Price for box lift

The price applies to a standard solution, and changes with modifications of the solution

from 395.000 EUR



Quality assurance

The continuous monitoring of samples ensures the quality of the containment, thus improving the analytic results.



1.400 samples/h as standard

The robotic solution ensures a fast handling of samples which gives faster answers from the analysis, thus improving patient safety.



Improve working environment

Automation of repetitive work improves the working environment, prevents working related injuries and improves the quality of the work.



Optimizing workflow

By visualizing the created data it is possible to optimize the pre analytic workflow with a focus on quality and efficiency.



Cost reduction

Automation of the pre analytic phase reduces cost, improves workflow and allocates employees to more value creating tasks.



Sample monitoring

Continuous monitoring of samples creates data which can be used to detect and correct errors in the pre-analytic phase.



Temperature monitoring

The temperature of the samples is continuously monitored to ensure the quality. The robotic solution can use the data to sort the samples.



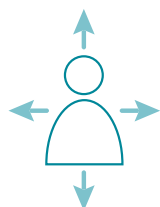
Intelligent software

Generated data is stored in the cloud and visualized in our software. This creates clear reports which are the basis for optimization.



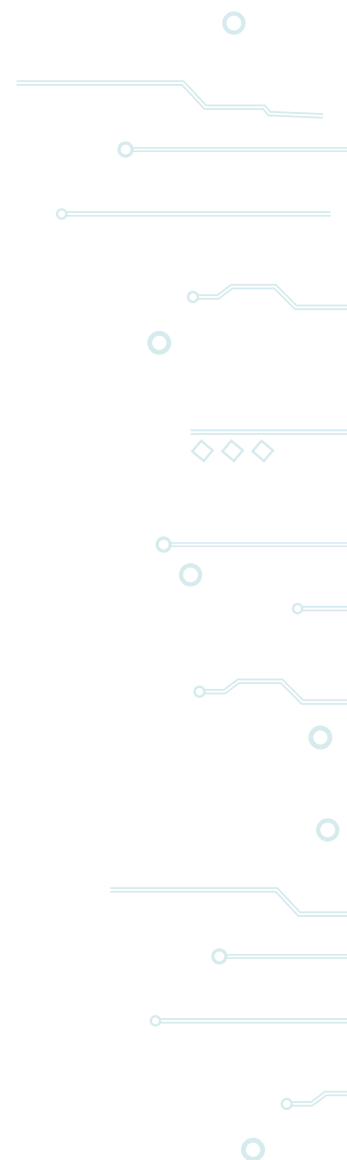
Modular construction

The solution is built in modules which makes it possible to scale the solution to fit your needs. This applies to both the robotic solution and the sample monitoring.



Allocation of employees

Automation makes it possible to allocate valuable workers to other tasks, creating more value for the lab and patients.



Standard solution consist of

Transport boxes

- Inner and outer box
- Foam insert for 60 test tubes (13 mm)
- Prepared for temperature monitoring and traceability

Price

From **165 EUR**
Price per transport box

Temperature and monitoring

- 350 RFID loggers
- 1 RFID room scanner (automatic and wireless data transfer on arrival at the laboratory)
- 1 RFID scanner for automatic unpacking

From **40.000 EUR**
Monthly subscription 2.300 DKK

Traceability

- Traceability of 350 shipping boxes
- 1 barcode on each box
- 10 mobile hand scanners incl. license
- 1 RFID scanner for automatic unpacking

From **45.000 EUR**
Monthly subscription 175 EUR

Workstation and vizualization

- Software for traceability on boxes
- Software for temperature monitoring
- Software for traceability on individual samples
- Software for integration to robot + mini-SCADA (visualization)
- 1 Barcode and RFID scanner
- PC workstation
- Alarm and notification via SMS, e-mail and warning lights/screen
- Intelligent ID cloud user license

From **72.000 EUR**
Monthly subscription 175 EUR

Automatic handling

- Automatic opening of standard transport boxes
- Automatic emptying of standard transport boxes
- Automatic closing of standard transport boxes
- Vision for detecting foreign objects in standard transport boxes

From **220.000 EUR**

Box buffer

- Buffer module for 10 boxes in/out
- Integration for automatic box handling

From **50.000 EUR**

Sample sorting

- Sorting of samples by cap color (13 mm sample tube)
- Output in rack (output can be adjusted as needed at extra cost)

From **125.000 EUR**

Box lift

- Box lift for vertical transport of boxes (1 story)
- Mini SCADA
- Automatic arrival registration of transport boxes

From **395.000 EUR**

The companies behind

The Intelligent Transport Box is the result of a collaboration between the technology companies; Intelligent Systems and LT Automation.



LT Automation is an innovative engineering company, who advises in, develops and implements long-term automation solution using robot technology. We operate within two areas of expertise that are constituted of Welfare and Health as well as Industry.

Within these two areas we tailor and innovate solutions and consulting to fit your needs with you as our focal point.

Learn more about LT Automation:

www.lt-automation.dk



Intelligent Systems creates intelligent logistics solutions, which automates and makes the world simpler, smarter and more intuitive.

This reduces costs while improving efficiency, quality, safety and working environment for companies, airports, hospitals and users of Intelligent Systems' solutions.

Learn more about Intelligent Systems:

www.intelligentsystems.dk



Ensure greater efficiency and improve the working environment at your hospital with
The Intelligent Transport Box

Visit the website

www.forsendelsekassen.dk



Watch case story from
Aalborg University Hospital



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