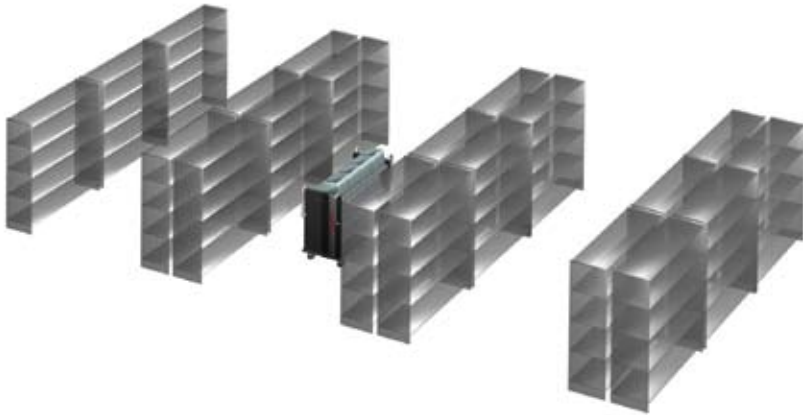


# LOGIMAT

Vertical Lift





## 1 Your current stock

A traditional warehouse will usually comprise of shelves for storing smaller items and pallet racks for storing palletised goods. Picking from this kind of stock will typically be done by the storeman, who will be given an order sheet listing all articles ordered by a specific customer.

The storeman will, guided by the order sheet, move around the warehouse and break down the order sheet line by line until the last line has been picked.

When picked, individual articles are normally placed on a picking cart which the employee will push along the aisles between the shelves. This traditional approach usually represents a picking frequency of 20-25 lines per hour, as approximately 70% of the time will be spent searching the aisles.

## 2 Think big – many products, smaller stock

In a traditional warehouse employees will easily spend 70% of their working time simply walking around trying to spot the articles to pick, which is necessary, but not necessarily a very productive activity. To this should be added further 15-20% of the total number of working hours spent at localizing the intended article, leaving only 10-15% for picking (producing) product lines.

Therefore, if you really intend to improve your stock capacity you must concentrate your efforts on minimizing both the transportation time and the search efforts involved in localizing articles that should be picked in a given transaction.



## 3 Your stock and LogiMat

If you wish to increase stock efficiency, improve the working environment and – as an extra benefit – save a lot of space it may be a good idea to take a closer look at the solutions offered by LogiMat.

A LogiMat may be described as a very large container with two columns of stacked trays, one at the front, and one at the back. Between these two columns there is a lift. When operated, the lift spans the entire container of trays and is capable of selecting an individual tray and transfer it to a pick-window where the storeman just picks the desired article. Each LogiMat tray typically contains between 20 and 150 locations (item numbers). This means that a single LogiMat tray is normally capable of holding articles that would otherwise occupy much space and cover many sections of a multi-shelf rack.

The trays of the LogiMat may be adjusted to the heights required by individual articles so that you will avoid that waste of space which is otherwise inevitable, due to differences of height.

The degree of utilisation within traditional racking is only 10-25%, and in a vertical lift equipped with floating positions the corresponding figure will be approximately 75-85%.





**Minimize your floor space while maximizing your picking speed**

Reduce the space utilized by a traditional stock to less than one tenth of the current space by placing your articles in vertical lifts.

In case of warehouses with extreme room heights, i.e. more than 10 metres, savings may be even more substantial.

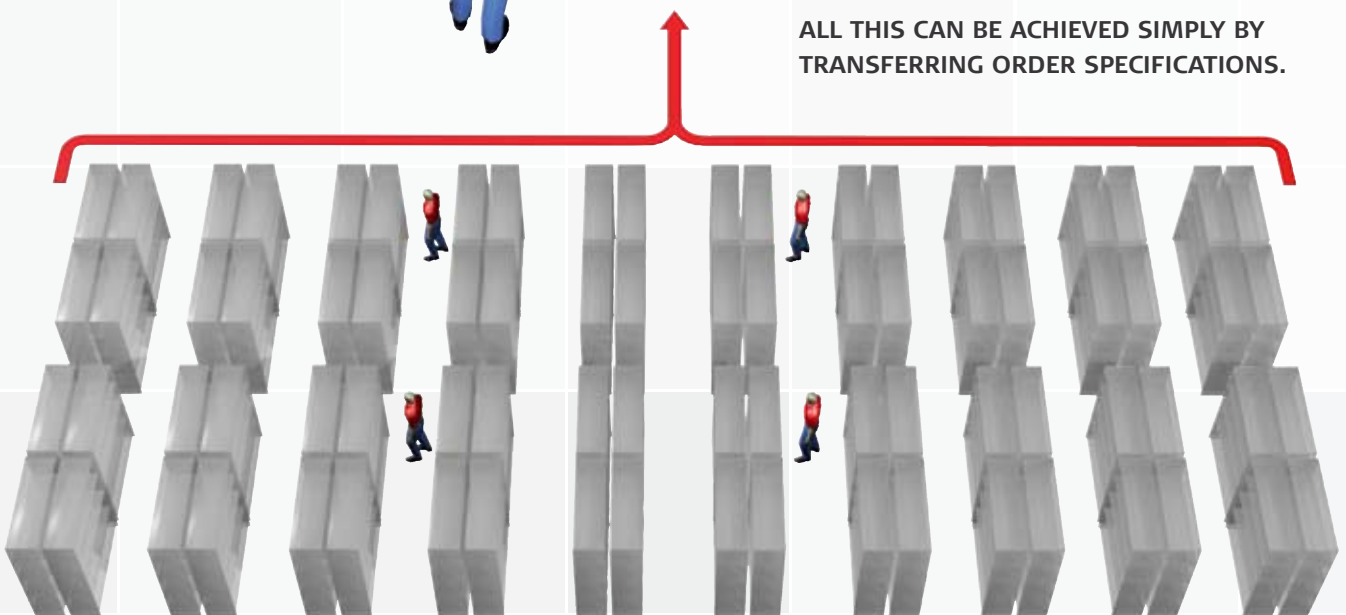
A vertical lift with this kind of height will typically contain about 350 square metres of storage space. The "footprint" of each lift is only about 9 square metres. There are examples of 8 lifts accommodating more than 2200 square metres of storage space.

Articles that are currently placed in the lifts within these 2200 square metres were previously stored in ordinary racks taking up more than 2000 square metres, including the space required for aisles. The 8 lifts mentioned take up 64 square metres of floor space.

This benefit is further enhanced by a much quicker handling of the articles in the vertical lift, which is effectively about 6-10 times faster than in a traditional warehouse, so it is evident that a significant breakthrough has been achieved.

Finally, the number of picking errors is significantly reduced, as the article in question is being selected and acknowledged, and it is possible to confirm the identity of the customer.

**ALL THIS CAN BE ACHIEVED SIMPLY BY TRANSFERRING ORDER SPECIFICATIONS.**

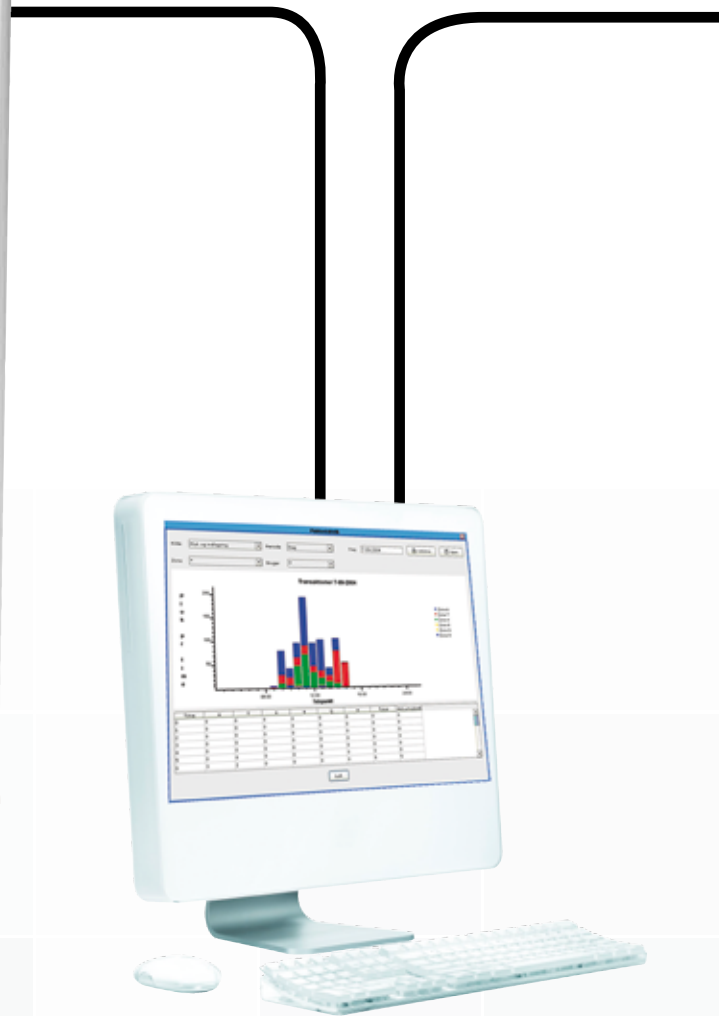




## Solo-lift

A "solo-lift" is a single vertical lift that is usually operated via the built-in touch screen. This touch screen contains a product database, enabling the placement of articles by item number, name or bar code, and without using any software.

The location of an article corresponds to the tray number. In case you wish to see a more detailed location position, our light pointer will guide you to the requested position within the tray and thereby ensure precise picking of the article in question.



## Your ERP system

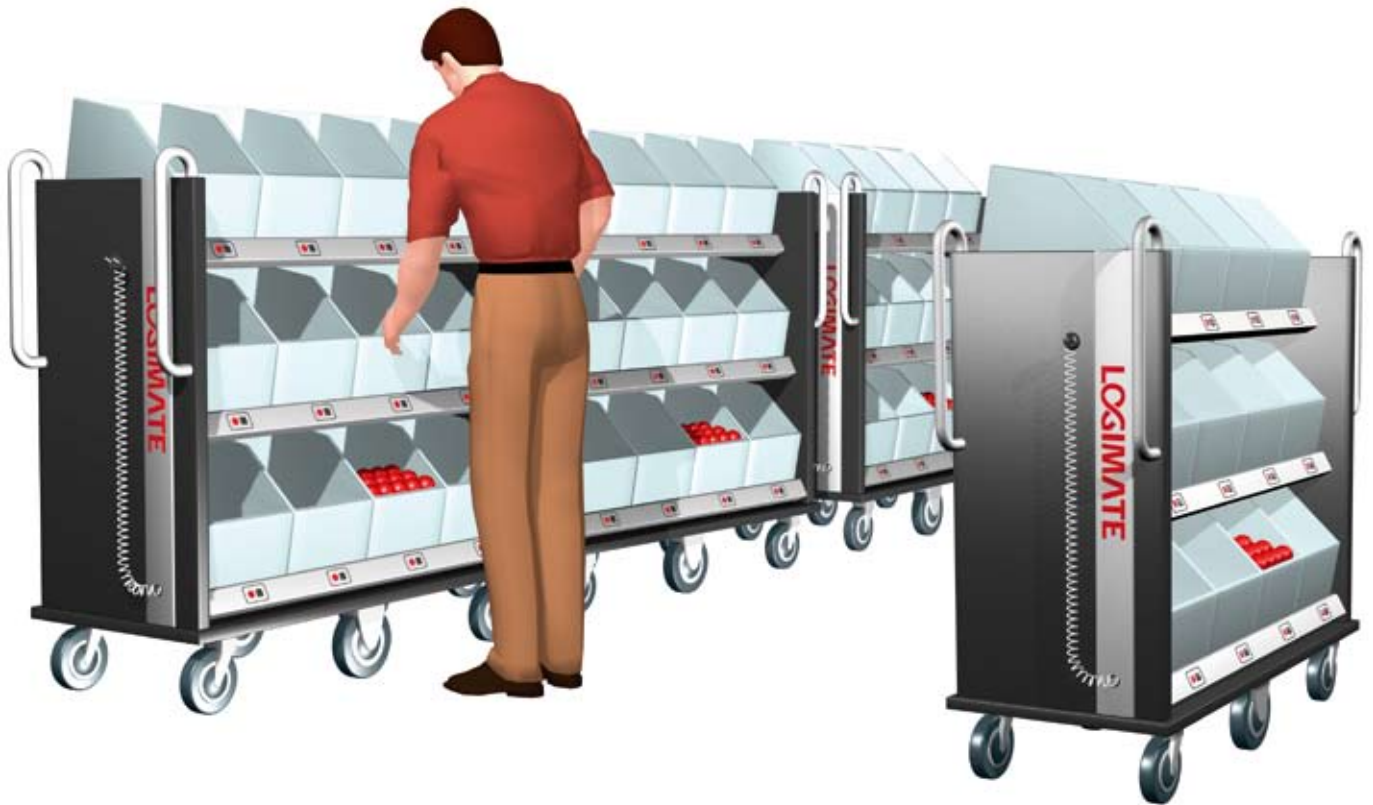
One solo-lift, or several connected lifts can be operated by software, usually in the form of an existing ERP system. Product lines that have been keyed in by the order department relating to articles placed in the lift will be directly transmitted via a pc to position the lift. This will activate the trays of the lift and transfer them to the pick-window – ready to be picked.



### “Fully hooked-up”

A “Fully hooked-up” solution means total integration of your ERP system and our SHARK software. SHARK is particularly well suited for operating LogiMat vertical lifts, in which a number of built-in functions will optimize the picking speed and storage utilization and provide access to the more advanced functions of the LogiMat, for instance tilting of trays, varying height of pick-window, individual programming for separate users, etc. Furthermore, it is possible to handle goods out-

side the lifts, on ordinary shelves, but within the same zone. This enables further optimizing of space and speed because highly frequent articles or outside articles that do not fit into a lift are placed so that they are immediately accessible to the operator within the zone in question. SHARK’s facility for batch picking, i.e. picking several orders at the same time, will dramatically increase the picking speed, as waiting time may be reduced to a minimum or be eliminated entirely, because SHARK will optimize the product line picking sequence and all “duplicates” will be picked while the location is positioned in the pick-window.



### LogiMate makes everything even easier

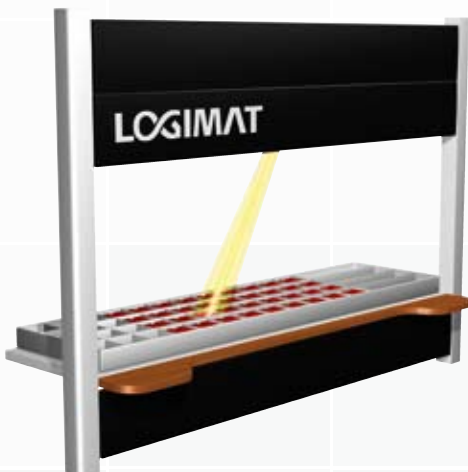
The LogiMate picking cart has been developed by HANDLER and represents an eminent utility for the LogiMates when these are being used for the purpose of increasing productivity. The benefit resulting from the production of 2 or 3 product lines per minute by each lift is not worth much if the articles cannot be disposed of equally fast. This is why we have invented the picking cart - operated by SHARK and constantly informing the picker of the intended position of each article.

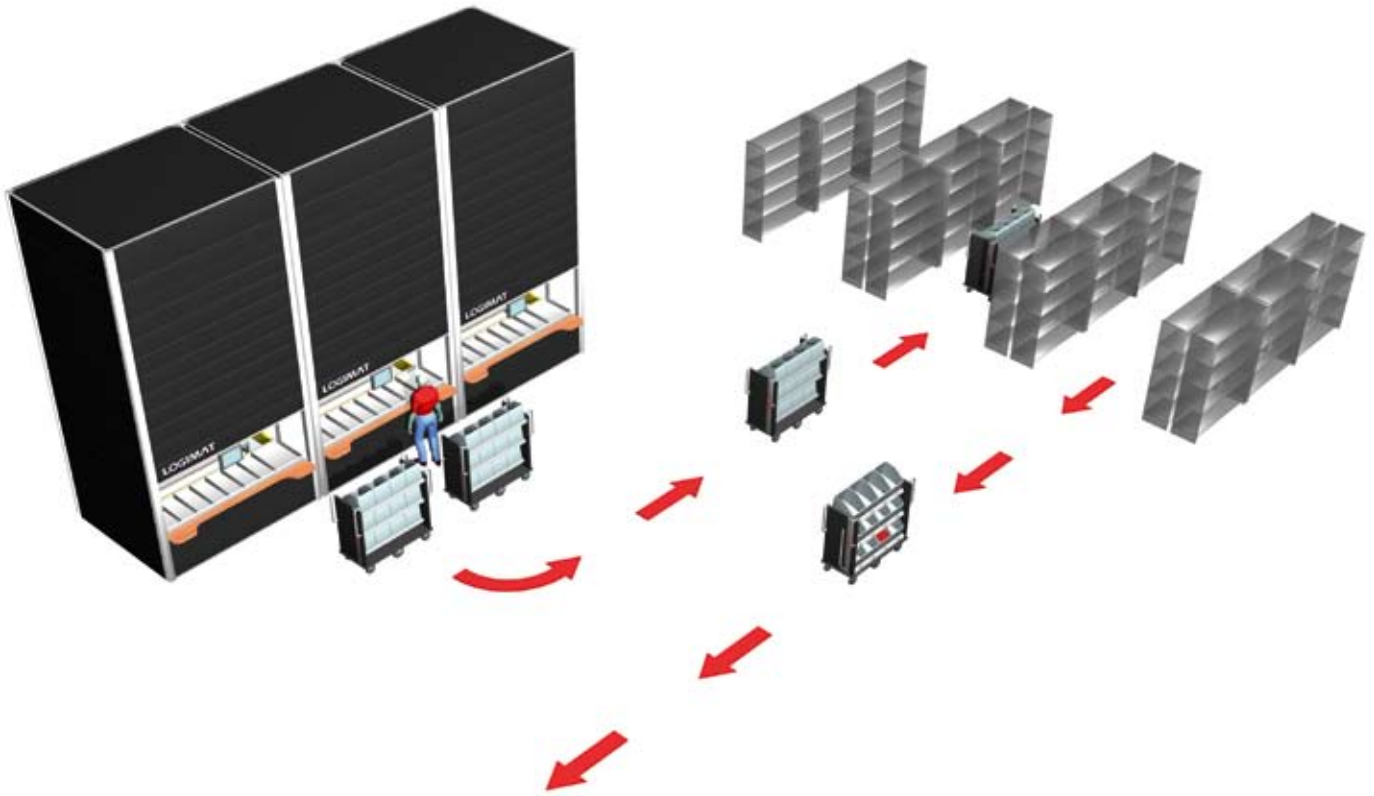
### SHARK supports the use of picking carts

SHARK supports both intelligent carts with wireless connections against a server and offering a light marking of the box to be picked to and an acknowledgment button for each box (as illustrated in the figure on the right), as well as standard carts that may use bar codes for controlling the pickings.

### One local LogiPointer shows the way...

One tray in the vertical lift contains 20, 40, or perhaps up to a couple of hundred minor locations, and in order to enable quick recognition of the location to be picked from we have developed the LogiPointer. This light feature is also called a 'pick-to-light' feature. Function: When picking and positioning articles the display will reveal where the article is placed, which is then marked by a spotlight. Calibration: The calibration procedure is an integrated part of SHARK. Calibration is done for the physical conditions related to the dimensions and location of the tray. The pointer consists of a rail mounted in the ceiling of the pick-window. A mirror is placed on the rail at an angle of 45 degrees. This mirror can move to both sides of pick-windows. A laser beam positioned at one side will illuminate the mirror, which will then project the light on the various locations. The rail may be tilted to cover the entire depth of the opening.





**LogiMat integrated  
in the overall inventory management system...**

SHARK is an intelligent inventory management system with special focus on automated stock and enhancing task efficiency. It is a scalable and flexible solution that will meet many diverse demands, from stand-alone computer installations to implementation of server-based installations with numerous clients. SHARK has been developed as a number of modules to be used as building blocks to accommodate individual, tailored systems. SHARK contains an advanced location management system, based on advanced algorithms and historical data and designed to ensure an optimum stock utilization, concerning both picking speed and space utilization. Most of SHARK's optimization functions have been automated and are thus transparent to ordinary users. The advanced functions are placed beneath a user-friendly interface, easy to use and thus requiring only a minimum of training. As many functions as possible have been automated so that users will not have to concern themselves with daily operations. SHARK's permanent stock module enables the handling of ordinary rack-based stock, elevated stock or pallet stock. By using wireless terminals you will ensure that all updates are done immediately.

**... so that multiple  
products can be shipped globally**

Once the articles have been picked from the lift and other zones of the warehouse they are consolidated so that the individual order, no matter where it has been picked, is assembled and packed as rationally as possible. This is especially important in case of consignments that are shipped abroad, but even local customers often prefer to receive as few lots as possible. HANDLER's products are supporting this workflow, and in our experience such efficiency involves a pay-back period of less than 24 months. It is therefore quite evident that there are vast economic and functional benefits to be gained by taking a closer look at the possibilities offered by these products.



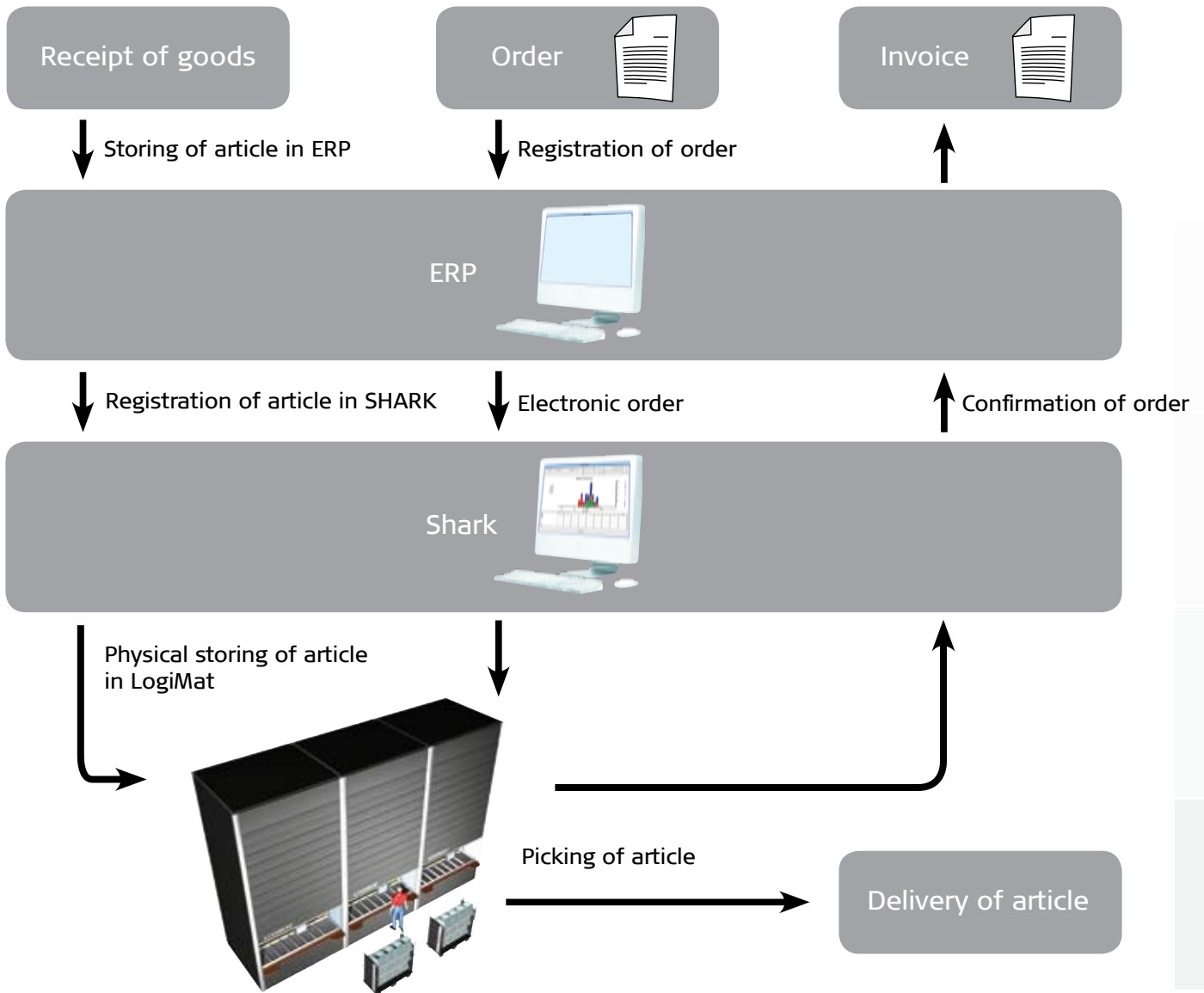
## SHARK – the integrator of ERP and LogiMat

SHARK is an intelligent inventory management system with unique facilities for handling automated stock while targeting task efficiency. It represents a scalable and flexible solution, capable of meeting the demands of everything from a stand-alone computer installation to a server-based installation with numerous clients. SHARK has been designed for integration in an existing enterprise resource planning system (ERP), so that SHARK, controlled by the top-level system, will manage the physical flow of products, a task that is normally handled far more efficiently by SHARK than by any other ordinary ERP system.

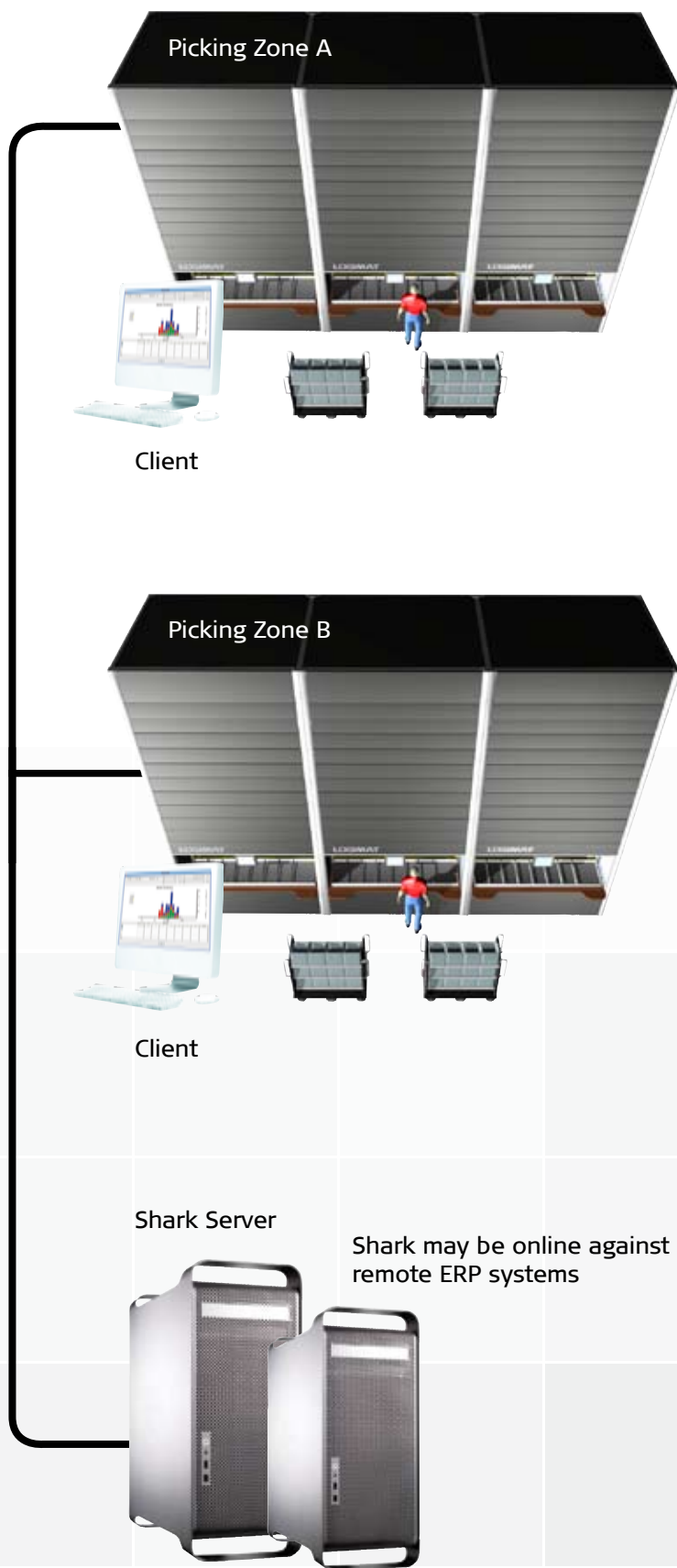
No two customers are the same, and to a wide extent SHARK can be configured to the actual requirements as it consists of a set of modules that, like building blocks,

can be combined to provide the desired system. This ensures that a standard solution will suffice in many cases and only require a minimum of adjustments. SHARK contains an advanced location management system, based on advanced algorithms and historical data and designed to ensure an optimum stock utilization, concerning both picking speed and space utilization.

The majority of SHARK's optimization functions are automatic and thus transparent to the end user. The more advanced functions are placed beneath a user-friendly interface, easy to use and thus requiring only a minimum of training. Many functions have been automated so that users will not have to concern themselves with the daily operations.







## SHARK

### Architecture

- State-of-the-art, web-based client/server architecture.

#### Server:

- Windows 2000
- Microsoft SQL Server Database
- Web Server
- Shark Application

#### Clients:

- Standard Internet
- Explorer web browser
- Running from all clients in the network
- No software installation on clients, only web browser required

The Shark Server is shared by all lifts and picking zones. The server may be installed throughout the network and can thus be placed in a secured area. Backup is only necessary on that Shark Server which is shared by all lifts and picking zones.

SHARK is configured through menus, giving you a high degree of flexibility. The figure on the left illustrates the simple creation of new storage areas, racks, locations, etc., for the purpose of providing SHARK with an exact picture of the warehouse floorage. This is necessary in order to secure optimum utilization of the space and the best possible placement of articles in the area. New locations can be created when desired and empty locations can be removed without any prior specific information. SHARK's permanent stock module enables the handling of ordinary rack-based stock, elevated stock, or pallet stock.

The use of wireless terminals guarantees that all updates will take place immediately, so that inventory status is up-to-date at all times. Furthermore, operators will have direct access to the database, and reprioritization of orders will immediately be reported to the person responsible. SHARK's transaction log is an efficient tool for revealing potential problems as it enables the tracing of any transaction that may have influenced the stock level. Effective search options make it easy to target and locate desired information. An efficient software management facility is vital for an optimum utilization of the automated stock.

| Functions   | Shark basic    | Shark 1.3       | Shark 2.0       | Shark 2.0 Enterprise |
|---|----------------|-----------------|-----------------|----------------------|
| Number of zones   | Max 1          | No limitations  | No limitations  | No limitations       |
| Support of vertical lifts   | Max 4          | ✓               | ✓               | ✓                    |
| Permanent stock   |                | I limited form  | ✓               | ✓                    |
| Support of picking lists for permanent stock  |                |                 | ✓               | ✓                    |
| Wireless terminals in permanent stock   |                |                 | ✓               | ✓                    |
| Support of truck terminals  |                |                 | ✓               | ✓                    |
| Support of wireless picking carts (LogiMate)  |                |                 | ✓               | ✓                    |
| Linking to ERP system via SHARK link  |                | ✓               | ✓               | ✓                    |
| Optional creation of picking and storing orders in SHARK  | ✓              | ✓               | ✓               | ✓                    |
| Product database (master data)  | ✓              | ✓               | ✓               | ✓                    |
| Location management   | ✓              | ✓               | ✓               | ✓                    |
| Automatic history-based ABC computation   |                |                 | ✓               | ✓                    |
| Advanced automatic location management with floating ABC, product relations, considerations regarding physical measurements of products, etc. |                |                 |                 | ✓                    |
| Database  | MSDE           | MSDE/SQL server | MSDE/SQL server | MSDE/SQL server      |
| User administration (user login with limited rights)  | ✓              | ✓               | ✓               | ✓                    |
| Module for receipt of goods   |                |                 | ✓               | ✓                    |
| Module for shipment/consolidation/packing   |                |                 | ✓               | ✓                    |
| Module for order release (planning & allocation)  |                |                 | ✓               | ✓                    |
| Use of barcode scanner  | ✓              | ✓               | ✓               | ✓                    |
| Printing of labels  | ✓              | ✓               | ✓               | ✓                    |
| Printing of reports   | Inventory list | Inventory list  | ✓               | ✓                    |
| Statistics: Distribution of pickings  | ✓              | ✓               | ✓               | ✓                    |
| Statistics: Statistics of pickings  |                |                 | ✓               | ✓                    |
| Statistics: Inventory profiles and product relations (in connection with replenishment module)  |                |                 |                 | ✓                    |
| Web information module  |                |                 | ✓               | ✓                    |
| Graphic editor for design of shelves and trays in Vertical Lift   | ✓              | ✓               | ✓               | ✓                    |
| Management of location light/tilt/lift of LogiMates   |                | ✓               | ✓               | ✓                    |
| Automatic refill of warehouse zones from other zone or from remote storage facility   |                |                 |                 | ✓                    |
| Client/server installation  |                | ✓               | ✓               | ✓                    |
| Administrative client option (offline)  |                | ✓               | ✓               | ✓                    |
| Inventory with simple lists   | ✓              | ✓               | ✓               | ✓                    |
| Inventory with orders (generated in SHARK or by ERP system)   |                |                 | ✓               | ✓                    |
| Location management: Fixed locations  | ✓              | ✓               | ✓               | ✓                    |
| Location management: Floating locations   | ✓              | ✓               | ✓               | ✓                    |
| Location management: FIFO   | ✓              | ✓               | ✓               | ✓                    |
| Transaction log   | ✓              | ✓               | ✓               | ✓                    |
| System log  | ✓              | ✓               | ✓               | ✓                    |
| Automatic e-mail reporting in case of errors and system events  |                |                 |                 | ✓                    |
| Integration with conveyor (roller path)   |                |                 |                 | ✓                    |
| Integrated test environment (separate SHARK installation for simulation tests)  |                |                 |                 | ✓                    |
| Monitoring software (Watchdog) for automatic error detection and restart etc.   |                |                 |                 | ✓                    |
| Flexible automated picking zones, enabling the combination of several zones   |                |                 |                 | ✓                    |
| Optimization of order sequence  |                |                 |                 | ✓                    |



## Shark in function

- Protocol: Data are imported/exported as files to/from optional folders. File format: XML files in SHARK XML format. Fixed length ASCII files. Comma- or tab-separated ASCII files.
- Import of picking orders.
- Confirmation: Picking and inventory input orders can generate a confirmation file once the order has been executed in SHARK.
- Stock data base: Updating of master data for inventory data base.
- Stock valuation: In connection with the stock valuation module it is possible to import a list of articles to be counted.



## Shark link

The linking of SHARK against a superior ERP system or any other inventory management system is a fully integrated part of SHARK that, with a minimum of effort, can be integrated in a more comprehensive solution. The SHARK module handling the connection to other systems is called SHARK link.

SHARK has been installed as an inventory system in connection with a number of different ERP systems as for instance XAL, Axapta, SAP, Movex, MAPICS, IFS, Concorde, BAAN, as well as in various customer-specific solutions. Logiware has great experience in implementing this link solution and will work closely with our customer's IT department or IT supplier. SHARK may also be installed together with existing inventory management software, where SHARK's unique facilities for managing automated stock can be utilized, while the existing system will continue to handle e.g. the rack-based stock.

The SHARK link module enables the import and export of data to remote systems, as files or by means of other data exchange methods. There will typically be an ERP system involved; however, this module may also be used for extracting data for e.g. spreadsheets and thereby enable new functions or reports.

## Shark highlights

The information module provides quick access to important information concerning operations and enables e-mail reporting in case of errors. All access takes place through a standard web browser. Efficient tool for the system administrator who will be advised by e-mail in case of unforeseen events, and who will then have the opportunity to trace the cause of possible problems via a web browser. Furthermore, it is possible – on a continuous basis – to monitor the immediate operation status. The fact that the info module is accessed through a web browser means that no software installation is required on individual computers, which again means quick and easy access to the desired information from any computer.

Information is the keyword for an optimum operation – only if you are completely aware and updated on the operation at all times will you be able to interfere and improve conditions. Useful information may be awareness of alterations of the workflow: do these improve or maybe impede the work speed (how many pickings have been done per hour today compared with the number achieved one month ago?). What is the utilization rate of lifts? Would it be more expedient to have the automated zones manned for shorter periods of time as efficiency is not optimized? SHARK web info thus becomes a natural management tool which, in simple key figures, defines an efficiency target, making it an essential component of ongoing stock activity enhancements.

**More on  
Shark**



**Logisafe**

The LogiMat Safe is an electrical “roller shutter” which may, according to requirements, be shut, thus preventing the access to the pick-window in the LogiMat. This is a perfect solution when storing valuable articles in the machine.



**Logilift**

The LogiMat Lift is an infinitely variable pick-window with adjustable height to ensure that the picking height will always be 100 per cent ergonomic.



**Logitilt**

LogiMat Tilt is a device tilting the tray in the pick-window at approximately 45 degrees. This minimises the picking depth (it is no longer necessary to stretch in order to reach the rear part of the tray) and ensures an optimum overview of the contents of each tray.



**Logipointer**

LogiMat Pointer is operated in combination with our picking software SHARK (or a similar application) which will inform the pointer of the location to be picked, after which the location will be indicated by a light marking.



**Logiturbo**

LogiMat Turbo is an additional pick-window within the existing pick-window and represents an extension of the managing software, resulting in extremely high picking frequencies on installations with only a few vertical lifts (1 or 2).



## LogiMat – tailored

### Basement / 2 levels

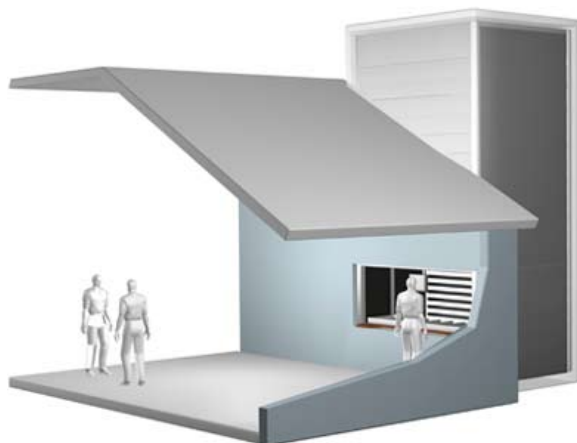
The LogiMat is placed on the basement floor and allowed to extend through higher-level floors so that the LogiMat vertical lifts may be operated from the desired level, typically from the ground floor where access conditions etc. are optimal. The lift may also be equipped with several pick-windows positioned opposite each other or at different levels, on the same or on different sides.



### Underground

Instead of having the upper part of the lift extend through the roof, a hole will be dug in the floor of the warehouse. The lift is then placed at the bottom of the hole, bringing the pick-window close to the centre of the lift.

The picking frequency can thus be dramatically increased, resulting in substantial benefits.



### Through ceiling / roof

Again, the LogiMat vertical lifts will be placed on the warehouse floor and be allowed to extend through the ceiling, the elevation of which has been enclosed in a shell.

The lifts are then placed within the elevation area, resulting in vast capacity at a relatively modest additional cost.



### Extension

In case of limited floorspace the lifts may be placed in an annexe or insulated shell placed around the LogiMat vertical lifts. The warehouse wall is then penetrated, enabling direct operation from the warehouse. This is a perfect solution if you require additional storing space while wanting to avoid the expenses involved in a "real" building.

## A working concept

As the manufacturer of vertical lifts on the market we have, during the development of the LogiMat, made an effort to apply standardized components. The reason for this is that we did not want our LogiMat customers to be “guinea pigs” striving with more or less successful technical solutions. As we all know, electronic components that have not been thoroughly tested may cause problems that everyone would rather avoid. Once your articles have been placed in a vertical lift it is of course essential that these articles can be retrieved and shipped to your customers. Therefore, operating efficiency is an absolute must, and this is why we have selected precisely these system solutions. Toothed racks, thoroughly tested monitors and electronics will guarantee you the very best result with LogiMat.

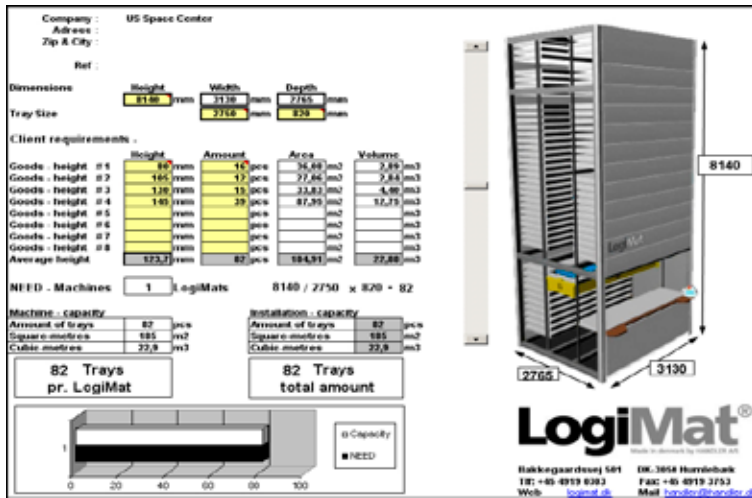


## Control is useful and ensures operating efficiency...

The LogiMat is equipped with a number of electronic systems that will contribute to a continuous and optimum operation. The LogiMat is the only product in the market containing photo-cells designed to control that the lift shaft is free. This also applies to the elevator which has been equipped with a number of sensors in order to provide an “all clear” prior to the execution of orders. The “brain” of the LogiMat consists of a professional PLC and 2 frequency converters and has also been selected for the purpose of optimum operating efficiency. All components are supplied by one of the largest producer of electronic equipment, implying that they have been thoroughly tested and are extremely reliable.



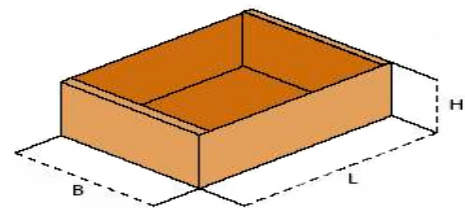
Trays – capacities and dimensions



The above illustration is an example of the utilization of a LogiMat. All articles that are higher than 75 mm and may be divided by 12.5 mm can be accommodated by a lift. This ensures maximum utilization of the capacity of each lift. Our LogiMat construction means that we are able to deliver it in almost any height or width. However, there are of course certain standard measures represented in the majority of our products. All standard heights are within the range from approximately 3 metres up to 16 metres, with increments of 75 mm. Standard widths for trays are 1220, 1650, 2500, 3000, 3500, and 4000 mm. Standard depths for trays are 650 and 820 mm.



Tray dividing systems



The trays of the lift may be divided in a number of ways. **Cardboard:** Perhaps the most widely used models are the "tailored" cardboard boxes, produced by using sub-measures of the lift trays. By using this system you will be guaranteed maximum utilization as one location size may at all times be replaced by another, either twice the size or half the size as the existing one. **Steel:** A steel layout is also available. This system consists of a steel rim of the desired height as well as corresponding dividers.

SAS



DBC Medier



**The SAS solution**

SAS Components have 10 LogiMat vertical lifts, 3.5 meter wide, all of which are equipped with a tilting function lifting the back panel of the tray and thus providing a better overview and better ergonomics.



The 10 lifts contain 70,000 locations. The lifts are software-linked, and label with picking information is printed by pressing the touch screen. The installation contains spare parts that are handled 24 hours a day. Shipments are effected partly to service and maintenance departments in Norway, Sweden and Denmark, and partly for the purpose of on-site repair of aircraft at Copenhagen Airport. Vertical lifts containing parts for these purposes must be 100 per cent reliable, which was one of the reasons for choosing LogiMat.

**An alternative solution at DBC Medier**

DBC Medier in Ballerup produces and mounts equipment for textbooks and library books. The lifts are used for collecting articles for DBC's customers. One lift tray contains 9 boxes, each representing one customer.



Three flat screens display an identical picture. The screens contain information about ongoing operations, and a light above each individual box indicates the current activity. Once a box has been filled an invoice is printed, the box is dispatched, and a new box will replace the previous box.





Oticon



### The Oticon solution

At Oticon the LogiMat has been integrated in a highly efficient picking system consisting of roller conveyors, throughput shelves and ordinary shelves with lights indicating where to pick.



The LogiMat has been provided with a turbo-function, allowing two trays to appear in the pick-window at the same time. Apart from the turbo-function the LogiMat also has a tilting function that lifts the back panel of the tray to provide better overview and ergonomics. The control function of the LogiMat will communicate directly with the picking system of the area, meaning that picking can be done swiftly and without the appearance of any documents.

Nissens



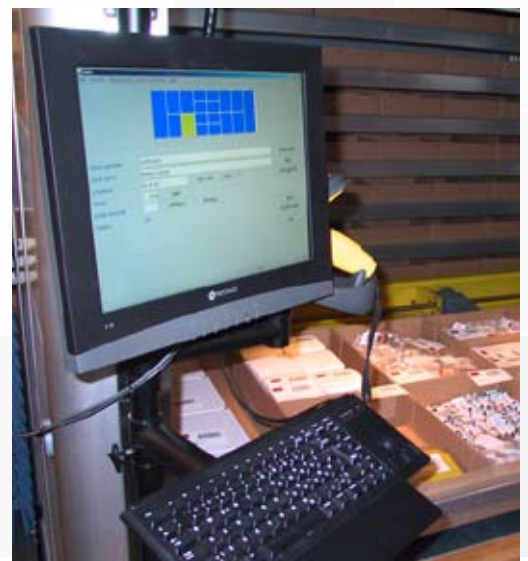
### An alternative solution at Nissens

Nissens Kølerfabrik produces cooling systems for engines. During production many heavy tools are used, and the handling of these tools weighing up to 100 kilos has always posed a problem.

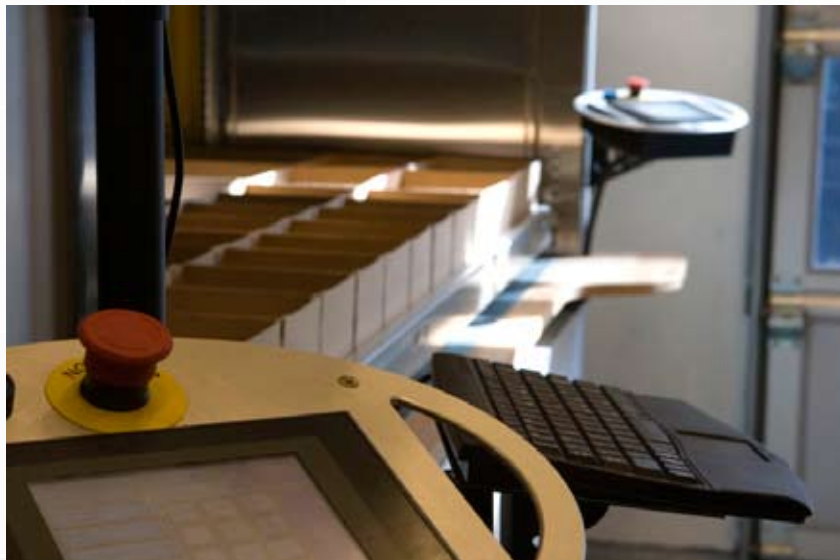
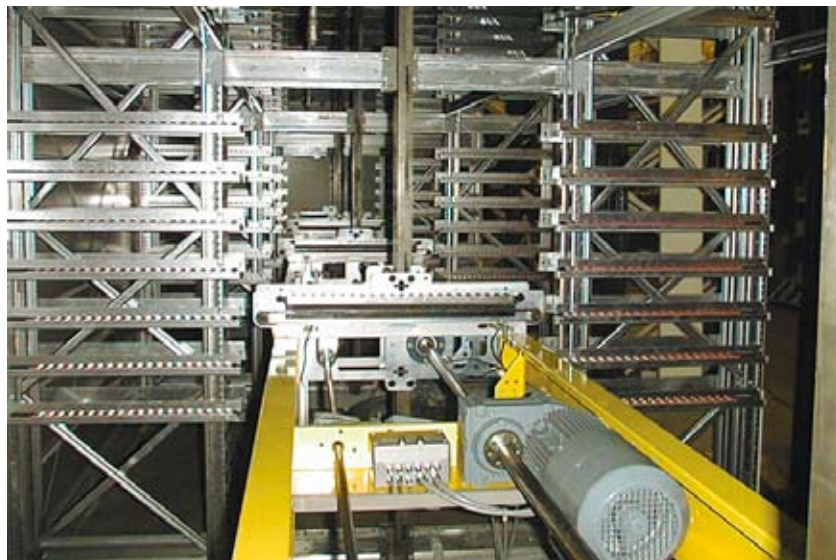


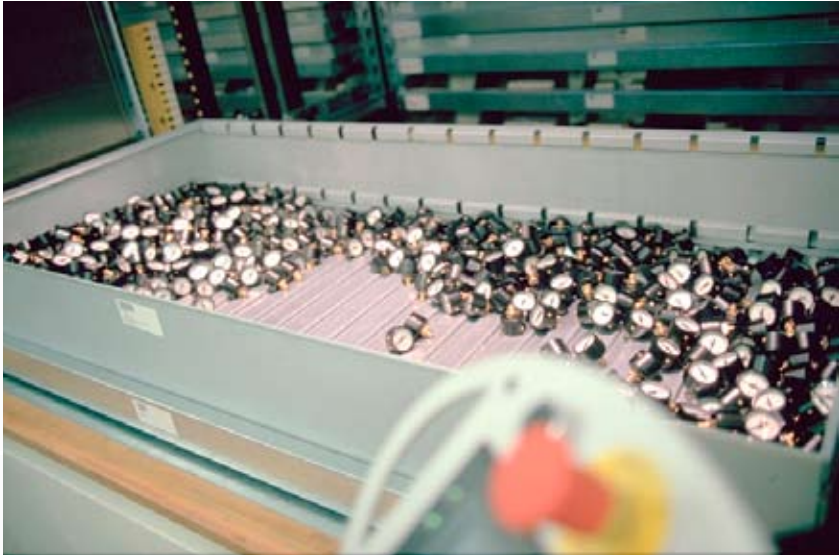
In order to solve the problem Nissens purchased 3 LogiMat vertical lifts where tools are placed on tubular pallets. Once the elevator of the LogiMat has transferred the pallet to the pick-window a lifting device with rollers will appear through the bottom of the pallet.

When the lifting device is in top position there will be rollers under all the tools of the pallet, meaning that each individual tool can be rolled freely from the pallet onto a cart transporting the tool to the production area.











### About HANDLER A/S

HANDLER A/S was established in 1981 and today is a leading supplier of warehouse equipment, transport facilities and end-to-end logistics solutions; furthermore, we deliver store concepts to DIY markets and timber companies all over Scandinavia.

#### Vision and targets

It is HANDLER A/S' vision to build, maintain and continue the personal contact to our customers – assets that can only be accumulated by an independent firm with no group affiliations. Our company is based on service and expertise. It is also our goal to be frontrunners concerning innovation and creativity, individual and flexible solution concepts, and cutting-edge technology while still adhering to the highest quality standards. We are always trying to trace new storage systems and at the same time designing alternative storing possibilities based on the existing facilities...

#### Vertical lifts

HANDLER A/S' experience with vertical lifts dates back to 1992 when we pioneered the introduction of vertical lifts from the U.S. into the European market. Since then we have been non-disputed market leaders within this area.

During 1992 HANDLER A/S developed the first Danish-made vertical lift, LogiMat®, which is being produced at our Humlebæk plant. It still remains the only Danish-made vertical lift in the market and has proved a success from the very start. Our LogiMat has been installed in all Nordic countries, in Europe, in the Middle East and in the United States. Approximately 9 out of 10 implemented vertical lifts in Denmark is a LogiMat®.

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## **HANDLER A/S**

Bakkegårdsvej 501  
DK-3050 Humlebæk  
Denmark

[www.handler.dk](http://www.handler.dk)  
E-mail: [handler@handler.dk](mailto:handler@handler.dk)  
Phone: (+45) 49 19 03 03  
Fax: (+45) 49 19 37 53

