

# The Intelligent Hänel Control and Software Technology



Hänel LEAN-LIFT  
EcoDrive

Hänel LEAN-LIFT  
EcoDrive

HÄNEL

Ideas that move the world...

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# Digitization with Hänel – Pure efficiency!

**Flexibility, efficiency and cost-effectiveness – these are the demands that modern-day intralogistics must meet!**

For over 65 years, the name Hänel has stood for high-quality products in the sector of intralogistics and office organization.

Vertical carousels like the Hänel Rotomat® or vertical lift modules like the Hänel Lean-Lift® and the Hänel Multi-Space® are high-tech products in automated storage technology.

**More than 60% of the available floor space saved and drastic reductions in the time taken to access the stored goods.**

Alongside ergonomic design, inventory protection and the many system advantages, we give top priority to the cost-efficiency of these systems.

The highest quality standards of the storage systems and the smart control technology from Hänel make these products a worthwhile investment for your company.

**The operating procedures of Hänel storage systems are optimally designed to create additional space and time savings**

Control solutions such as the optimization run, which automatically eliminates any unused space that may have arisen, or the Access Priority Factor which stores frequently requested containers closer to the access point than those needed less often, are only two examples of the many highlights of Hänel control systems.

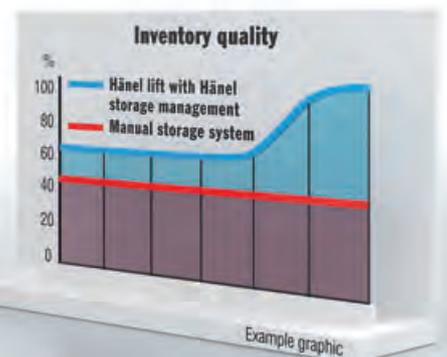
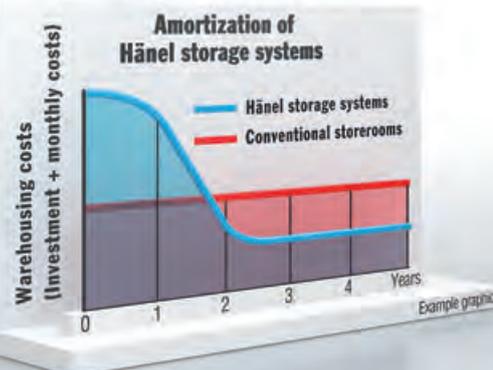
The perfect interplay between Hänel high-speed drive and micro-processor control unit enable travel speeds in the Hänel Lean-Lift® of up to 2.30 m per second!

Numerous add-on modules and the various options for integrating the controllers into existing IT systems offer you optimal, customized storage management for your intralogistics.

**The right decision**

If you want to improve your intralogistics concept and reduce costs, you should talk to the specialists at Hänel first. They will work with you to develop your own 'tailor-made intralogistics concept.'

**Be sure to choose the intelligent control and software solutions from Hänel, as so many renowned companies worldwide have done!**



# Intralogistics 4.0 – Digitization and network connectivity with solutions from Hänel

## One control system – four operating modes

Four different modes of operation in one controller make integration in your network easy.

## The MP 14 N new control system

New ease of operation and typical Hänel high quality with a 12-inch touch display. The virtual alpha keyboard is displayed clearly on the touchscreen.

## Direct integration of Hänel systems in various ERP solutions via SOAP protocol

Hänel has further enhanced its controllers with a SOAP web service interface. Web-based technology enables the implementation of a link between the Hänel controller and many ERP solutions – for example, SAP – without any middleware.

## Onboard warehouse management

The MP 12 N-S, MP 14 N and the central MP 100 D controllers all have full-scale integrated warehouse management functionalities – no additional PC is required.

## Integrated web server

All warehouse data can be called up via the IT network thanks to the integrated web server and standard browsers.



High-tech picking via wireless augmented reality application for Hänel lift systems



Hänel **LEAN-LIFT**

### **Storage management**

Control software for Hänel storage units networked with host-supported ERP (Enterprise Resource Planning) systems.

### **Order picking with Augmented Reality**

The storage system is operated remotely via AR eyeglasses – no other operator action is necessary. All relevant information is displayed in the data eyeglasses – system operation is initiated through **Pick-by-Voice**.

### **Hänel Tool Management**

Various manufacturers have already realized a standard interface for our Hänel solutions, for example: TDM, MAPAL, Gühring, E-Zoller, Datas, COSCOM, STB-System and Seppone, among others.

### **Warehouse Management System WMS**

The complete solution for complex warehouse management with Hänel storage systems – from incoming goods to dispatch.

**Hänel's digital world offers innovative solutions that address the demands of tomorrow!**





Fast and error-free picking with 12 Hänel Lean-Lift® systems thanks to Pick-by-Light and Drop-to-Light

# MPON

## Single lift controller for the Hänel Rotomat®

The MPON is designed as a single-lift controller for the Hänel Rotomat® with one access point. It offers three different operating modes:

### MPON-StandAlone

### MPON-HOST

### MPON-BARCODE

The high-resolution TFT display can handle virtually any language. A lift run graphic shows the movements of the lift.

The user-friendly menu structure for information and system services makes it easy to work efficiently. An RS 232 interface for connecting peripheral systems (PC, barcode reader, etc.) is also integrated.

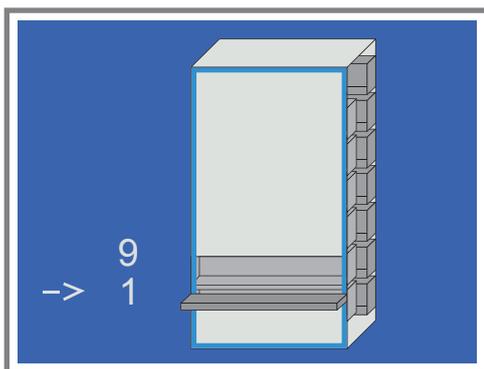
The Hänel EcoLoad® can be integrated into the MPON as an option. It ensures even load distribution in the Hänel Rotomat®. This helps to save energy and avoid dangerous load imbalances (further information on the Hänel EcoLoad® is available on page 26). The load status is depicted graphically on the display.

Storage locations are pinpointed by compartment LEDs, and sub-level indicators are also possible if required.

The **Operation by remote control** module in conjunction with the requisite safety equipment can be used to control the Rotomat® directly from a PC or barcode reader.

### The pluses

- ▶ Three different operating modes are possible.
- ▶ Direct selection of the shelf levels by entering the shelf number.
- ▶ Digital display of the shelf number in the access point.
- ▶ Messages displayed in plain text.
- ▶ When positioning system MFPS is used: Individually programmable stop positions, position monitoring.
- ▶ Different language versions can be set.
- ▶ RS 232 interface for PC and barcode reader.
- ▶ Keylock function.
- ▶ Emergency operation possible with retrieval hatch closed (optional).



With the MPON, the movements of the lift are shown via a lift run graphic





On the Hänel Rotomat® office carousel, the MPON is integrated into the work counter



The MPON is integrated in the switch panel above the access point of the Hänel Rotomat® industrial storage system

# MP 12 N

## One control system – four operating modes

**The MP 12 N – the compact controller for Rotomat<sup>®</sup>, Lockomat<sup>®</sup>, Lean-Lift<sup>®</sup> and Multi-Space<sup>®</sup>**

Whether you use the Hänel storage systems as stand-alone solutions with integrated inventory management or want to integrate the control units into a higher-level ERP system – the top controller MP 12 N from Hänel has everything already built in.

This is the compact controller for Hänel storage systems with comprehensive, integrated storage management for article numbers, storage locations, stock quantities, minimum inventory and other supplementary data fields.

The many configuration options give the customer a tailored range of functions.

There are four different operating modes available, so you can choose the right one for your storage management.

**MP 12 N-StandAlone**

**MP 12 N-HostWeb**

**MP 12 N-HostData**

**MP 12 N-HostCom**

### The Hänel advantages:

- ▶ **ONE controller for all requirements!**
- ▶ **Simple operation**
- ▶ **Multiple languages support global usage**
- ▶ **No PC/server required – ready to use, with very little administration!**
- ▶ **Optional modules available for added functionality**
- ▶ **Whether you decide today or tomorrow, you will ALWAYS have a good solution when you choose the MP 12 N controller!**



Optimal integration of the Hänel MP 12 N controller in the digitized warehouse organization



# MP 14 N

## High-performance control system with 12-inch touch screen

### Hänel control technology in new dimensions

The 12-inch high-resolution touch display supports maximum ease of use with a screen having plenty of space to show vast amounts of information. This is ideal for the presentation of user interfaces for various ERP systems directly at the storage system terminal – this is possible thanks to the integrated SOAP interface.

The fully integrated warehouse management system has also been optimized for the large display and improved in terms of functionality and convenience.

### The latest browser technology

The MP 14 N uses the latest browser technology to display information. Integrating the MP 14 N in existing networks is completed quickly, just as it is with the MP 12 N.

There is no need for a classic alphanumeric keyboard with the MP 14 N – texts are entered using the virtual keyboard displayed directly on the touch screen.

When used in conjunction with Hänel PictureControl, the camera feature integrated in the Lean-Lift®, the large display area of the MP 14 N is a great advantage.

Three operating modes are integrated in the MP 14 N system:

**MP 14 N-StandAlone**

**MP 14 N-HostData**

**MP 14 N-HostWeb**

**Storage at a glance!**

### The pluses

- ▶ TFT color display with 1,024 x 768 pixels and touch-screen technology.
- ▶ The overview of the storage situation is outstanding thanks to the graphical presentation of articles and layout inside the system.
- ▶ Presentation of article master data in a lightbox.
- ▶ Overview of all storage positions on the multifunction carriers in the Hänel Rotomat®.
- ▶ Convenient searches via match codes or key words.
- ▶ USB and RS 232 interface for the connection of peripheral devices.



The 12-inch touch screen has plenty of space to display information



Maximum ease of use with the 12-inch touch screen of the new Hänel MP 14 N controller

# Hänel's wide range of controller modes

## StandAlone

### The mode with maximum ease of use and functionality

In **StandAlone mode** the picking lists and order management are already integrated.

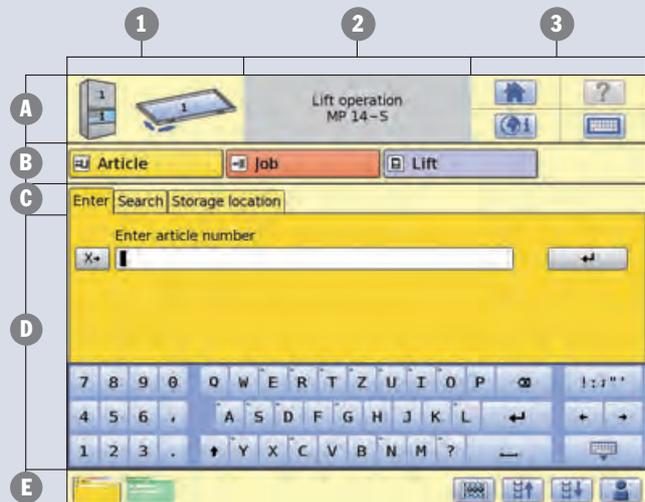
One USB interface and two serial RS 232 interfaces for barcode scanners, badge readers and other peripherals are standard features. Thanks to the Ethernet interface, the Hänel controllers can be easily integrated in the customer's net-

work. This supports data communication with any ERP system, and a network printer can be set up for list printouts.

The integrated web server also enables retrieval of storage data via the intranet using a browser.

#### The pluses

- ▶ Wide range of languages.
- ▶ Integrated FTP client, CIFS client, SOAP server for data communication.
- ▶ Graphical tray display
- ▶ Integrated web server supports retrieval of current storage data via intranet and Internet.
- ▶ Ethernet interface is standard.
- ▶ Storage management package is included.
- ▶ New download functions are available on the PC browser: Article master data, order recommendation lists and operations journal (optional) can be exported to Excel.
- ▶ Article numbers and designations can be input via the PC browser.
- ▶ Other modules: batch management, data field allocation via 1D/2D barcode scanner.
- ▶ Control center for entering HTTPS certificates.



- A Header**  
A1 = Lift information, A2 = Lift status, A3 = Navigation
- B Menu bar**  
Toggle function between article, order and lift.
- C Function bar**  
Selection of functions for each menu item.
- D Interaction and display area**
- E Task bar**  
Display of all open windows.

## HostCom

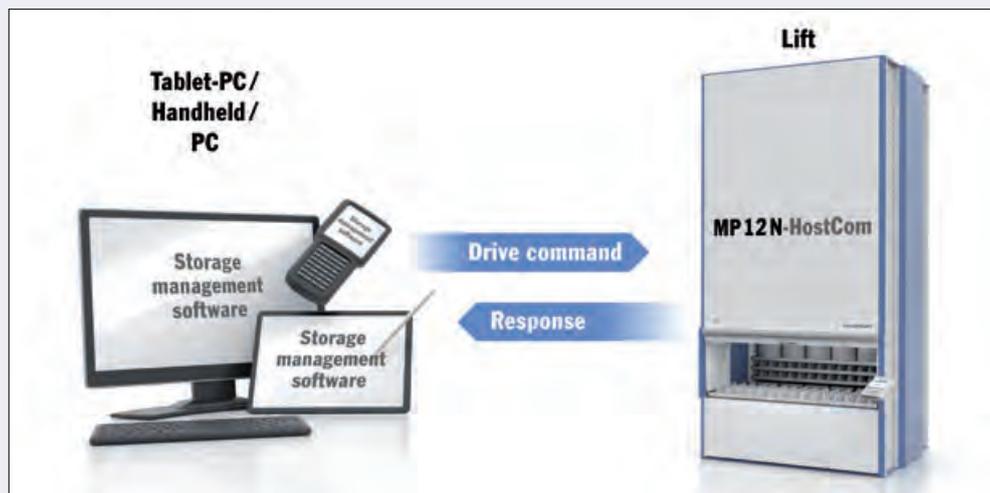
### Direct actuation of Hänel storage systems with transport commands

Storage management takes place in the overarching HOST system. The lifts are controlled via the user interface of the external warehouse

management system (WMS). The control point for the lift can be a stationary PC workplace or a mobile terminal.

For put and pick operations, a transport command is sent to the lift controller by the WMS to start the lift drive. A status message

tells the WMS that the container has been transported into position and is ready. Communication takes place via TCP/IP.



#### The pluses

- ▶ Customers can also use their existing storage management software for the Hänel machines.
- ▶ The units are then operated via the familiar user interface of the storage management software.
- ▶ The interface between storage management software and lift is reduced to a few commands using a TCP/IP connection.

## HostData

### The mode for fast connectivity to your warehouse management system (WMS)

The pick and put orders are generated in the storage management system and passed on to the warehouse in data form. The orders are then processed at the storage lift(s) in route-optimized sequence.

The controller buffers up to 5,000 list items.

With the pre-positioning option, all the lifts in an order picking group are positioned simultaneously. Each confirmed pick or put operation

is reported back to the storage management system as an inventory booking.

Data exchange between the lift and the ERP system via SOAP, SFTP or CIFS.

The integrated web server offers the option of displaying the buffer contents directly on the controller or via an external PC browser according to various criteria.



#### The pluses

- ▶ Simultaneous operation of all systems is possible.
- ▶ File interface for storage and retrieval orders (pick lists) or individual data records.
- ▶ Data conversion and automatic, time-controlled data exchange.
- ▶ Route-optimized processing of orders, even across multiple Hänel storage systems.
- ▶ Data field display or input at the lift can be individually configured.

## HostWeb

### The mode for using web applications directly at the lift

With this controller, once again inventory is managed in the customer's storage management system.

The MP 12N-HostWeb offers every tool needed to bring the user interface of the storage management system directly to the lift:

- an Ethernet interface for integration into the customer's network
- a color TFT display with touch-screen operation

- one integrated web browser for controlling the lift via macros integrated in an HTML page, or lift control via web services per SOAP server

- two serial and one USB interface for connecting peripheral devices

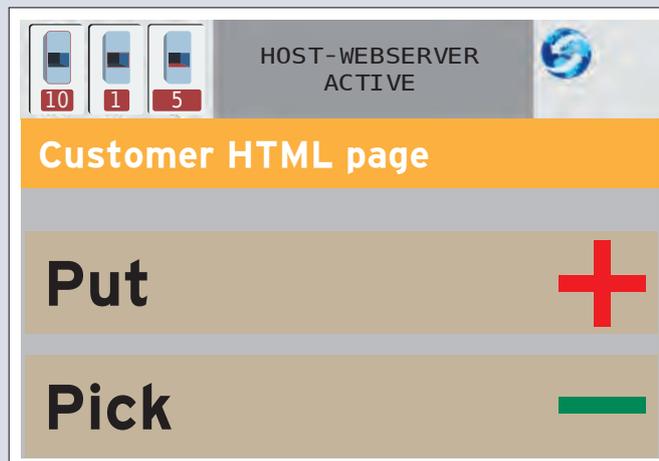
Customer solutions can be individually implemented on the control terminal by means of a web server. There are virtually no limits to the way the user interface is designed.

The HänelSoft® storage management software, for example, uses this technology to provide an

intuitive and modern user interface directly at every storage lift.

#### The pluses

- ▶ The lift controller is simultaneously a full-scale operating terminal for the storage management system.
- ▶ Direct access to the storage management database from each storage lift.
- ▶ Easy-to-read color TFT touch display with integrated web browser for showing the storage management user interface.
- ▶ No additional PC hardware required to operate the lifts in the warehouse.



The integrated web browser is the basis for each customer's user interface



A wide range of information can be shown just like on a web page. There are virtually no limits to the design

# MP 100 D

## The central controller

### The MP 100 D – high-performance central control system for up to 99 storage units

Hänel developed the central control system MP 100 D so that a large number of storage units can be managed effortlessly with the integrated storage management packages from Hänel. It manages the data of up to 99 storage units.

The client control systems MP 12 N and MP 14 N can be used as the control panel for each lift – this means each lift is operated independently of the others.

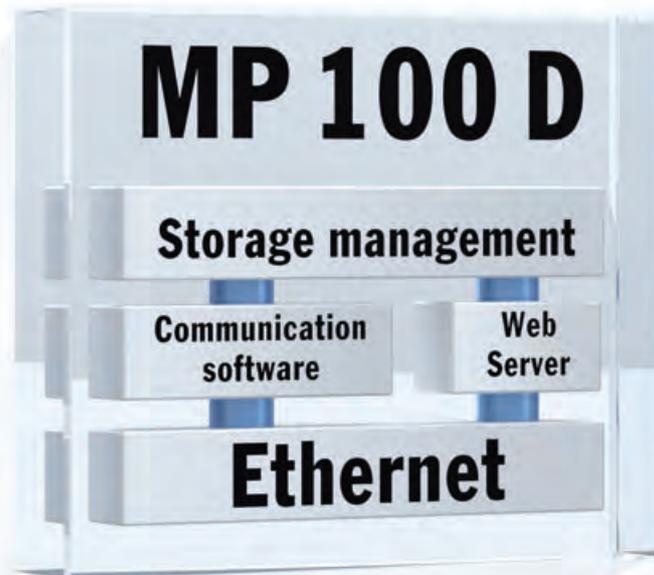
All the stored articles are managed centrally via the MP 100 D. It has space for 100,000 part

numbers in up to 400,000 storage locations and 4,000 pick lists, job lists or parts lists with up to 100,000 items. Powerful order-picking functions make work in the warehouse easier.

Processing of the pick and put lists, for example, can be either

route-optimized, time-optimized or sequential. Route lists can be configured to ensure that users walk the shortest distances through the warehouse.

To boost order picking speed, the shelf/tray pre-positioning option can be used, which simultane-



**PC with web browser for data viewing**



ously positions multiple lifts in an order picking group. The standard Ethernet interface enables data to be exchanged with higher-level host systems.

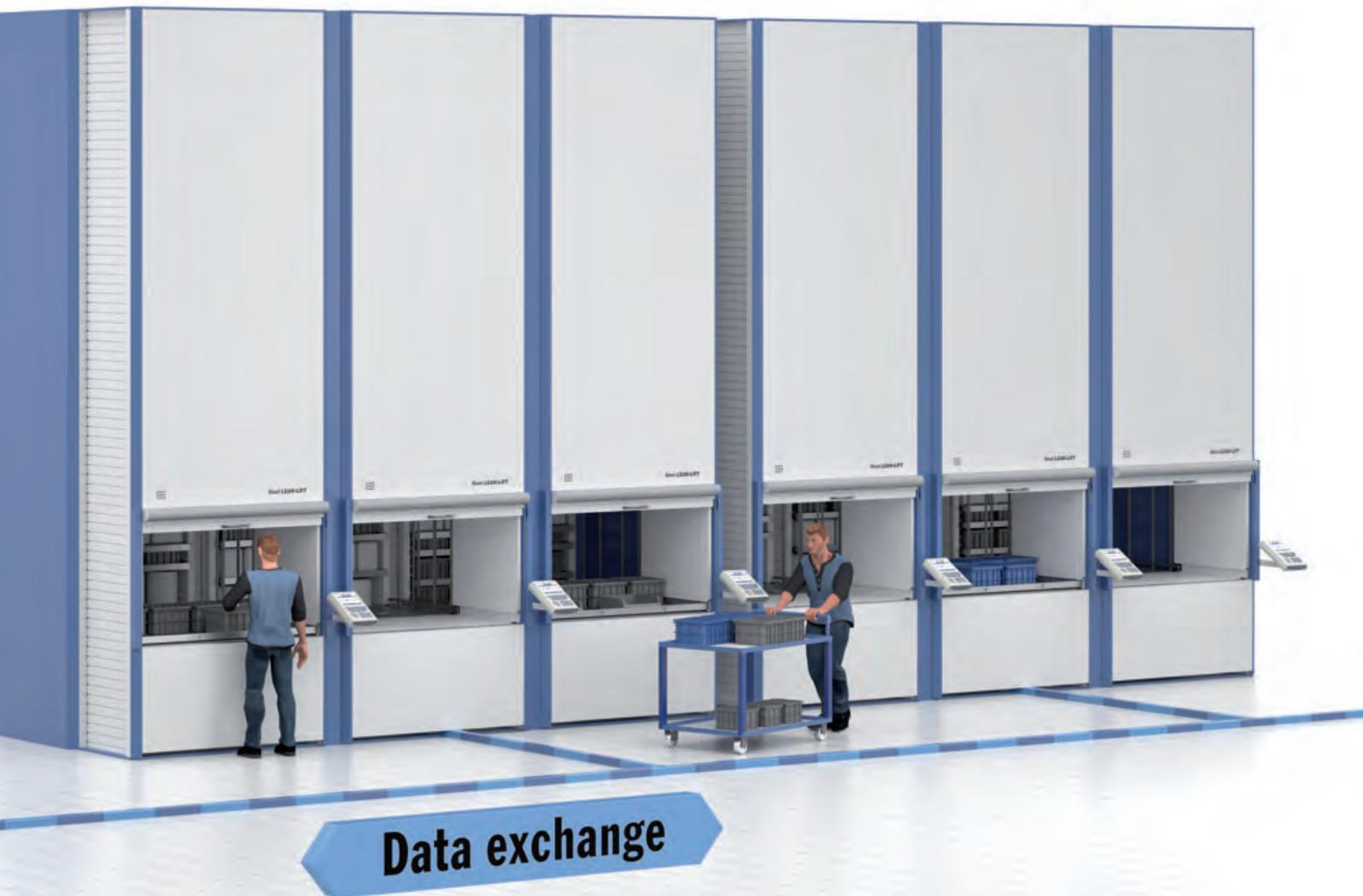
MP 100 D contains an FTP client or CIFS client or SOAP server and data conversion software. The

integrated web server provides access to the storage data in the customer's corporate network.

The integrated Hänel storage management packages can be adapted to individual customer needs with numerous add-on modules.

#### The pluses

- ▶ Management of data of up to 99 storage units (depending on the version).
- ▶ Route lists can be stored to ensure short walking distances.
- ▶ Integrated web server for data retrieval via the intranet/internet.
- ▶ Data conversion software.
- ▶ File exchange for rapid connection.
- ▶ Ethernet interface for exchanging data with higher-level systems (HOST, ERP systems, etc.).
- ▶ All storage lifts can be operated independently and simultaneously.



**Data exchange**

Eine detaillierte Beschreibung der integrierten Lagerverwaltung finden Sie auf den Seiten 16–18.

# The integrated storage management packages of the MP controllers from Hänel

## Intelligent inventory control with the storage management packages from Hänel

The compact MP 12 N-StandAlone, the MP 14 N-StandAlone and the MP 100 D central control unit are delivered a Hänel WMS package. This means all the inventory control functions are already integrated.

The storage data are saved on compact flash cards that guarantee

high data security and insensitivity to dust, dirt and vibration.

All inventory bookings are immediately written to the memory card by a secure procedure. Even if the control system is switched off unexpectedly, your data is still safe.

The MP 100 D also offers the option of using a second memory card as an automatic backup medium.

### No additional PC is required!

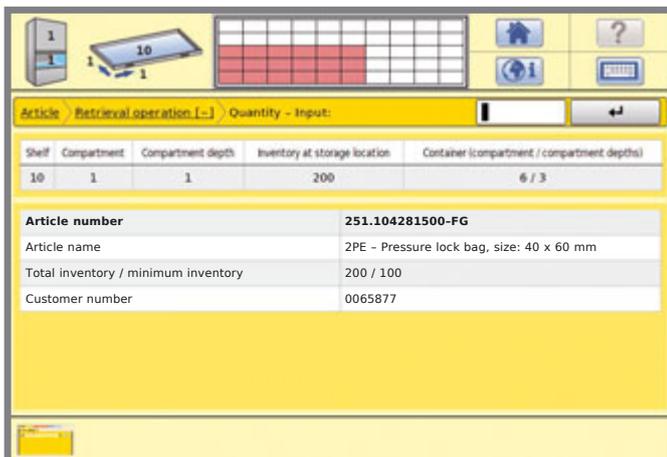
Three storage management packages are available:

► Hänel article management

► Hänel tool management (only MP 12 N)

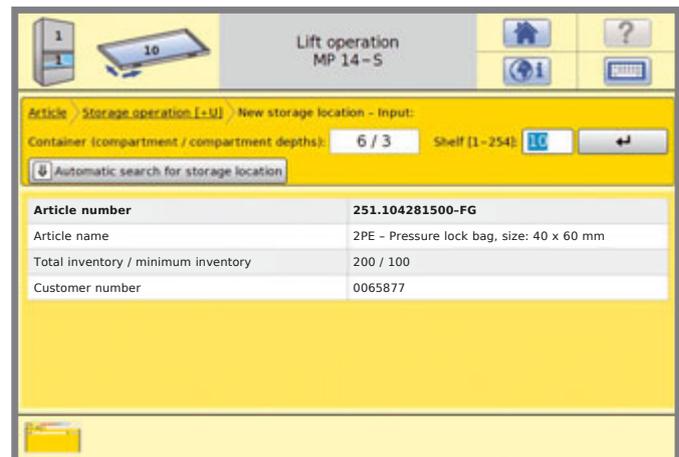
► Hänel file management (only MP 12 N)

All three packages boast easy-to-handle user interfaces and maximum storage management functionality.



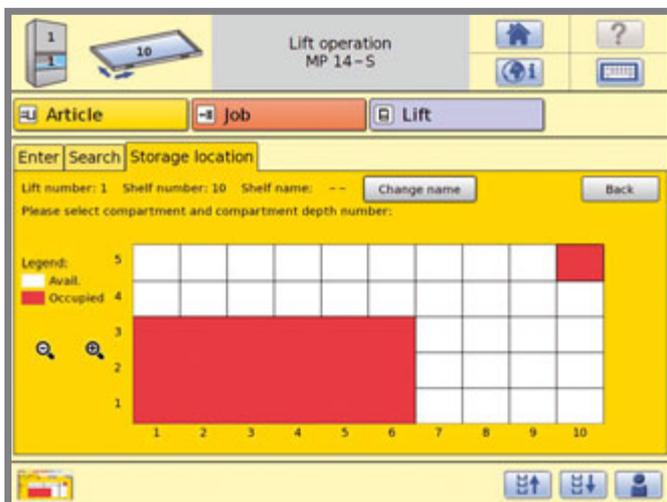
### Article selection storage/retrieval

When an article is selected, a detailed list of information about the item is displayed.



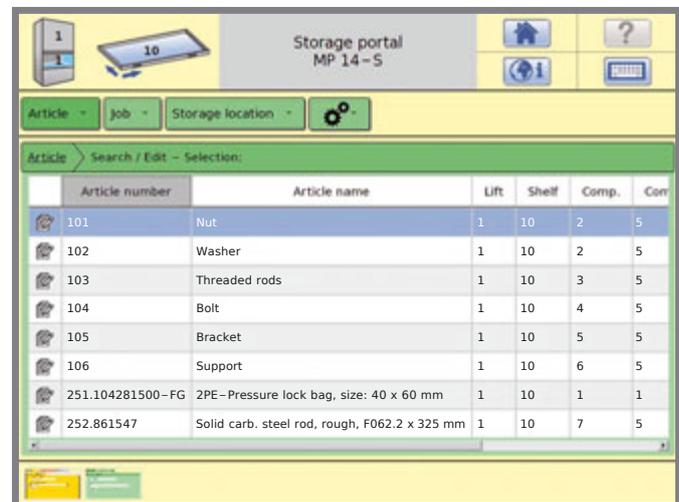
### Storage location search

When a container size is entered (optionally with a height specification) the control system suggests the next free storage location.



### Graphical overview of shelves

The graphic shows the current situation on each shelf. Tap on the marked compartment to display its contents.



### Info on article data

When a search term is entered, the results are displayed in a table. Any data field can be selected as a search field, such as article number, article name, etc.



Wind LEAM-LIFT

Wind LEAM-LIFT

Wind LEAM-LIFT

# Add-on modules for the integrated storage management packages of the MP controllers

For optimal storage functionality tailored to customer requirements, there are many supplementary modules available

Module	Add-on modules	Functions
01	<b>Management of external shelves</b>	Complete trays with the articles on them can be removed from the Lean-Lift® and, conveyed to the production department by transport cart.
02	<b>Access code management</b>	Users and user groups are defined and assigned codes that give them authorized access to specific areas.
03	<b>Item pool management</b>	Import of item data from the host ERP system.
04	<b>Management of storage location height</b>	Each shelf/tray can be assigned a relative height. The automatic storage location search suggests a storage location with the requisite height to the user.
05	<b>Management of storage time</b>	The minimum storage time and the maximum duration ("shelf life") can be set and monitored.
06	<b>Operations journal</b>	Data such as all put/pick operations, including information such as quantities, cost center, job number, storage locations and freely definable data, can be recorded in the operations journal and printed out or sent to the HOST system.
07	<b>Barcode cross-check</b>	When an article is stored or retrieved, the user is prompted to enter the article number via barcode as a check.
08	<b>Free space management</b>	Articles can be stored in different container types of predefined size. These specified details are assigned to the individual shelves/trays as fixed structures. Empty containers can be added or deleted at any time.
20/25	<b>Shelf prepositioning</b>	Parallel and serial shelf pre-positioning boost order picking efficiency. All the lifts in an order picking group are positioned at the same time, or the next lift is brought into position while the list item at the previous lift is being processed.
21	<b>Inventory function</b>	The inventory function supports constant status control or the option of defining specified dates for item inventory checks.
23	<b>Decimal input</b>	Depending on the setting, there can be 0 – 3 decimal places in the quantity field. The use of decimal places can either be selected for each individual article or be permanently set for all articles.
24	<b>Adjustable container speed</b>	This feature allows for the gentle transport of sensitive items. The speed of each container can be set individually
26	<b>Lending management</b>	Lending management is useful for storing articles that are not consumables but are repeatedly returned to the lift. With lending management the identity of the person borrowing the item is requested and logged.
30	<b>Park position extractor</b>	Note: Only with Lean-Lift® and Multi-Space® systems with one access point at standard height. Note: After a container has been stocked and the optimization run has been completed, the extractor is then positioned at retrieval height. This is called the 'Park position extractor' feature.
31	<b>Authorization management Rotomat®</b>	<ul style="list-style-type: none"> <li>– Before operating a Rotomat® storage system, users must complete an authentication process.</li> <li>– If user identification is positive, the lift system will be 'unlocked' for operation.</li> <li>– Manual logout or automated logout based on specified timing are possible.</li> <li>– The add-on module 'operations journal' can also indicate which Rotomat® users have been logged on and logged out.</li> </ul>
32	<b>Batch management</b>	<p><b>Only for MP 14 N-S (MP 14 N-H/MP 100 D-5)</b></p> <ul style="list-style-type: none"> <li>– Only for MP 14 N-S (MP 14 N-H/MP 100 D-5)</li> <li>– Articles can be put and picked in batches.</li> <li>– Batched articles can be managed in combination with non-batched articles.</li> <li>– Batch articles can be defined as such using the add-on module 'Article pool management' and host communication.</li> </ul>
33	<b>Shelf prepositioning according to article</b>	<p><b>Only for MP 14 N-S (MP 14 N-H/MP 100 D-5)</b></p> <p>If an article is called up on one lift, but the article's storage location is in another lift, the user is given information about which lift has been started for the ensuing process. The user can go to this lift and continue working, without having to enter the article number again. This feature applies to serial and parallel shelf prepositioning (per job order).</p>
34	<b>Data field completion with 1D/2D barcode</b>	<p><b>Only for MP 14 N-S (MP 14 N-H/MP 100 D-5)</b></p> <ul style="list-style-type: none"> <li>– The barcode scanner can be used to put information into data fields as an alternative to manually entering the data via keyboard.</li> <li>– The operational process is identical to the standard process. The lift run must be started without the add-on module 00 'remote lift run' using special protective equipment with the green return key.</li> <li>– The use of a 2D barcode (e.g. Data Matrix code) is recommended for large data volumes.</li> </ul>

# Easy connection of peripheral components

**All Hänel control systems are equipped as standard with serial and/or USB ports for the connection of peripheral components**

The central arrangement of all the peripheral devices needed for order picking, such as RFID systems, barcode and badge readers, printers and scales, ensures the best possible user comfort, saves time and guarantees smooth workflow.

The MP 12 N and the MP 14 N controllers also allow the connection of network components via the integrated Ethernet interface.

It is possible to connect:

- Printers for different list printouts: article lists, storage location lists; filtering and sorting of data according to different criteria is possible.

- Label printers for marking the stored and retrieved material with article numbers, names, quantities, etc.
- Barcode readers for identifying articles by their article number, and optionally for checking the article number (barcode cross-check) or entering a quantity.
- Transponder readers or badge readers for personal identification and access control at the storage lifts.
- Counting scales enabling the number of stored/retrieved items to be determined by weight when large quantities are involved. This eliminates the need to laboriously count the items individually.



Storage and retrieval via barcode



Access control via RFID



The Hänel RFID transponder: one of many options for user authorization



Scales for counting the quantity by weight

## The pluses

- ▶ Quick and easy connection of peripheral devices.
- ▶ Efficient work methods thanks to the ergonomic positioning of the peripheral devices.
- ▶ Flexible positioning with the Hänel Vario arm system.
- ▶ Smooth workflow resulting in saved time.

# Ergonomic integration of the control terminal

Maximum user comfort thanks to individual needs-oriented positioning of the control keypad



On the Hänel office Rotomat® the control panel is integrated ergonomically into the work counter



Hänel Lean-Lift® control keypad on movable Vario arm (standard)



Keyboard in the Rotomat® control box above the access point, keys positioned centrally at eye level (standard)



Control keyboard on movable pedestal at working height (optional)



Pull-out keyboard housed beneath the Rotomat® work counter

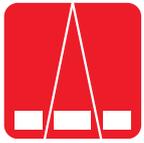
**Hänel offers various solutions for ergonomic integration of the control terminal – depending on the needs of the customer.**



The 12-inch high-resolution touch display supports maximum ease of use with a screen having plenty of space to show vast amounts of information. Installation of the controller on a universal swivel bracket (optional) ensures maximum flexibility and movement

# Maximum overall efficiency

## Visual, digital, safe, secure and time-optimized



### Hänel Pick-o-Light® system

**One component of Hänel's high-speed-picking concept is the Hänel Pick-o-Light® system for quickly finding requested items**

An LED array is integrated into the panel above the access opening of the lift. A colored LED directs a beam of light onto the requested article so that it is

identified unmistakably and unequivocally.

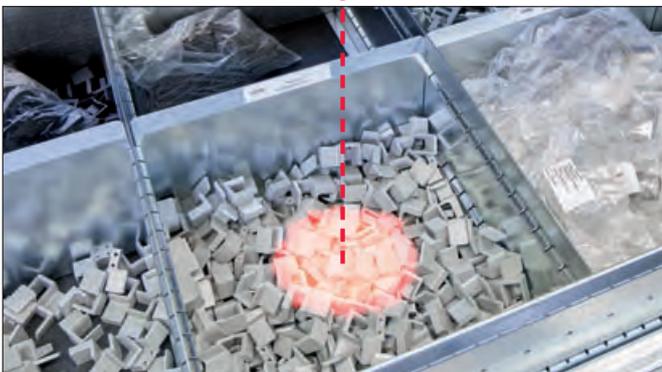
This ensures maximum efficiency and reliable selection during order picking.

The Hänel Pick-o-Light® with fixed raster can identify compartments of different sizes by lighting up the respective corner points.

The storage space needed for the unit size can span multiple compartments in width and depth, and is marked out by 4 LEDs.



LEDs in the access point ...



... identify the requested article unmistakably



4 LEDs indicate ...



... the storage location required

### The compartment indicator ensures error-free access and quick storage and retrieval

The LED display can be positioned above or below the access point as required. The compartment and sub-level indicators ensure the right article is accessed.

The compartment and sub-level are displayed on the LED strip as either one or two digits.

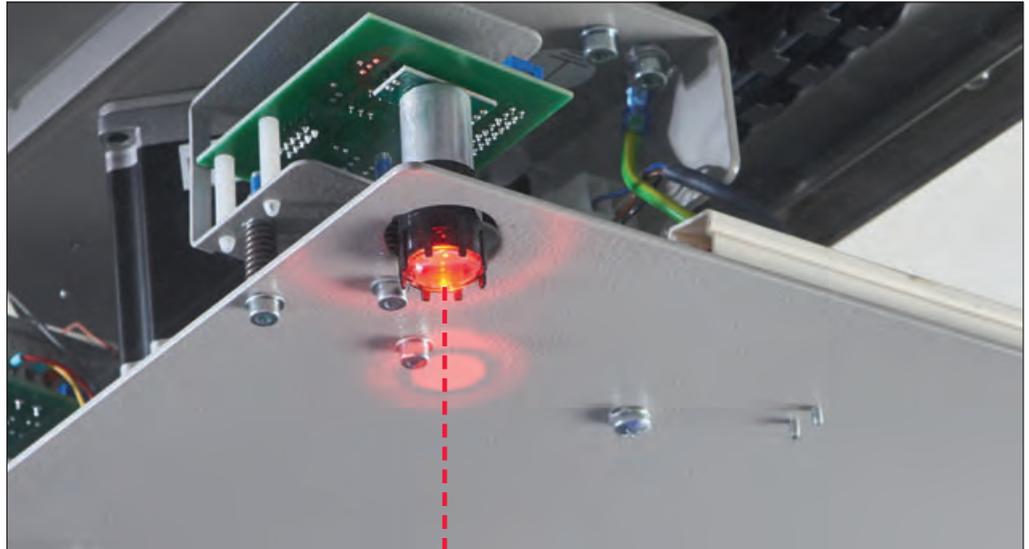


Error-free access with integrated compartment and sub-level indicators

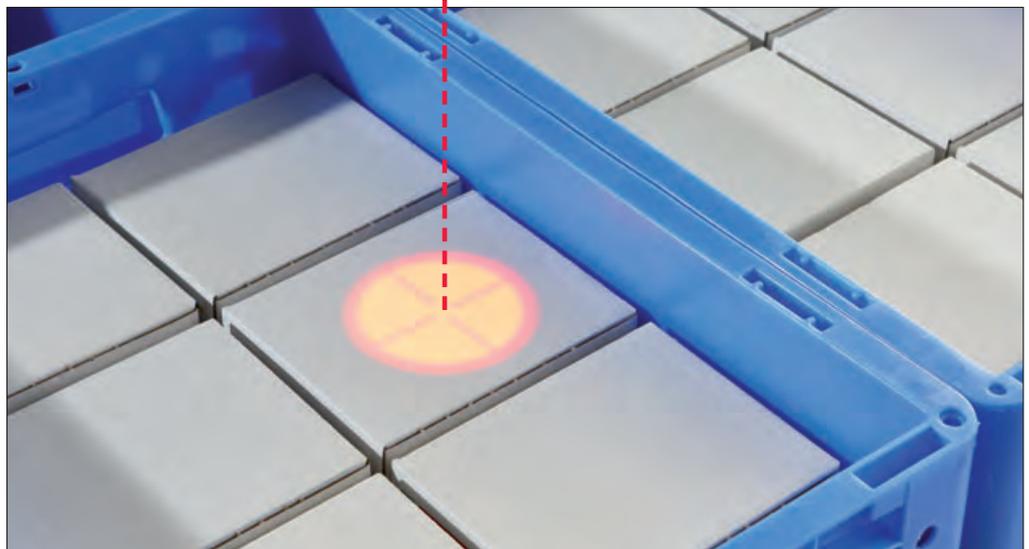
## Hänel Pick-o-Light-Vario® for variable container divisions

Alternatively, if container divisions are variable, items can be identified via a free-moving Vario unit with 4 integrated LEDs.

Hänel Pick-o-Light-Vario® moves freely along two axes. An LED unit inside the top of the access point...



... identifies the requested item unmistakably. Pick-o-Light-Vario® can be fitted with an optional reticle for identifying extremely small items



## Digital picking display

With its new digital picking display, Hänel offers yet another system feature for finding stored articles quickly and easily.

The digital picking display shows where the requested article is currently positioned and also provides additional information about the item itself and the storage location in direct proximity to it.

Input can be entered in the digital picking display via the touchscreen. Retrieval is confirmed directly on the location display. This is particularly useful on very wide storage systems as it eliminates long walking distances and saves time. All Hänel systems can be equipped with the digital picking display.



The Hänel digital picking display indicates where the requested item is located in the system and also provides additional information about the item and its storage position

# Hänel EcoConcept

## A system with the future in mind

**Energy-efficient systems are the key to lowering energy consumption in your warehouse**

The effective energy consumption of automated material and file handling systems has a major impact on operating costs, amortization and, critically, on environmental protection.

For this reason we have always placed great emphasis on continually optimizing the energy efficiency of our storage systems. This brings our customers many benefits, both from an economic and an ecological perspective!

### The efficient design principle:

#### Hänel Lean-Lift®

The Hänel Lean-Lift® stores all items in height-optimized positions, which ensures extremely compact storage in a minimum of space. This optimal use of storage area inevitably results in energy savings.

#### Hänel Rotomat®

The vertical carousel principle of the Hänel Rotomat® is energy-efficient in its very design. Using the Hänel EcoLoad® system makes sure the weight distribution inside the Rotomats® is balanced out. As

a result of this, very little energy is required for a rotation or travel movement. And of course the unit always picks the shortest route automatically.

#### Design optimization

Careful selection of high-quality components and technologies brings more energy savings.

#### Energy-efficient drive systems

Motors controlled by frequency converter use considerably less energy than drives powered

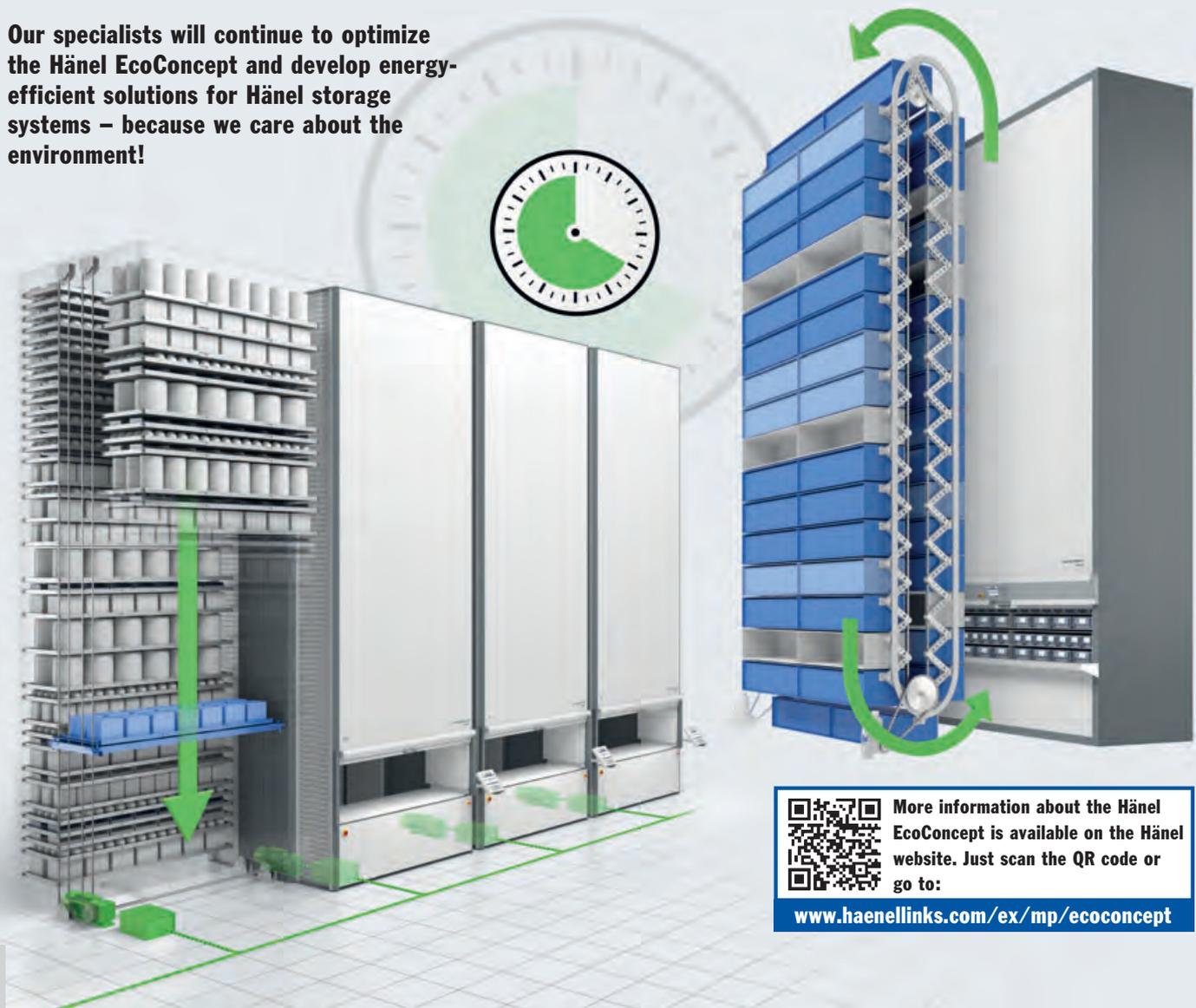
directly from the mains and running at full load.

#### Optimizing the energy balance with intelligent concepts

The goal of continually optimizing the energy efficiency of the Hänel storage systems is a challenge we embrace every day.

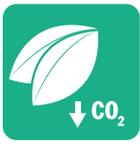
Under the heading **Hänel EcoConcept** we constantly develop components that contribute to improving energy efficiency.

**Our specialists will continue to optimize the Hänel EcoConcept and develop energy-efficient solutions for Hänel storage systems – because we care about the environment!**



More information about the Hänel EcoConcept is available on the Hänel website. Just scan the QR code or go to:

[www.haenellinks.com/ex/mp/ecoconcept](http://www.haenellinks.com/ex/mp/ecoconcept)



# Hänel EcoDrive®

## Efficient energy recovery

**Depending on the traversing rate, up to 40% of the energy fed in previously for the upward run can be returned to the power supply network!**

Sustainability plays a key role from the very beginning in the design of Hänel lift systems. For example, Hänel systems are equipped with energy-efficient motors from brand-name manufacturers.

What's more, Hänel engineers have been optimizing energy recovery in Hänel Lean-Lift® and Hänel Multi-Space® storage systems for more than 10 years now.

Years ago – at CeMAT 2008 – Hänel launched its **EcoDrive®** system. This system is based on a frequency converter developed by Hänel and Mitsubishi exclusively for vertical storage systems.

Hänel has relied on Mitsubishi frequency converters since 2002, and units with energy recovery have been available for Hänel Lean-Lift® and Hänel Multi-Space® systems since 2008.

**Hänel was the first manufacturer worldwide to integrate such a development as a series feature in automated storage systems!**

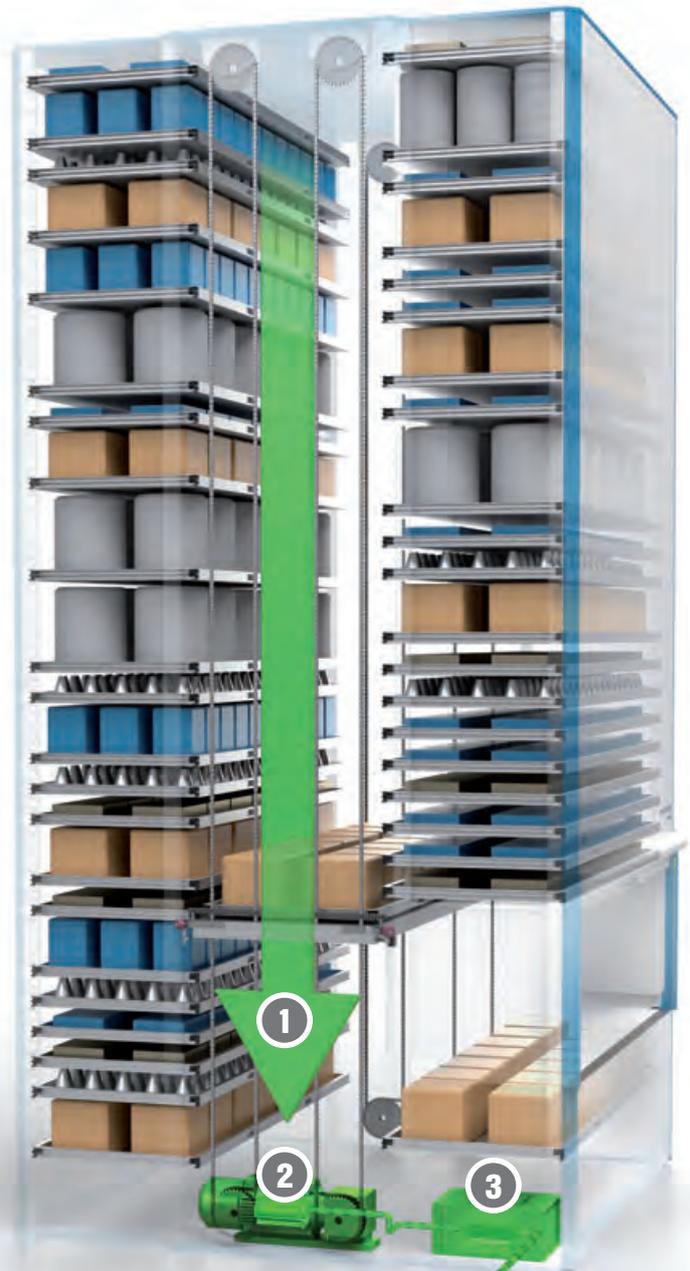
The built-in frequency converter transforms the kinetic energy of the descending extractor into electrical energy instead of allowing it to dissipate in the form of heat.

Rather than being lost, this energy is fed back into the electrical power supply system and can be used elsewhere – for example, in other Hänel Lean-Lifts® running in a cluster configuration.

Depending on the rate of extractor travel, up to 40% of the energy required for the upward run can be recovered.

Today more and more customers worldwide are opting for efficient energy recovery when ordering Hänel Lean-Lift® and Hänel Multi-Space® storage systems.

**Hänel EcoDrive® can improve your energy footprint and considerably reduce CO<sub>2</sub> emissions!**



More information about the Hänel EcoDrive® is available on the Hänel website. Just scan the QR code or go to:

[www.haenellinks.com/ex/mp/ecodrive](http://www.haenellinks.com/ex/mp/ecodrive)



**1** As the extractor descends, electrical energy is fed back into the main power supply



**2** The electric motors function as generators when the extractor moves downwards



**3** The frequency converter in the Hänel Lean-Lift® EcoDrive® returns energy to the main power supply



# Hänel EcoLoad® Energy-efficient loading

## A smart energy conservation concept is also available for the Hänel Rotomat®

As its name suggests, the Hänel Rotomat® is based on rotation and functions much like a Ferris wheel. This vertical carousel principle ensures that the Hänel storage system is very energy efficient by design when handling balanced loads.

If items put into the storage system are carefully arranged to ensure balanced payloads, the energy needed for the rotational movement of the system carriers is minimized. This is where **Hänel EcoLoad®** helps system operators by providing them with loading recommendations via the control terminal. What's more, Hänel uses quality high-end components when manufacturing its storage systems – these components reduce friction and make rotational movement in the systems much smoother.

The weight distribution in the Hänel Rotomat® is measured continuously so that if a load becomes uneven, a relocation of goods is recommended to optimize energy efficiency

Well-balanced loads on all of the carriers throughout the entire storage system reduce energy consumption considerably.

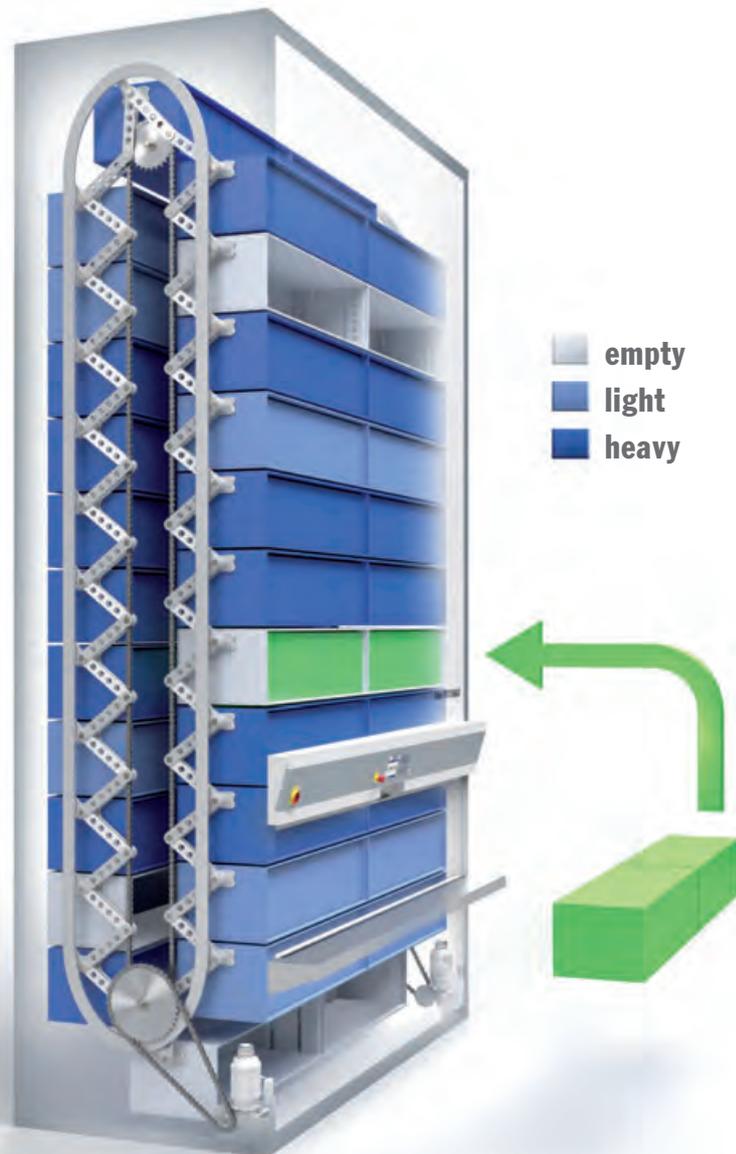
If items in storage are kept in balance, even heavy payloads can be moved with very little energy. **Hänel EcoLoad®** monitors the load status of the Hänel Rotomat® continuously.

The Hänel microprocessor controller – in conjunction with **Hänel EcoLoad®** tells system operators how stored items can be optimally distributed across the various carriers. This also makes sure that payloads are kept in balance when systems are in operation.

If system operators follow the recommendations, the entire

inventory stored inside the storage system is kept in nearly perfect balance, and that maximizes overall energy efficiency.

**Hänel EcoLoad® reduces energy consumption and CO<sub>2</sub> emissions!**



## Energy-efficient loading recommendations



More information about energy-efficient loading is available here. Just scan the QR code or go to:

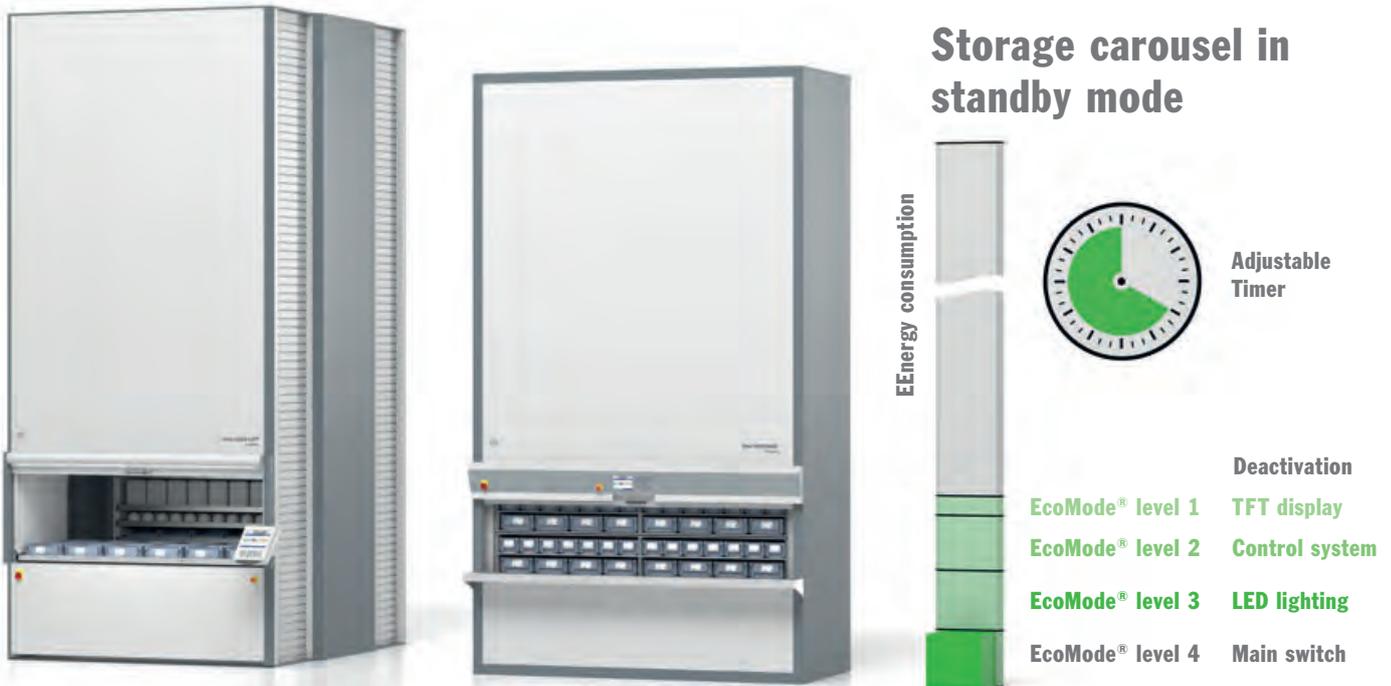
[www.haenellinks.com/ex/mp/ecoload](http://www.haenellinks.com/ex/mp/ecoload)



# Hänel EcoMode®

## Intelligent energy management

The intelligent energy management feature of Hänel storage systems gradually shuts down idle systems in four steps



With Hänel **EcoMode®**, a storage system that remains at standstill for long periods without being operated can be switched automatically to different levels of standby mode at freely configurable time intervals.

All systems that consume energy even when at standstill are closed down by the control system in four **EcoMode®** levels (energy-saving levels). The time intervals can be programmed as required and therefore adapted precisely to individual needs.

This minimizes the energy intake of Hänel storage systems when they are idle.

### **EcoMode® level 1**

First the background lighting of the TFT display is switched off.

### **EcoMode® level 2**

In the second level components of the electrical control system are switched off.

### **EcoMode® level 3**

The complete lighting of the storage system is dimmed automatically at level three.

### **EcoMode® level 4**

If the storage system is not used for a specified time, the entire system is shut down in **EcoMode®** level 4 via the main switch.



Hänel EcoMode® minimizes the energy intake of Hänel storage systems when they are not being used



More information about intelligent energy management is available here.

Just scan the QR code or go to:

[www.haenellinks.com/ex/mp/ecomode](http://www.haenellinks.com/ex/mp/ecomode)

# Hänel features for efficient storage

## Height sensors and weighing device

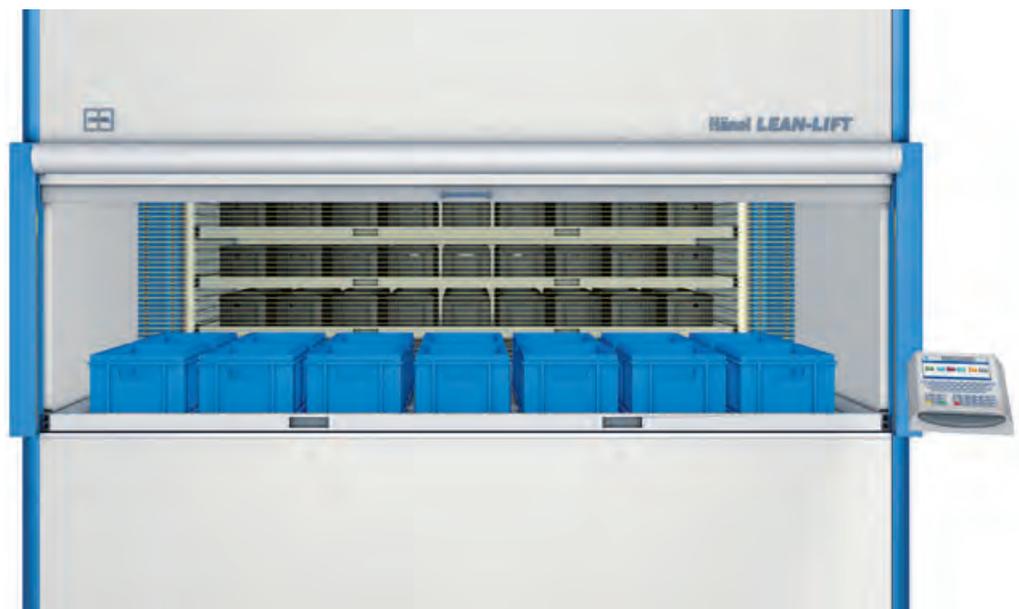
### Space-saving storage based on precise height measurement of goods

**With its height sensors, profile wall and Hänel container technology, the Hänel Lean-Lift® provides vertical optimization and height optimization in one!**

Accurate height measurement when storing trays ensures optimal packing density.

Height-measuring light barriers spaced at 25 mm, 37.5 mm, 75 mm or 90 mm log the height of the storage goods.

When the tray is drawn in, the highly accurate light barriers measure the articles, and the Hänel microprocessor control system finds the optimal slot in the Hänel Lean-Lift® based on the height reading. At the same time a protruding goods check is carried out.



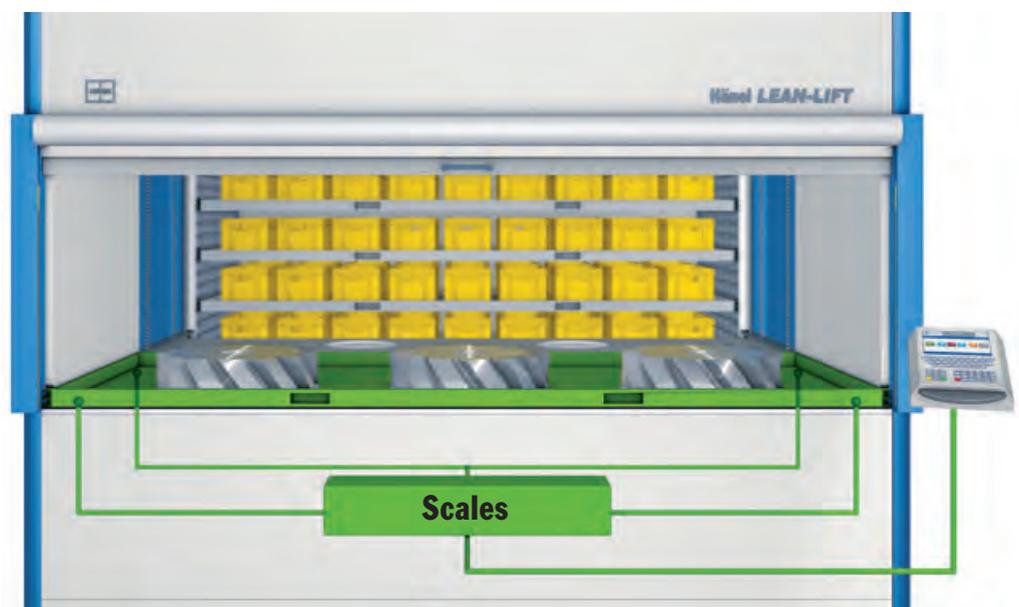
Precise measurement of the stored articles by height sensor technology

### Accurate weight readings with the Hänel weighing device

The Hänel Lean-Lift® is equipped with an overload protection/overload monitoring mechanism as standard.

As an option, the Hänel Lean-Lift® can be fitted with a container weighing device. Each tray is weighed in the access point by an electronic 4-point weighing system. The current weight is shown on the keyboard display. The weighing device allows the maximum load of the individual trays and that of the entire lift to be recorded and monitored.

An easy-view table shows the current weights of the individual trays.



Weighing device



# Very high availability through redundancy with Hänel ESB

## Hänel ESB – the intelligent safety package for enhanced availability of the Hänel lifts

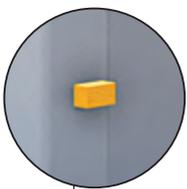
Hänel storage systems work reliably and failure-free. Should a malfunction arise, however, the Hänel redundancy systems kick in.

Lean-Lifts® can be fitted with a **second safety circuit**, for example. This means that if the safety

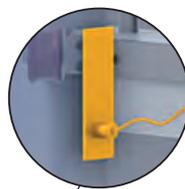
light barriers in the retrieval opening fail, it is still possible to continue operating the Lean-Lift® with the sliding door closed. The Hänel Lean-Lift® can also have the Hänel **ESB (Expanded Safety Bypass)** package integrated.

By activating the ESB system directly at the microprocessor controller, the user can continue to operate the Hänel Lean-Lift® in defined cases despite a malfunction. This redundancy system consists of seven integrated safety circuits.

It means that in the following cases the Hänel Lean-Lift® can continue to be operated safely and reliably until the Hänel service technician arrives.



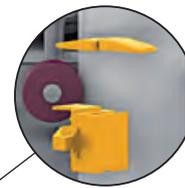
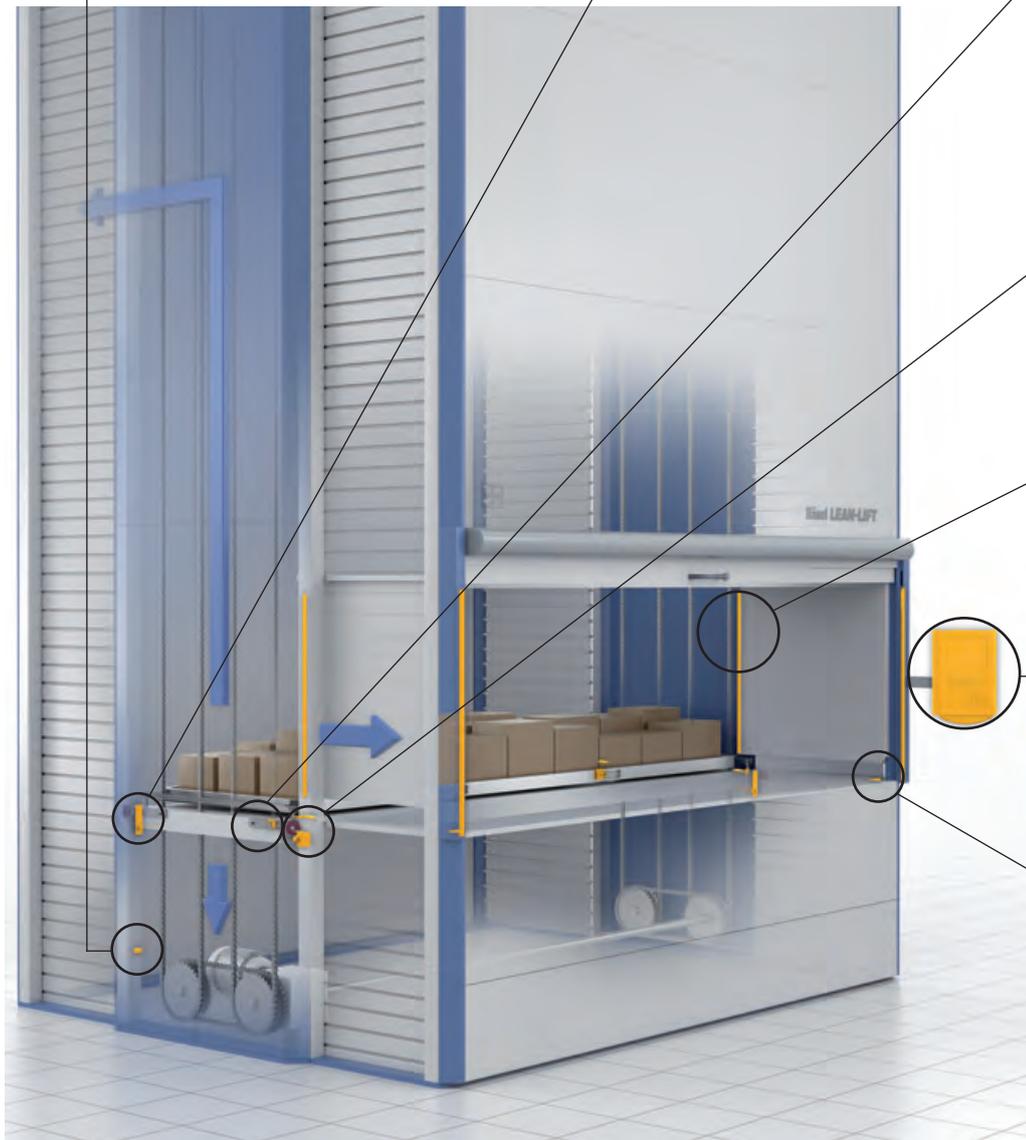
If a limit switch in the upper or lower storage area fails



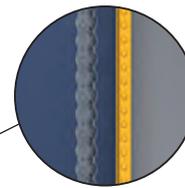
If a positioning sensor for the drive catch fails



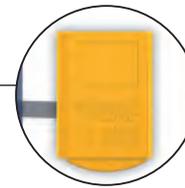
If a sensor on the extractor fails



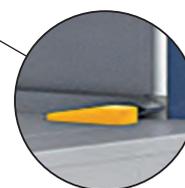
If a positioning system fails



If the height detection system fails



If the shelf memory is defective



If a sensor in the access point fails

# Hänel controllers integrate with IT systems

Hänel controllers and their integrated storage management packages can be networked with existing IT systems

The Hänel single-lift controller MP 12 N-StandAlone and MP 14 N-StandAlone such as the central controller MP 100 D are already equipped with a comprehensive range of storage management functions and therefore provide an ideal basis for connection to higher-level materials management systems.

The MP 12 N-StandAlone, MP 14 N-StandAlone and the MP 100 D are integrated into the corporate network via the standard Ethernet interface.



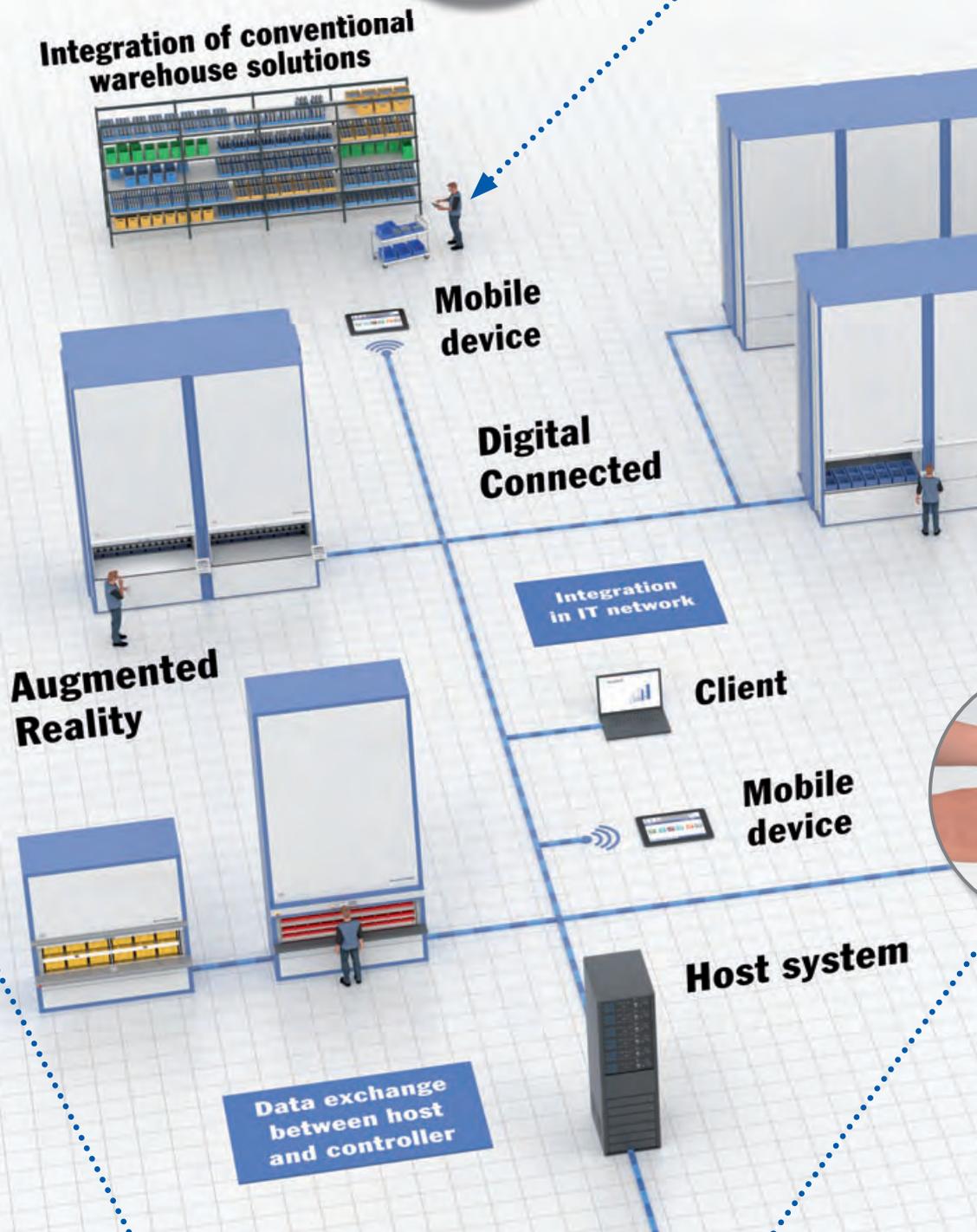
## The Hänel advantages:

- ▶ Hänel offers a qualified support service for customers who want to integrate the Hänel storage systems into their existing IT concept.
- ▶ Platform independence.
- ▶ Web applications for all clients – at the lift, for PC workplaces, for mobile devices/tablets.
- ▶ Pick-o-Light® control via the network – no serial interface required for a PC.
- ▶ No PCs required for operating lifts or optional lift equipment.



### Handheld for managing manual storage

Mobile terminal devices with WLAN technology support online data communication between conventional warehouse storerooms and the server.

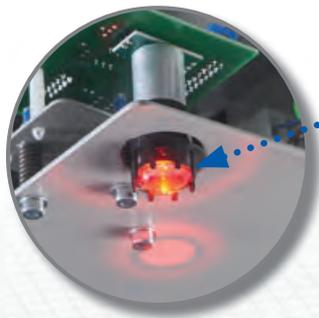


### Operation of Hänel lifts via wireless augmented reality

Hänel storage systems and optical AR devices can be linked to various ERP systems thanks to the SOAP interface.

### Integration of mobile devices such as tablets and smartphones

Integrating Hänel lift systems in the customer's network environment enables data communication with the ERP system to support remote operation and control.



**Hänel Pick-o-Light-Vario®**  
LEDs at the access point identify the requested article unmistakably.

**Hänel Control  
Visual display of container contents**

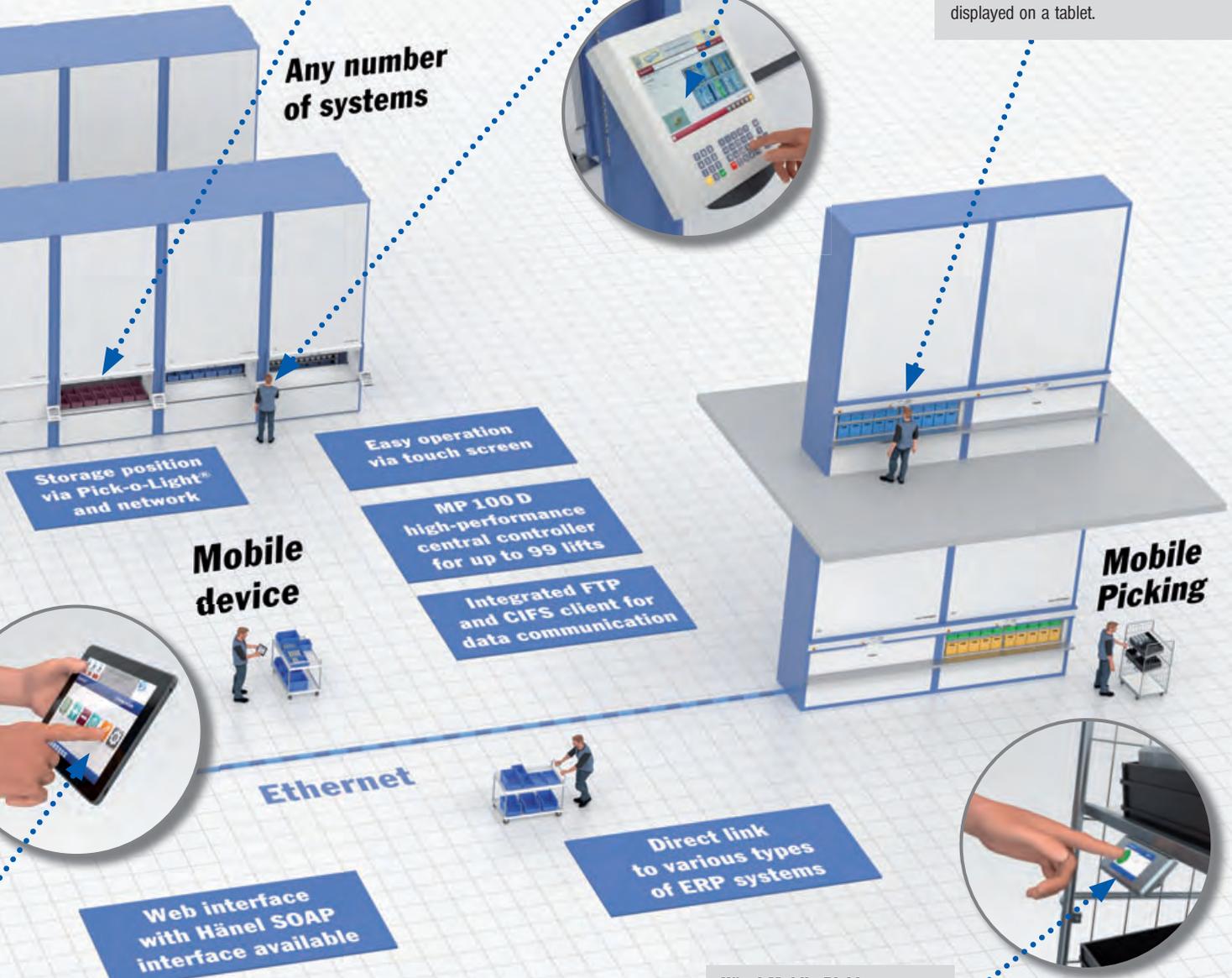
Graphics data enables the display of items on the controller screen.

**Web client directly on the controller**

The browser functionality of the MP 12 N-HostWeb and MP 14 N-HostWeb controllers supports the presentation of an existing customer web interface on the controller display. The Hänel controller is then used to operate the lift systems.

Alternatively customers can operate the lift systems via their existing software – the user interface could be displayed on a tablet.

**Any number of systems**



**Mobile device**

Easy operation via touch screen

MP 100 D high-performance central controller for up to 99 lifts

Integrated FTP and CIFS client for data communication

**Mobile Picking**

**Ethernet**

Direct link to various types of ERP systems

Web interface with Hänel SOAP interface available



**Hänel Mobile Picking**

The cart indicator shows which bin to use for the picked item.

**Hänel MP 12N and MP 14 N controllers can be operated directly from a storage management system or a customized software solution**

Customers can use their existing storage management software with the Hänel MP 12 N and MP 14 N controllers in the modes HostCom (MP12N only), HostData and HostWeb.

The MP 12 N and MP 14 N controllers – in the HostData and

HostWeb versions – can be directly linked to the warehouse management system without the need for an additional PC.

The MP 12 N-HostData and the MP 14 N-HostData controllers are equipped with a data buffer and automatic host communication.

The following variants are available: CIFS, FTP (SFTP) or SOAP protocol. This is already included as standard.



# Our strength lies in our know-how

## Hänel software solutions – flexibility is key

### Hänel's inventory management software enables efficient, rationalized workflow

Hänel's inventory management programs are intelligent software systems for computerized handling of warehouse processes on Hänel storage systems.

These programs manage storage locations, articles, tools, stocks, pick and put jobs and orders.

### Hänel offers special software solutions for every application:

#### Integrated Control Software

The MP 12 N-S, MP 14 N-S and the MP 100 D controllers all have integrated warehouse management functionalities – no additional PC is required.

#### Tool management

The ideal solution for your tool management.

#### Direct integration of Hänel systems in various ERP solutions via SOAP protocol

Hänel has enhanced its MP 12 N- and MP 14 N-HostWeb controller with a SOAP web service interface. Web-based technology enables the implementation of a middleware-free link between the Hänel controller and many ERP solutions – for example, SAP.

#### Warehouse Management System WMS

Complete warehouse management solutions including receiving, high-speed order fulfillment and shipping are possible with fully-integrated storage systems from Hänel.

#### The pluses

- ▶ Quick and reliable access during pick and put operations as the user works directly at the Hänel storage units.
- ▶ Modular functions for optimized adaptation to customer requirements.
- ▶ Standardized interfaces for simple data exchange with materials management/ERP programs.
- ▶ Optimized picking for all connected lift units.
- ▶ Interface to the Hänel lift controllers for pick and put operations directly at the storage units.
- ▶ Optimized order picking for all connected storage units.
- ▶ Rack storage systems, pallet stores, container stores, etc., can be managed in addition to Hänel storage units.





Occupancy Load Units Top view Accepted LUTs History 100%

Image	Store location	Stock/LU	Item ID	Name	Item group	Linked	Quantity	HS	Created
No entries									

# Hänel ERP Interface

## Direct integration of Hänel systems in various ERP solutions

Hänel attaches great importance to enabling the storage lifts to interface directly with customer ERP software.

For many years, Hänel's MP 100 D, MP 12 N-HostData and MP 14 N-HostData control systems have been supporting data exchange without the need for additional middleware. An FTP server, a Windows drive release or a web service interface is all that is required for data exchange between the Hänel controller and the customer's ERP system.

### The multifunctional controller from Hänel

The new-generation Hänel controllers can be used as operator terminals for various ERP systems.

Synchronization problems, such as duplication of stored data, are thus avoided.

All ERP user dialogs are displayed directly on the touch screen of the Hänel control unit. Data entries are booked in the ERP system in real time – then the storage system is actuated. The booking is executed directly in the ERP server. There is no data buffering or data conversion in the control system. This means that the storage overview and inventory status control are always updated – worldwide, regardless of the client used.

Thus Hänel storage systems can be integrated in nearly every kind of ERP environment.

Thanks to its close cooperation with **prismat**, a leading provider of SAP logistics solutions, Hänel was able to realize the middleware-free link joining the Hänel controller and an SAP warehouse management system.

The individual programming and configuration in the **SAP** environment can be done by our cooperation partner **prismat** or by customers themselves (see on the right).

The user interface can be adjusted on the control unit according to specific individual needs.

A large number of installations have already proven their worth in real-world environments.

With the wide range of connectivity options offered by Hänel, it has been possible to set up installations having ERP systems from SAP, Navision, proAlpha®, Sage, PSI Penta, INFOR, ABAS, Epicor, Maximo and many others – with great success.

## HÄNEL

### MP 12 N-HostWeb

### MP 14 N-HostWeb



By integrating the SOAP interface in its controllers, Hänel has succeeded in making the visions of its customers a reality.

## ERP systems



## An example with SAP

The functions of the Hänel control system are available in the SAP development environment:

- ▶ The structure of the Hänel lifts is mapped in SAP WM or EWM (e.g. the number of lifts, shelves and the number and size of the compartments).
- ▶ SAP dialogs, needed at the lift controller as user dialogs, are defined.
- ▶ Drive commands are generated to bring the storage location to the access opening of the lift.
- ▶ No data exchange is necessary; management is handled in real time in SAP.
- ▶ Optimal storage overview and inventory control.

prismat, as a certified SAP partner, and Hänel offer an effective SAP warehouse management template

A **storage management template** created in advance for **SAP Business Suite** (SAP ERP and SAP SCM) and containing standard dialogs can be included in delivery.

This easy integration and user-friendly operation of the Hänel storage lifts in an SAP environment is the result of our close cooperation with **prismat**.

### Scope of the SAP template

- ▶ Planned standard storage and retrieval dialogs.
- ▶ Unplanned standard storage and retrieval dialogs.
- ▶ Display of material number, pick quantity and storage position.
- ▶ Order picking.
- ▶ Content relocation between lifts.
- ▶ Inventory management for Hänel industrial lift systems.
- ▶ Inventory (SAP WM Standard).
- ▶ Graphic display of storage trays.
- ▶ Each retrieval point equipped with own SAP interface.
- ▶ Storage strategy with module allocation.
- ▶ Support with Pick-o-Light-Vario®.
- ▶ Customized features possible.
- ▶ Communication between Hänel controllers and SAP via SOAP.



SAP can be operated directly from the Hänel control unit



# Augmented Reality and Pick-by-Voice – Storage strategies of the future that are now a reality with Hänel technology

## High-tech picking via wireless augmented reality and Pick-by-Voice for Hänel industrial systems

The Hänel Lean-Lift® can be operated remotely with an optical augmented reality device in conjunction with Pick-by-Voice – there is no need for additional input at the system control terminal.

The Hänel Lean-Lift® is connected to an SAP server via the integrated SOAP interface so that no additional middleware is required.

Data input and item selection is accomplished through voice commands in conjunction with the optical AR device. All data and information of relevance to the item, including a photograph of the item, are visible on the AR display worn by the system operator. Users can thus focus their full attention on the picking process without having to handle lists or paper notes.

Once an item is requested via voice command, the storage system automatically brings the item to the access point for retrieval, and the item position on the container is identified by Hänel Pick-o-Light®. This minimizes the risk of human picking errors.

This technology has been successfully tried and tested in industrial environments – for example, MAN Diesel & Turbo SE in Oberhausen, Germany, has been profiting from this concept for some time now. More information about this solution is available in a video on our website.

Hänel storage systems and AR glasses can be linked to various ERP systems thanks to the SOAP interface.

## Hänel offers innovative solutions that address the demands of tomorrow!

Hänel Pick-o-Light® identifies the items that should be retrieved



The augmented reality monitor can be adjusted to fit every user



All key item information and commands for voice control are displayed



Watch this video highlighting Hänel Rotomats® as component storage depots in production environments.

[www.haenellinks.com/ex/mp/ar-glasses](http://www.haenellinks.com/ex/mp/ar-glasses)



**AUGMENTED  
REALITY**



Hänel LEAN-LIFT  
Systeme

Einzigartiger, platzsparender Einbauelement

Hänel

Hänel

**POWERFUL FEATURES**



Live presentation of the augmented reality storage solution at the Hänel stand

# Tool storage in the Hänel Lockomat® : Safe, secure, fast and cost-effective!

**The Hänel Lockomat® is the ideal storage system for safe and secure provisioning of tools and measuring devices right in the production hall!**

Users confirm their authorization by means of an ID card, password or transponder. Then a personalized user interface appears on the display.

This means that all transactions can be traced to a specific user.

Multiple users with various authorizations can also be set up.

## Tool management

Tools are retrieved or put into storage by manually entering a

tool number or scanning a barcode. The digital LED indicator on the work counter indicates the compartment in which the tool is stored.

Then the specified compartment door opens automatically.

All pick and put operations are logged, which makes later verification and tracking easy.

There is also no confusion when retrieving similar-looking tools.



User authentication for each transaction – here via transponder



Absolutely no mix-ups!  
Only the requested tool can be removed

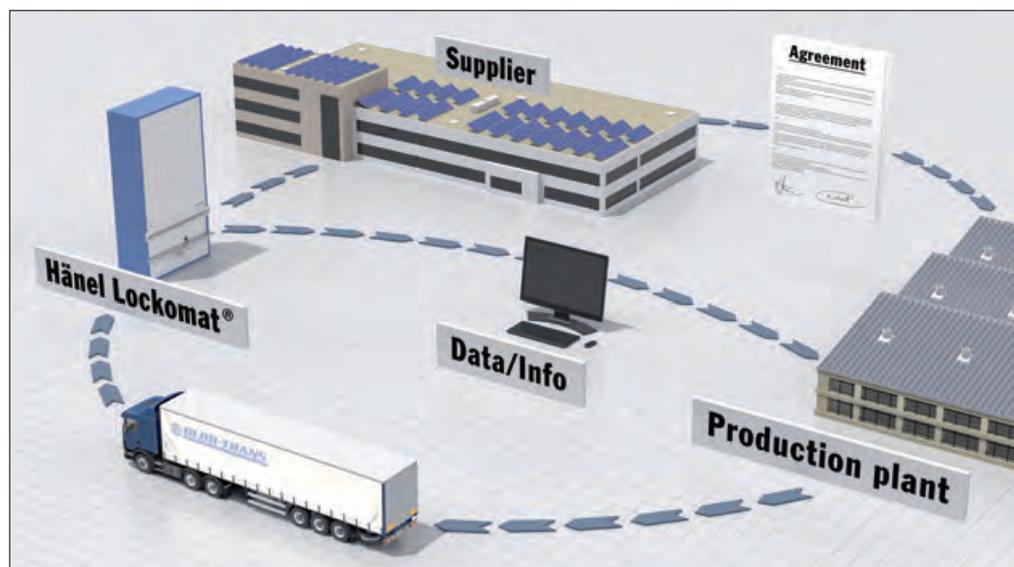
## Hänel Management of C items

In recent years the subject of tool management has been a matter of keen interest in all types of industries. And we can expect tool kitting and provisioning “as

a service” to become even more important in the future.

When manufacturing plants need to be supplied with tools around

the clock, the Hänel Lockomat® in conjunction with Hänel TDM software is the ideal tool provisioning system.



### Benefits at a glance:

- ▶ 24-hour tool availability.
- ▶ Constant inventory control.
- ▶ No downtime due to missing tools.
- ▶ Secure storage of valuable tools.
- ▶ Transparent cost control.
- ▶ Secure access with employee authorization.
- ▶ Accurate retrieval of similar-looking tools.
- ▶ Fully automated tool provisioning.
- ▶ Convenient handling.

**Protect your tools from dirt, damage and unauthorized access!**



Fully automatic compartment doors open to enable retrieval of various-sized parts

# Higher-level storage management with Hänel

## Hänel optimizes your logistics processes by integrating WMS systems

The **Warehouse Management System (WMS)** controls and optimizes the entire logistics chain, including the Hänel vertical lift and Rotomat® systems in both office and storeroom.

Thanks to the collaboration with software partners, Hänel Storage Systems is able to offer solutions for complex intralogistics requirements.

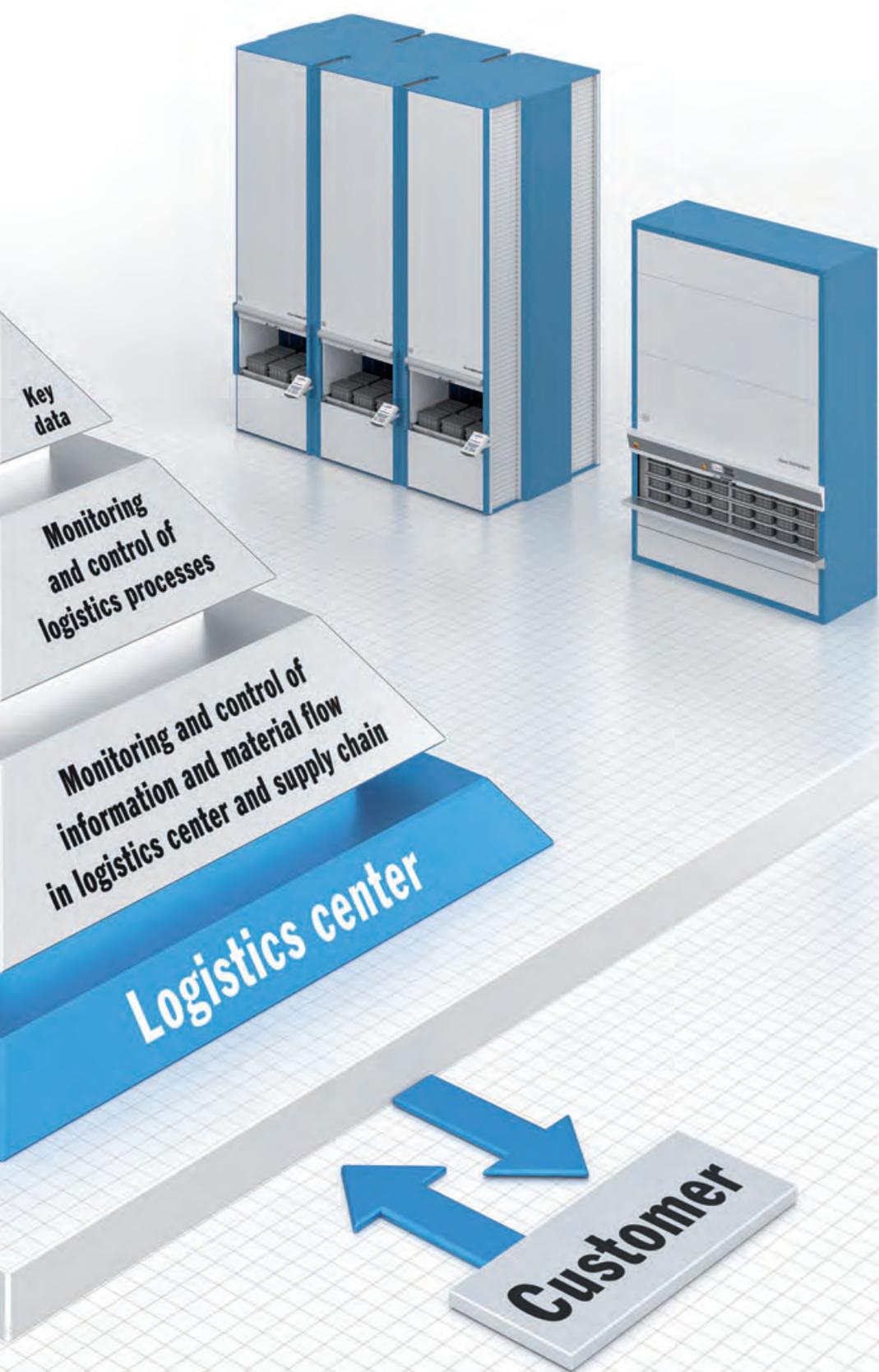
The software works with innovative technologies for real-time process monitoring and control: wireless data transmission, pick-by-light, pick-by-voice, RFID, automatic weighing, control of conveyor systems, roboting, automated warehouse.

A control station is available for monitoring and controlling all the logistics business processes in the warehouse, logistics center and in the supply chain.

The software system can be integrated easily into leading ERP systems from SAP and many other ERP manufacturers. It controls and optimizes the flow of information, materials and work involved, including all storage and retrieval operations.

**The specialists of our partners will team up with you to develop customized storage solutions for your intralogistics!**



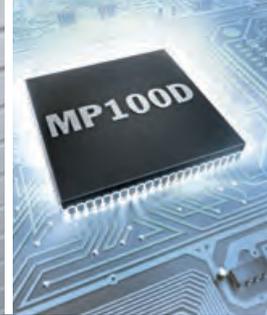


# Hänel microprocessor control systems at a glance



Model	MPON	StandAlone
<b>Rotomat® office carousels</b>	●	●
<b>Rotomat® storage carousels</b>	●	●
<b>Lockomat®</b>	—	●
<b>Lean-Lift®</b>	—	●
<b>Multi-Space®</b>	—	●
<b>Display variants</b>		
TFT color display, 320 x 240 pixels	●	—
TFT color display, 800 x 600 pixels, with touchscreen technology	—	●
TFT color display, 1,024 x 768 pixels, with touchscreen technology	—	—
<b>Functions</b>		
Device controller with direct selection of shelves/trays	●	●
Storage management for up to 99 systems	—	—
Two networked controllers for data communication between storage modules	—	●
Integrated Hänel storage management packages	—	●
Numerous additional functions thanks to intelligent software modules	—	●
Integrated web server for direct access to storage data via web browser	—	●
User interface multilingual with Latin, Cyrillic or Greek scripts	●	●
User interface multilingual thanks to UNICODE e. g. for Chinese	—	●
Access authorization via RFID	—	●
Storage location display by compartment LED	●	●
Hänel EcoLoad® for displaying load imbalances on Rotomat®/Lockomat®	●	●
Optimization run on Lean-Lift® and Multi-Space®	—	●
Access-Priority-Factor on Lean-Lift® and Multi-Space®	—	●
Expanded Safety Bypass Package (redundancy package)	—	●
Integration of HänelSoft® with graphical user guidance via browser	—	—
<b>Network / Periphery</b>		
Host communication with FTP/SFTP/CIFS	—	●
Host communication with SOAP	—	●
USB port for barcode reader	—	●
RS 232 interface for connecting peripheral devices	●	●
Ethernet interface for quick and easy integration into existing corporate networks	—	●
Intelligent multi-point connection for networking multiple storage systems	—	●
Ethernet connection for networking multiple lifts	—	●
Client controller for connection to a host system via RS 232	●	—
Controller for connection to a host system via Ethernet	—	●

● Configuration variant available     
 ○ Configuration variant depends on selected control system software  
— Configuration variant not available



MP 12 N			MP 14 N			MP 100 D together with MP 12 N-H or MP 14 N-H
HostWeb	HostData	HostCom	StandAlone	HostWeb	HostData	
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	●	●	●	●	●
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# New brochure with case studies featuring augmented reality and Hänel lift systems with SOAP interface

**Hänel's digital world offers innovative solutions that address the demands of tomorrow!**

Demands for flexibility and precision in manufacturing and shipping are on the rise, which makes having a digitized and intelligently networked intralogistics infrastructure crucial to business success. Hänel Office and Industrial Storage Systems has been developing solutions to address these demands for many years now – long before the wave of digitization known as “Industry 4.0” began transforming our world.

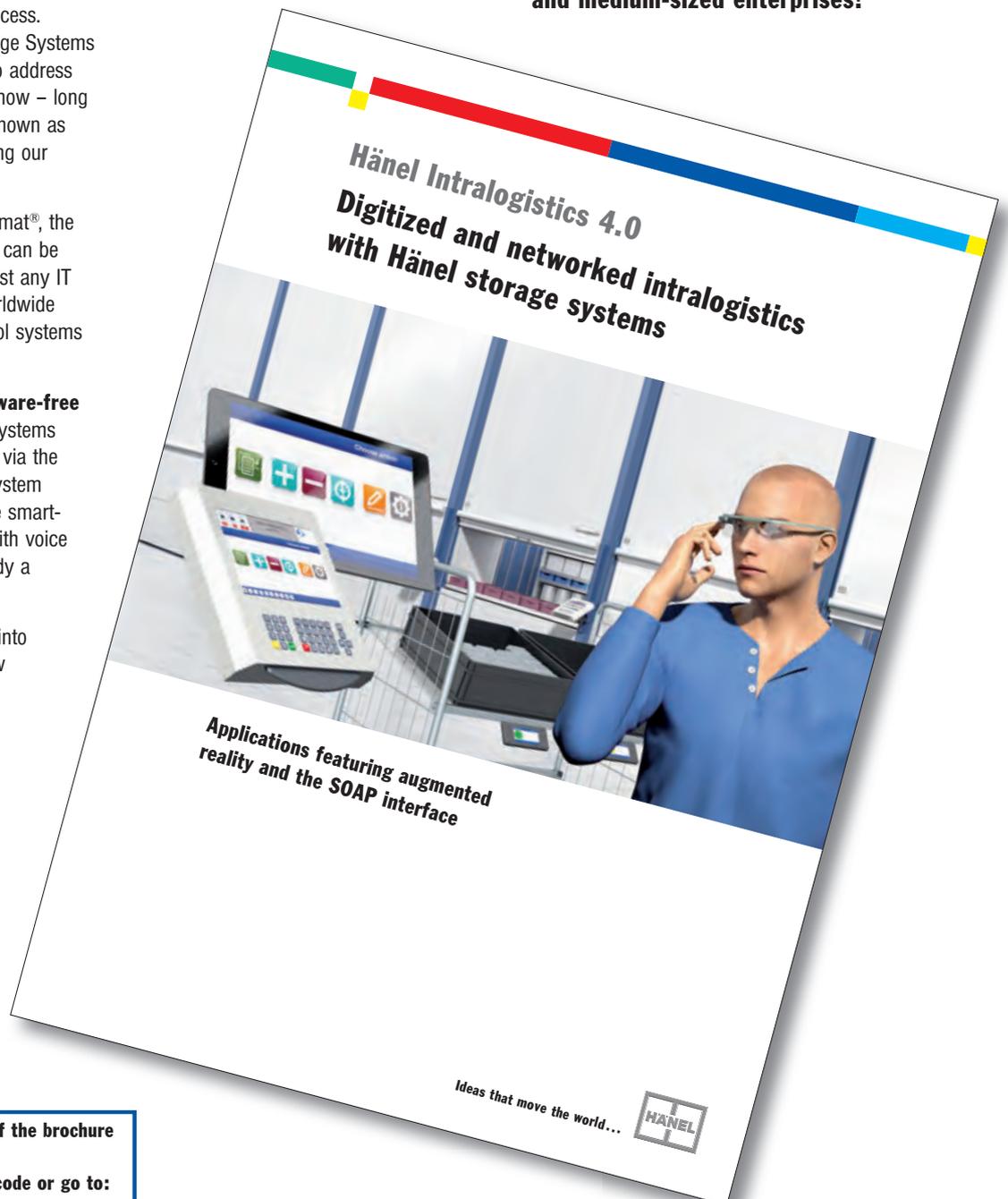
Hänel systems such as the Rotomat®, the Lean-Lift® and the Multi-Space® can be clustered and integrated in almost any IT environment at various sites worldwide thanks to intelligent Hänel control systems and an open architecture.

One key highlight is the **middleware-free connectivity** of Hänel storage systems to a wide range of ERP systems via the **integrated SOAP interface**. System operation via optical devices like smart-glasses (**augmented reality**) with voice control (**pick-by-voice**) is already a reality at Hänel.

This brochure provides insights into some actual Hänel solutions now in operation at customer sites

where digital transformation and system integration have been successfully implemented for optimized intralogistics.

**The new brochure illustrates the efficiency of Hänel storage solutions that are now in operation at small and medium-sized enterprises!**



Order your copy of the brochure now.

Just scan the QR code or go to:

[www.haenellinks.com/ex/mp/intralog4](http://www.haenellinks.com/ex/mp/intralog4)

# The Hänel product portfolio – the right solution for every need!



## Hänel Rotomat® office carousel

The Hänel Rotomat® is the optimal filing system for office and administration.

Folders, index cards or files – the Hänel Rotomat® keeps them all in order. It finds the right file from among thousands of hanging folders and retrieves it in seconds. The powerful Hänel micro-processor control systems enable the Rotomat® to be networked directly with a PC.

All Rotomat® office carousels are also available in a version suitable for disabled operators.



## Hänel Rotomat® storage carousel

Each Hänel Rotomat® is designed according to the tried-and-tested Ferris wheel model (vertical carousel principle) which means: goods to man and not man to goods.

The compact construction enables up to 60 % more storage capacity to be created on a minimal footprint by making use of the available room height. No two Hänel Rotomats® are the same, because each task demands a precisely defined solution.



## Hänel Lean-Lift®

The Hänel Lean-Lift® is both storage rationalization and goods protection in one. At the center of the 'cabinet' is a computer-controlled positioning lift – called the 'extractor'. In front of it and behind it are the storage shelves. This is where the articles are kept in containers.

The storage locations are accessed automatically under electronic control by means of the extractor, which stores or retrieves the requested container. The goods are then delivered to the retrieval area at the correct ergonomic height.

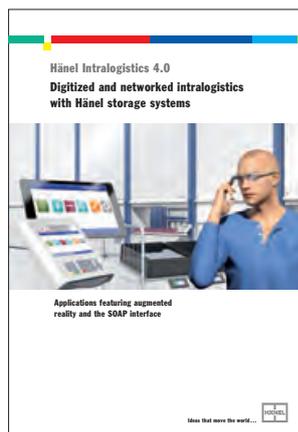


## Hänel Multi-Space®

Hänel has optimized the principle of three-axis storage systems with the Hänel Multi-Space®. In addition to the many advantages of the Hänel Lean-Lift® technology, the Hänel Multi-Space® offers maximum flexibility, speed and use of space.

With its advanced technology, Hänel is able to offer a three-axis storage system almost 9 m wide. The Hänel Multi-Space® can even be varied in width and height once installed – an innovation from Hänel!

Even the number of retrieval points is variable and can be changed at any time.



## Hänel Intralogistics 4.0 Digitized and networked intralogistics with Hänel storage systems

Demands for flexibility and precision in manufacturing and shipping are on the rise, which makes having a digitized and intelligently networked intralogistics infrastructure crucial to business success.

Hänel presents solutions for the digitization of intralogistics. The brochure features case studies based on the successful integration and networking of Hänel lift systems with various IT systems in small and medium-sized enterprises.



## Examples of Hänel storage systems in operation at small and medium-sized enterprises

Tightening up operating procedures, increasing flexibility and lowering costs – these are the objectives of small and medium-sized enterprises if they are to be successful.

With Hänel storage systems, we offer you first-class high-tech systems for storage organization and materials handling that save time, storage space and costs and result in substantially improved workflow.

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