Jungheinrich WMS
Future reliability and perfection for your warehouse
The Jungheinrich Warehouse Management System
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The Jungheinrich WMS is an intelligent, industry-independent software solution for intralogistics, which enables you to manage, control and optimise your warehouse efficiently. The Jungheinrich WMS has been undergoing constant development by our in-house software and logistics experts for more than 20 years now. Our support employees can provide you with help 365 days a year, 24 hours a day, if required and will provide you with reliable and fast responses to all your queries via a remote link. With the Jungheinrich WMS, you will also increase the efficiency of your intralogistics processes and reduce your costs by up to 70%. This is irrespective of the size or complexity of your system. Jungheinrich always has the right solution. For operators of standardised manual warehouses, the Jungheinrich WMS Series 2 offers all the necessary functionalities for mapping your requirements. Our proven, comprehensive Jungheinrich WMS is used for processes that go beyond this.

**Future reliability and perfection**

The requirements in modern warehouses are diverse and pose genuine challenges. The Jungheinrich WMS addresses these challenges and offers innovative solutions perfectly tailored to your individual needs. Whether manual, semi or fully automated warehouses: Regular further development ensures that the WMS always remains state-of-the-art. Unique in the industry is the forward compatibility that ensures that your Jungheinrich WMS will remain compatible with new releases and upgradeable in the future. The multi-dimensional configuration model of the Jungheinrich WMS also guarantees high process precision for mapping your individual needs even with future changes in your warehouse.

### Jungheinrich WMS Series 2

<table>
<thead>
<tr>
<th>MANUALLY OPERATED WAREHOUSE</th>
<th>PARTLY AUTOMATED WAREHOUSE</th>
<th>FULLY AUTOMATED WAREHOUSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive-in warehouse with manually operated UPC shuttles</td>
<td>Drive-in warehouse with UPC shuttles and UPC management module</td>
<td>Automated pallet warehouse with rack operating equipment</td>
</tr>
<tr>
<td>Narrow aisle warehouse</td>
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<tr>
<td>Wide aisle warehouse</td>
<td>Mobile racking system</td>
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</tr>
<tr>
<td>Drive-through racking</td>
<td>Mobile racking system with mobile racking control module</td>
<td>Automatic small parts warehouse with rack operating equipment</td>
</tr>
<tr>
<td>Block storage warehouse</td>
<td>Lift racking</td>
<td>Automated Guided Vehicle</td>
</tr>
<tr>
<td>Cantilever-type racking</td>
<td>Modular racking floor system</td>
<td></td>
</tr>
</tbody>
</table>
The profile control and the modular structure of the Jungheinrich WMS combine the advantages of standard software with those of individual programming.

You can trust our references!
The independent validation of completed projects by the Fraunhofer Institute for Material Flow and Logistics confirms the reliable functional fulfilment of our implemented systems.

Validation and certification of the software
The Jungheinrich WMS is regularly validated by the Fraunhofer IML. The basis for the independent validation is an extremely comprehensive questionnaire, comprising more than 2700 individual aspects, which is adjusted annually to the market by the Fraunhofer IML. Warehouse Logistics is certified in accordance with DIN EN ISO 9001.
Goods receipts can be assigned to an order based on the order number and very quickly and efficiently identified by a comparison of the key inspection criteria. All the necessary data for these notified orders is transferred from the host system to the Jungheinrich WMS via the interface. Of course, goods receipts can also be collected without notification. Among other things, a quality inspection can be carried out at Goods Receipt in order to block goods with quality defects for customer orders.

With the single-level stacking in Goods Receipt a collected load unit is picked up and brought directly to the displayed destination storage location. Identification of the storage locations in the racking is also possible via an RFID tag, for example. Such an approach is also supported in the Jungheinrich WMS.

Goods Receipt, quality assurance and stacking
Process reliability from the outset
In addition, the Jungheinrich WMS plays a significant role in that the error rate is close to zero. Working conditions are also made easier: The WMS is very user-friendly for workers in the warehouse.

The **put-to-light module** increases process reliability by providing the employee with visual information for stacking.

When using the **GS1 module**, labels in the so-called Global Standard One format can be scanned or printed. This significantly simplifies the identification of the goods using their properties such as best-before dates, serial or batch numbers.

After collection, the stacking order can be created automatically or by the employee guided by the system. Then, in the course of the stacking, a mobile racking system, for example, is controlled by the Jungheinrich WMS and the corresponding destination aisle is opened. Other warehouse types such as drive-in or pushback racking, block storage warehouses, drive-through or cantilever-type racking can also be easily mapped in the Jungheinrich WMS.

The **bypass module** ensures that just delivered goods for which a retrieval order already exists need not be stacked and are therefore immediately available for customer orders. The **cross-docking** throughput type is also supported by the Jungheinrich WMS.

CEO of an electrical wholesaler
Both manually and automatically managed areas can be mapped and controlled in the Jungheinrich WMS. As a rule, narrow-aisle and high-bay warehouses involve a multi-level stacking or retrieval process. The management of automated guided vehicle systems is also possible with the Jungheinrich WMS.

Very flexibly adjustable warehousing strategies can be used in different warehouse areas in order to guarantee the optimal warehouse management for each requirement. Our strategies take into account both the physical properties of the warehouse areas as well as the logistical attributes of the goods to be stacked.

The warehouse reorganisation module facilitates a recalculation of the optimal assignment per storage location, thereby significantly contributing to improved performance in your warehouse – particularly in fully automated areas.

Should hazardous substances be moved in the warehouse, the Jungheinrich WMS takes into account the applicable statutory requirements.

The empties management module offers the possibility to manage and balance empty containers and pallets accordingly.
The truck guidance system module optimises transport for outstanding goods movements in a narrow-aisle warehouse for example. All work instructions for this appear directly on the truck terminal. This also means that double cycles are possible, thereby minimizing empty runs. Outstanding efficiency for narrow aisle trucks is also achieved through the use of the Jungheinrich warehouse navigation. The truck is permanently aware of its current position and the transport order is transmitted directly from the Jungheinrich WMS.

Multi-level storage, e.g. in drive-in warehouses, drive-through, pushback or drive-in racking, can also be mapped in the Jungheinrich WMS. When stacking or retrieving in multi-depth areas, the Jungheinrich UPC can be fully integrated and controlled via the Jungheinrich WMS.

The material flow computer (MFC) integrated in the Jungheinrich WMS calculates the routes for automated guided vehicles such as the Jungheinrich Auto Pallet Mover (APM), for example. The transport orders are transferred from the MFC to the truck control system. After transferring a pallet onto the conveyor system, the material flow computer accepts responsibility for its subsequent stacking in the automated high-bay warehouse. In this way, the material flow computer controls the pallet on the conveyor system and via the rack operating equipment to its destination.

CEO of a retail company

„On top of that, the selected concept is future-proof. Especially as the WMS allows parametrisation and adaptation to changed flow strategies at any time without great programming cost.“
Irrespective of whether you are active in distribution or production, order picking is the key process in any logistics system. Jungheinrich increases your efficiency with a number of order picking strategies, for example, order-oriented (single-level), item-oriented (multi-level) or parallel order picking as well as multi-order picking, thereby guiding employees around the warehouse on optimised routes. In addition to an availability check of the ordered item, the software also takes into account item or order-specific requirements such as FIFO, batch requirements, but also quantity optimisations when calculating the optimum picking actions.
As an alternative to the wireless terminal, the employee can also be supported through pick-by-voice when order picking. The corresponding module ensures that your employees are able to keep their hands free for this. The result: Improved ergonomics with a simultaneously lower error rate.

The resource management module provides you with access to utilisation and control of your resources at any time. Simultaneously, you have the option to process your orders in a timely manner and with significantly lower resource expenditure.

Replenishment strategies can be configured for every warehouse area. Based on the predefined characteristics, the system is able to detect whether replenishment is necessary and initiates this automatically. When using the truck guidance system module (TGS), the replenishment order appears directly on the terminal of the user. The distribution of the orders to the appropriate employees takes place based on predefined criteria such as optimisation of routes and resources.

Are you using a wireless terminal for order picking? Then your employees receive all relevant information for retrieval in a clear, paperless form on the device – and in real time. The integrated scanner increases the efficiency of information acquisition.

CEO of a logistics services provider

„The introduction of the WMS enabled us to discover untapped potential in the management and control of the warehouse, with the result that our entire process is now more efficient.“
Order picking – Goods to operator

Ergonomics – Focusing on removal

The **material flow computer** enables the WMS to also take over the control and management of complex automatic warehouse systems. For example, the ASW management module supports the ergonomic workstations with context-sensitive user interfaces.

Thanks to our more than **25 years of experience** of interacting with automated systems, Jungheinrich offers many different control and optimisation strategies:

<table>
<thead>
<tr>
<th>Single cycles</th>
<th>Relocation minimisation</th>
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<tr>
<td>Double cycles</td>
<td>Item-oriented characteristics</td>
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<td>Multiple cycles with n-fold LHAs</td>
<td>Order picking-oriented characteristics</td>
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<tr>
<td>Priorities</td>
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<tr>
<td>Work zones</td>
<td>Sequences</td>
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<tr>
<td>Aisles</td>
<td>Bypasses</td>
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<tr>
<td>Multiple stacking</td>
<td>ABC</td>
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<tr>
<td>Nearby location</td>
<td>... and much more</td>
</tr>
</tbody>
</table>

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Thanks to our more than 25 years of experience of interacting with automated systems, Jungheinrich offers many different control and optimisation strategies:
Automatic small parts warehouse (ASW) are always used when there are high performance requirements. The control and optimisation of the ASW is executed entirely by the Jungheinrich WMS. Both filling and order picking takes place in ASWs at upstream workstations. When order picking, using the pick & pack module, for example, enables the goods to be packed directly into a shipping unit during the picking process. As a result, two work steps are merged into one. The container pre-calculation module calculates in advance the optimal loading pattern for goods in shipping containers and combines the packing and order picking sequence with the aim of increasing the utilisation of volume and weight in shipping containers.

In addition to all other warehouse types in the Jungheinrich portfolio, the Jungheinrich lift racking (LRK) and the Jungheinrich paternoster racking (PRK) shuttle warehouses can also be fully integrated in the Jungheinrich WMS. In order to execute the item movements without errors, the Jungheinrich WMS provides control of all the important functions of the shuttle warehouse such as the positioning aid via a light in the removal area. Additional picking-relevant information such as the item number or picking quantity can be displayed on a removal bar.

The picking stations facilitate flexible, yet simultaneously very efficient work. This releases our workers from monotonous work, contributing not only to the efficiency of our processes but also to the motivation of our employees.”

Logistics manager at a leading wholesaler
Utilise another strength of the Jungheinrich WMS – industry independence. Benefit from our experience in very diverse industries and from perfectly coordinated processes.

The client module enables several clients to be managed in parallel using the Jungheinrich WMS. In addition to corresponding master data, process and interface-specific settings can be made. This ranges, for example, from different inventory processes to the individual generation of delivery notes.

The cost allocation module can be used to create the basis for executing performance-based invoices for the warehouse services.

The recorded data can be exported from the Jungheinrich WMS at any time via an interface. This ensures that nothing stands in the way of a timely settlement of the service to your clients.

Workstations for consolidation, value added services and packing

Industry independence – From producer to service provider
When processing production orders or during set formation, the Jungheinrich WMS controls the creation of a new item from two or more items. Following this, a new product label or other documents can then be printed by the Jungheinrich WMS. The batches of the individual components are saved when processing a production order and can be viewed at any time. This guarantees optimum traceability back to the individual component.

“The have reduced our delivery time from six to two weeks. Optimised shipment control has also made it possible for us to improve our delivery quality by around 50 percent. And this is without additional employees.”

Logistics manager of a furniture manufacturer
Optimised material flows at Goods Out

Transparency that you see in the warehouse

The modelling of your material flows in the Jungheinrich WMS gives you a high degree of consistent transparency. As a result, the integrated profile technology makes a significant contribution to the complete recording of all relevant information. You are able to schedule resources for compliance with important upcoming deadlines, while also easily identifying order backlogs at any time.

After the order picking, the optional packing and loading modules may take over the control and optimisation of Goods Out. Not only does the Jungheinrich WMS enable you to print the relevant documents during the corresponding process steps, but it also creates an overview of how the goods are packed and when they left the warehouse, i.e. when they are en route to your customers.
Jungheinrich Under Pallet Carriers (UPC) can be used with great flexibility in conjunction with the WMS in drive-in warehouses.

With the **UPC virtual remote control** module, you can replace the physical remote control for controlling the UPC with a virtual remote control on the wireless terminal. The **UPC management module** manages all UPCs directly in the Jungheinrich WMS and saves your employees from having to search for a free UPC. The Jungheinrich WMS then automatically assigns the correct commands to the UPC.

The **truck guidance system** first gives the truck operator the order to lift the UPC and deliver it to the correct channel. After successful delivery, the UPC controller automatically receives the orders for the pallet transports from the Jungheinrich WMS.

After consolidation, the packages produced in the Jungheinrich WMS can be brought to a Goods Out door and outgoing goods to be released there. The loading of the load carriers is then carried out, documented and the necessary documents such as a dispatch note made available in the Jungheinrich WMS. When using **run preparation**, several orders can be grouped together as runs. This means that the calculation of removals can already be controlled in advance, so that all orders in a run are picked together and in the correct sequence. In the course of loading, the orders in a run are then loaded according to the run sequence. All the relevant data for the packages is then prepared in digital form, e.g. for a shipping provider or shipping software, via the **shipping interface**.

„Our processes have become leaner and more reliable. We now have full warehouse transparency at all times and have been able to realise enormous cost savings."

CEO of a logistics services provider
Your IT solution for the warehouse management

International locations – We speak your language

Warehouse managers can obtain a great deal of information from the control panel including a graphical representation of the current system in the warehouse. In addition to updating master data and profile settings, orders can also be started and warehouse access be monitored at any time with the aid of the control panel in the Jungheinrich WMS.

The multi-warehouse module enables the Jungheinrich WMS to manage different warehouses at several company locations. This ensures that all profiles and master data are available across all locations.

Save time with the correct inventory procedures. The Jungheinrich WMS also provides numerous inventory support functions, regardless of whether a reference date or a permanent process is to be applied.

The Jungheinrich WMS is available in 12 languages. The language can be changed online via the user interface.

1. The conveyor system and rack operating equipment are shown in full detail up to the controller and sensor level in the system visualisation. This gives you an overview of the operating conditions of the different system components at any time.

2. The KPI report generator provides you with an overview of your most important data/assessments at any time. Your individual evaluations can be represented in tabular or graphical form.

3. The Jungheinrich WMS offers you both a 2D as well as a 3D visualisation of manual or automated warehouses.
What prerequisites are required by the Jungheinrich WMS?

PC client
A PC client is required on the control panel or at Goods Receipt or packing stations. Due to the better display options, workstations with a PC client offer the user a greater range of functions than on a wireless terminal screen.

Minimum requirements
Operating system: Windows XP, Windows 7 (32 or 64-bit), Windows 8.1 (32 and 64-bit), Windows 10 (64-bit)

Truck and hand-held terminals
As a rule, truck terminals are used on fork lift trucks. Moreover, these are also used at mobile workstations in Goods Receipt or Goods Out.

Hand-held terminals can be used with great flexibility along the entire process chain. Due to their smaller size, they offer greater mobility.

Minimum requirements
TRUCK TERMINAL
Operating system: Windows XP/7/8.1/10 embedded
Recommended resolution: at least 800 x 600 pixels
Free memory: 1 GB Flash
Network: WLAN 802.11a/b/g/n
(Connection with at least 10 Mbit)

HAND-HELD TERMINAL
Operating system: Windows CE 6.0 Mobile 6.5
Recommended resolution: at least 320 x 240 pixels
Free memory: 1 GB Flash
Network: WLAN 802.11a/b/g/n
(Connection with at least 10 Mbit)

We are pleased to offer you a selection of suitable truck and hand-held terminals. Existing devices already in use at your company can be tested for compatibility with the Jungheinrich WMS.

In addition, we offer a broad portfolio of WLAN and wireless data solutions as well as the associated services, such as WLAN simulations or system and performance analyses.

Pick-by-voice
When choosing pick-by-voice solutions, Jungheinrich works with Vocollect among others to find the right solution for you.

WMS server
Both the WMS database and the necessary server services are installed on the server. All data is transmitted from the central server via LAN and WLAN to the PCs and terminals.

Minimum requirements
Operating system: Windows Server 2003, 2008, 2008R2, 2010 or 2012 (32 or 64-bit)
Processor: 2 x CPU with at least 2.4 GHz
RAM: 8 GB RAM
Hard disk: 2 x 500 GB HDD (for WMS and database installation)
Network connection: 100 Mbit
RAID controller: at least 256 MB cache for RAID1 or RAID5

The Jungheinrich WMS can also be operated in a virtualised environment, e.g. Microsoft Hyper-V or VMware vSphere, and supports cluster and high availability solutions. Jungheinrich works with the customer to determine the precise specifications of the server during the course of the project.

Both Oracle and a Microsoft SQL Server can be used as a database. We will be happy to answer any questions you may have about the respective licensing.
## WMS – Integration into the system landscape

### Clear demarcation – clear responsibilities

#### Tasks of an enterprise resource planning system

An enterprise resource planning (ERP) system is a software system for the comprehensive planning and coordination of corporate, especially managerial, tasks with the aim of utilising the resources (staff, equipment etc.) already existing in a company as efficiently as possible.

#### Tasks of a warehouse management system

As part of a system environment in the company, the WMS communicates with neighbouring systems via interfaces. In doing so, the position of these systems within the IT hierarchy orients itself towards the tasks and key functional aspects of the software systems involved. The following figure shows a plane model of the system landscape as per VDI 3601. The figure also describes the tasks and key functional aspects of the different systems.

### Tasks of an enterprise resource planning system

- Finance and accounting
- Human resources
- Order management/Purchasing
- Production
- Sales and marketing
- Master data management
- Stock management

### Tasks of a warehouse management system

- Warehouse structure
- Master data management (with WMS relevance)
- Stock management (at position level)
- Transport management (in-house)
- Support of the processes from Goods Receipt to Goods Out

<table>
<thead>
<tr>
<th>System level</th>
<th>Tasks</th>
<th>Key aspects of functions</th>
<th>IT hierarchy and systems</th>
</tr>
</thead>
</table>
| Administration level | Management Planning Scheduling (Company) | - Finance and accounting  
- Human resources  
- Order management/Purchasing  
- Production  
- Sales and marketing  
- Master data management  
- Stock management (summary) | Enterprise Resource Planning (ERP) |
| Process level | Process control Control Optimisation (Warehouse) | - Warehouse structure  
- Master data management (with WMS relevance)  
- Stock management (at position level)  
- Transport management (in-house)  
- Support of the processes from Goods Receipt to Goods Out | Warehouse Management System (WMS) |
| Control level | Identification Handling Transport (Warehouse) | - Data recording/transfer  
- Execution of material movements | Programmable logic controllers (PLC) |

Source: VDI Guideline 3601

### IT hierarchy and systems

- **Enterprise Resource Planning (ERP)**
- **Warehouse Management System (WMS)**
- **Adjacent systems** (e.g. TMS, Customs)
- **Subsystems** (e.g. Pick-by-voice, pick-by-light)
- **Material flow control system (MFC)**
- **Integrated material flow control system**
- **Sensors/actuators**
Interface module for the connection of SAP and all common host systems

The Jungheinrich WMS ensures the data exchange and communication via standard interfaces to all common host and ERP systems, while simultaneously providing a certified interface to SAP.

### Interface types for connection to SAP
- SAP R/3 (file)
- SAP R/3 (tRFC – transactional remote function calls)
- SAP Media (file)

### General interfaces types to other ERP systems
- Data exchange (file)
- Database access (DB)
- Socket connection (TCP)

### Extract of the already successfully connected ERP systems

<table>
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<tr>
<th>A</th>
<th>M</th>
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<tbody>
<tr>
<td>abas</td>
<td>MAPICS</td>
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<td>Aberon (DB)</td>
<td>mesonic WinLine (DB)</td>
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<td>AP+</td>
<td>Microsoft Dynamics AX (Axapta)</td>
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<tr>
<td>ASP-XTrend</td>
<td>MOVEX (File)</td>
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<tr>
<td>Atos Origin (LLS)</td>
<td>myBusiness (DB)</td>
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<td>Autostore WMS</td>
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<td>Axapta</td>
<td>Navision (DB)</td>
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<td>Biceps</td>
<td>Oracle JD Edwards EnterpriseOne</td>
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<td>Brain (File)</td>
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<td>P2 (PA AG)</td>
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<td>cimdata</td>
<td>Perftech (DB)</td>
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<td>Sage New Classic (File)</td>
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<td>WAWI</td>
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21
The Jungheinrich WMS – Service from beginning to end*

*Example sequence for the integration of a close-to-standard Jungheinrich WMS in manual warehouses.

<table>
<thead>
<tr>
<th>QUOTATION PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jungheinrich Sales Department and the customer</td>
</tr>
<tr>
<td>Creation of a binding quotation by Jungheinrich</td>
</tr>
<tr>
<td>Commissioning for the customer.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SYSTEM SPECIFICATION PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>System specification workshop on site, at which all delivery and service content will be discussed and specified in detail</td>
</tr>
<tr>
<td>Creation of the system specification in which all delivery and service content are described in detail</td>
</tr>
<tr>
<td>Coordination of system specification, in order to refine the content and obtain agreement of all concerned parties</td>
</tr>
<tr>
<td>Acceptance of system specification by the customer.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IMPLEMENTATION PHASE (INHOUSE)</th>
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<tbody>
<tr>
<td>Jungheinrich</td>
</tr>
<tr>
<td>Modelling of the warehouse, mapping of processes and implementation of the interface on the basis of the accepted system specification</td>
</tr>
<tr>
<td>Installation of the WMS clients on the PCs provided based on an installation guide</td>
</tr>
<tr>
<td>Provision of a server and remote maintenance access</td>
</tr>
<tr>
<td>Remote installation of the database and the WMS on the server</td>
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</tbody>
</table>

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<thead>
<tr>
<th>TRAINING AND TEST PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jungheinrich</td>
</tr>
<tr>
<td>Test of the interface using an approved test plan</td>
</tr>
<tr>
<td>Pre-commissioning of the systems already delivered on site</td>
</tr>
<tr>
<td>Training of key users by Jungheinrich</td>
</tr>
<tr>
<td>Final integration testing of the Jungheinrich WMS and adjacent systems, e.g. ERP, warehouse systems</td>
</tr>
<tr>
<td>Go-live decision with all project partners involved</td>
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<tr>
<td>Internal training of employees by the key users</td>
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<table>
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<tr>
<th>IMPLEMENTATION PHASE (ON SITE)</th>
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<tbody>
<tr>
<td>Jungheinrich</td>
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<tr>
<td>Completion of commissioning of the systems supplied on site (go live)</td>
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<tr>
<th>SUPPORT AND ACTUAL OPERATION</th>
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<tbody>
<tr>
<td>Jungheinrich</td>
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<tr>
<td>Support of actual operation</td>
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<tr>
<td>Remote support and transfer to standard support</td>
</tr>
<tr>
<td>Support services in accordance with catalogue of services previously discussed (support contract)</td>
</tr>
<tr>
<td>Support for enquiries and extensions relating to your WMS</td>
</tr>
</tbody>
</table>
Logistics systems from Jungheinrich have been proven to be highly reliable. Our many years of experience in working with customers from the most diverse of operations shows that investment in service and support services pays dividends. It leads to increased productivity, reduced operating costs and maximised availability of your logistics system. Our support employees can provide you with assistance and answer your questions *365 days a year, 24 hours a day*, quickly and reliably via remote link. The contact persons and service engineers in your immediate vicinity are also happy to help.

We offer you three support models tailored to meet your needs.

**Jungheinrich care support**
Use of support during office hours without taking out a support contract for an event fee plus hourly rate.

**Jungheinrich basic support**
Flat-rate basic support package with guaranteed response times and with support hours charged for according to use.

**Jungheinrich premium support**
Coverage of all support services for a flat rate, regardless of duration and scope.

We are available at any time to help you with the configuration of a suitable support model. You can benefit from our expertise and experience, enabling you to focus on your core business. We look after your logistics system.
The German production facilities in Norderstedt, Moosburg and Landsberg are certified. Jungheinrich trucks conform to the European Safety Requirements.