

EISENMANN

Electric monorail systems



This is EISENMANN

EISENMANN is one of the internationally leading system suppliers in the sectors of surface engineering, material flow automation, environmental technology and thermal process engineering.

A workforce of around 2,800 develops new technologies and systems for production, installation/assembly and distribution. Engineers, technicians and specialists from various disciplines plan, design, construct and commission ultra-modern systems and service them through to complete operation of the systems. This includes experts and specialists with well-founded know-how from various specialist disciplines and industries. This is an advantage which is reflected in tailor-made concepts incorporating state-of-the-art engineering and high economy.

EISENMANN as a logistics specialist or prime contractor

As a supplier of single components and system components for material flow automation and as an experienced general contractor, we plan and construct conveying components such as electric monorail systems through to complete logistic systems, including warehousing and building services engineering.

Our products incorporate the experience of a large number of projects implemented worldwide in a wide variety of industries and companies. These include all sectors of the automobile and component-supply industry, food companies and commercial enterprises, machine builders and service providers, in addition to print shops etc.

EISENMANN has the individual, right solution for every material flow task: the range covers all modern conveying systems for production, assembly, storage and dispatch.

Our performance profile

- Consultancy and planning
- Simulation
- Customized product and system development
- Design and production
- Component assembly and test set-ups
- Installation and commissioning of all mechanical and control components
- Instruction and training
- Maintenance and global servicing



EISENMANN Technology Center in Holzgerlingen



Electric monorail test course for practical trials and commissioning

Electric monorail systems



What is an electric monorail system?

An electric monorail system (EMS) is a rail-bound means of conveyance with individually driven vehicles which move independently on the rail system. Branch points can be implemented on the line with the aid of switch points. The vehicles are generally supplied with power and control signals via collector wires on the carrier rail. The actual rails themselves are attached either to the shop ceiling or – if this is too high – to a suspended or column-supported steel structure.

Reasons for using an electric monorail system (EMS)

- Fast transport
- Gentle transport
- High flexibility
- Ground clearance
- Low investment with increase in performance
- Silent transport
- Extremely high availability
- Constant transport over several levels
- Energy-efficient transport

Fast and flexibly to the destination

The use of an electric monorail is the obvious choice if it is necessary to interconnect large spatial distances or even different buildings logistically. Unlike stationary conveyor systems (e.g. roller conveyors or carrier chain conveyors), an EMS is far more efficient and faster. This is how your goods to be conveyed reach their destination within a very short time.

Not every load can be transported with standardized auxiliary equipment (e.g. on a Europallet). The EMS in such cases is extremely flexible. The basic structure of the trolley, admittedly, is always the same but the hanger can be designed individually to meet your requirements. Even as an assembly platform and within the framework of innovative order-picking systems, the EMS highlights its flexibility of use. An EMS system can be extended flexibly and at low cost by using further vehicles even as regards a higher transport capacity.

Special advantage: ground clearance

When staff and fork-lift trucks are crossing the EMS is your ideal transport system! The floor remains unobstructed and free of installations and wiring and can thus be cleaned

Electric monorail systems

simply. During order-picking work, your staff is able to approach the trolley from all sides and move around the trolley. Neither are there special requirements as regards the surface characteristics.

Gentle, low-noise transport

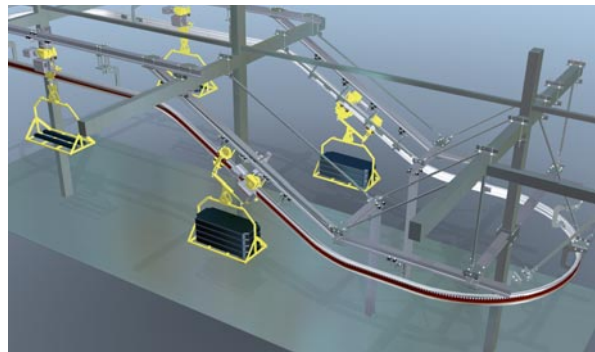
Sensitive goods to be transported are in the very best hands with an EMS. It avoids vibrations. It allows its load to reach the destination safely and quietly, it almost glides. This is ensured by plastic-sheathed wheels – and also at high speeds. This also has a positive effect on material wear and, thus, servicing and maintenance costs.

High system availability

Virtually 100 % availability is today, in many sectors, e.g. in logistics, crucial to the decision for a specific system technology. This can be achieved simply with the EISENMANN EMS: if a vehicle fails, it can be slid without major effort from the transport line into the maintenance bay. Material flow then continues unhindered.

Constant transport over several levels

If routing involves connecting several levels, simultaneously with continuous transport, the obvious choice is to use an EMS capable of climbing. Switching to the other level occurs almost continuously which has a positive effect on throughput times. Moreover, investment costs, operating costs and maintenance costs are lower than on systems with lifting stations.



EMS systems are more efficient and more economical



Gentle transport of sensitive goods to be transported even for gradients up to 45°.

Sophisticated technology

Graded rail system

EISENMANN's graded rail system covers different weight ranges. Depending on payload, the right carrier rail with the required bending and torsional strength is used. Our 180 mm hollow chamber section, for instance, is very popular in intra-logistics.

The EISENMANN rail system requires no stationary sensors or busbar sections for control tasks along the route. This means that adaptations to routing or subsequent system extensions can be implemented very easily and quickly. This cuts investment costs owing to short assembly and commissioning times.

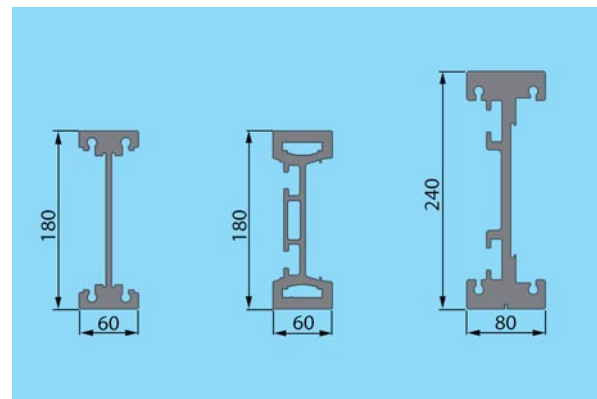
High-performance trolleys

EISENMANN's high-performance trolleys with a drive power of up to 3 kW, 200 mm-diameter wheels and 100 mm-diameter lateral guide wheels are rugged and have a long service life. They guarantee travel speeds of up to 180 m/min. on straight sections and up to 60 m/min. around bends.

Variable-frequency drives permit acceleration and deceleration adapted to product and its environment. An intelligent spacing sensor orients itself to the left and right, thus allowing contactless accumulation, even in tight bends. This means that an EMS circuit with individual hangers is able to



EISENMANN individual trolley with drives up to 3 kW



Every system has a modular structure, thus allowing short assembly times on site. M = goods up to 500 kg, HII = goods up to 1,600 kg; HIII = heavy loads up to 3,000 kg.

transfer to storage and remove from storage over 500 pallets per hour in a high-bay warehouse apron zone at the same time.



Oscillating hangers

The hangers attached to the trolleys, so that the hangers are able to swing, greatly reduce the centrifugal forces acting on the product. Load slip is thus restricted, in particular when cornering fast.

After cornering, its shock absorbers immediately return the hangers to their initial position. This allows transfer stations to be arranged even just after the bends. Floor guides are not required on high-speed transport sections.

Sophisticated technology

Floor guidance in transfer areas

Floor guidance in the transfer areas ensures a high positioning accuracy as regards the conveying direction of the goods to be transported and stabilizes the hanger.

Spring-mounted funnel-shaped entry guides are provided for threading into the floor guide. This avoids knocks to hanger and product.



Floor guidance at transfer points ensures stability when loading

Sturdy and easy-to-maintain

EISENMANN's electric monorails embody rugged technology with optimally dimensioned components. The 3-D designs are created using state-of-the-art design programs.

Our continued improvement process incorporating our own test course and feedback from our own operator projects and full-service projects ensure that our EMSs are always state-of-the-art.

Continuous, automatic trolley diagnosis (carbon brush wear) incorporated in the rail system greatly reduces maintenance effort.

The trolleys run through a diagnostic station integrated in the main line. In the event of a defect, the trolleys are transferred automatically to the maintenance line and can be serviced or repaired there, without disturbing system operation. In the event of failure of the drive, it is disengaged and can thus be shunted to the maintenance line. Preventive maintenance means that system availabilities of over 99% are conventional.

Also suitable as a floor-mounted rail system

If it is not possible to install a monorail system for any reasons, we also construct an electric suspension rail system or electric pallet rail system for you.

The system which is supported on the floor is designed from the same elements as the electric monorail system.

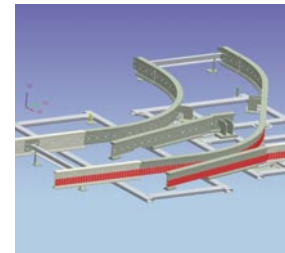
Two different switch point systems may be used in the case of the electric pallet rail system depending on structural conditions and throughput requirements:



A Spanish logistics service provider received two EISENMANN electrical pallet railway systems, one with 9 trolleys and one with 30 trolleys.



Quadro switch point with the advantage of space-saving design



V switch point with the advantage of higher throughputs – patent-pending

Control and communication

Own trolley controls

Since 2001, EISENMANN has used its own trolley controls with an open architecture, and these have been further-developed in ongoing manner. A digital display with sealed keypad on each controller and a special-purpose, infrared remote control offer convenient diagnosis and handling. All components fitted are freely available on the market. System adaptations, be they software or hardware, can be done by the customer himself.



Intelligent system control

Even complex material flow configurations can be coped with by the intelligent system control from EISENMANN. In the case of complex trolley management configurations owing to changing transport relationships above ground, the stationary system control is supplemented, if required, by an EISENMANN material flow computer.

software in the stationary control and in the mobile control is intermatched.

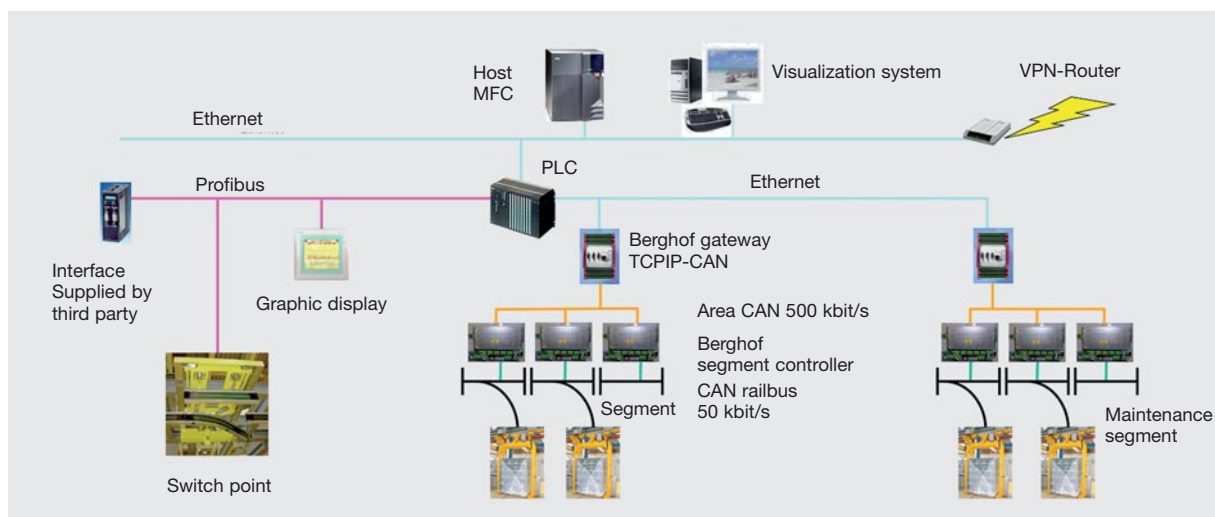
Speed reductions in weak-load operation or parking of trolleys not required are selected automatically by the master routing control system. These operating modes greatly reduce power consumption and are gentle on the system technology.

Permanent data communication

Permanent data communication via a CAN railbus allows short response times. This allows continuous adaption of material flow strategies. Bidirectional data communication allows extensive trolley diagnosis. Programs and parameters are downloaded from a central point via the railbus.

EISENMANN EMS master routing control system is also able to replace PLCs and material flow computers. An industrial PC incorporated in the control cabinet not only controls material flow but also evaluates digital inputs and sets outputs. This also allows complex software functions to be integrated at low cost at the subordinate control level. The

The absolute position sensing system using barcode strip or steel code rail allows layout-specific speed changes and a high positioning accuracy in the travel direction of the trolleys at the load change points.



Example of a control configuration

Examples from practice

EISENMANN equips IKEA's largest logistics center

The Swedish furniture group IKEA supplies its branches Europe-wide with products which are characterized by a high order-picking share from Dortmund, Germany. EISENMANN equipped this logistics center, the largest one in Europe, with a total of 3,500 m of electric monorail system (EMS). The EMS systems operate on the basis of the "pick by light" principle.

Efficient order picking thanks to "goods to man"

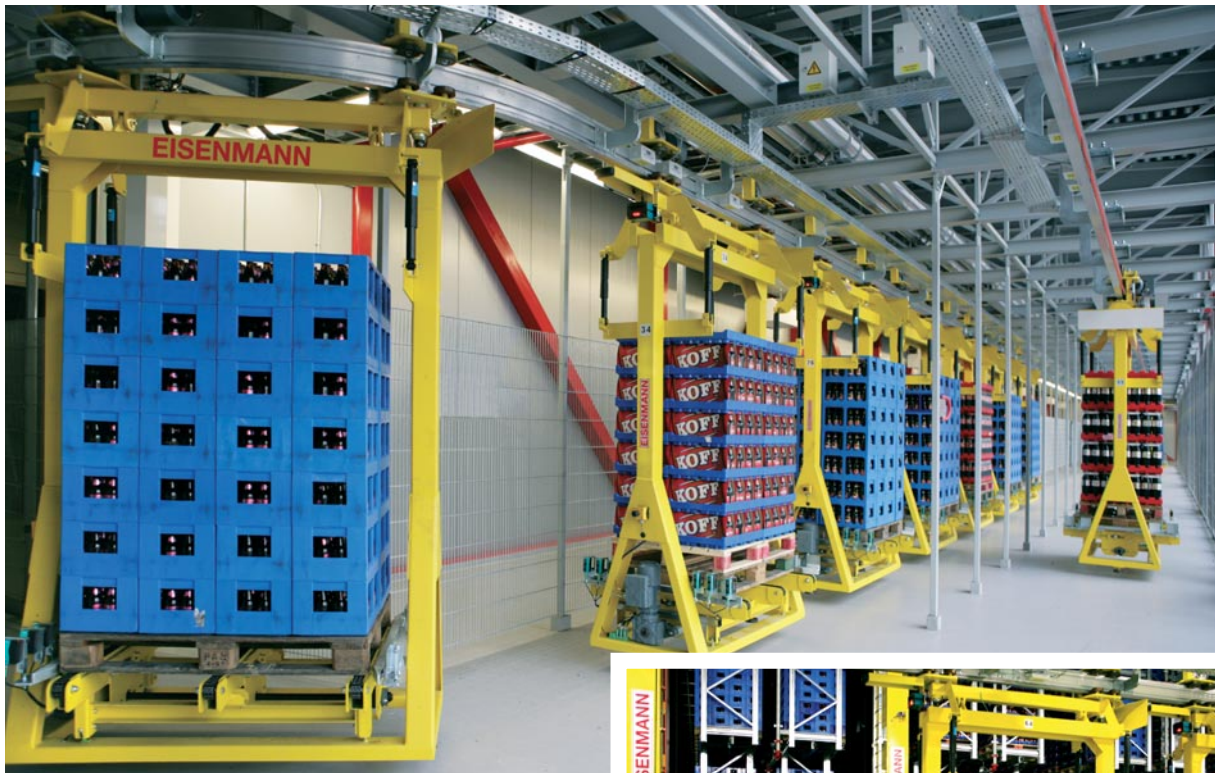
Besides transporting goods, the system is used for supply and disposal for "goods to man" order picking. The EMS is guided to 384 order picking positions in 48 bays in which orders are picked directly onto automatically readied shipment pallets. The shipment pallets are also forwarded by fully automated shuttles and lifting stations. In accordance with the "pick by light" principle, the order pickers receive their orders on the EMS trolley and also confirm here that they have been picked.



Over 500,000 pallet deposit positions in five silos are supplied by 68 storage and retrieval units featuring an EISENMANN control and software. In addition, EISENMANN supplied around 2,000 m of flat conveyor systems and 272 EMS trolleys for transport weights up to 800 kg. With a throughput of over 300 pallets per hour, the EMS system shortens response times to delivery and thus assists the endeavored short delivery times from logistics center to branch.



Examples from practice



Electric monorail system and high-bay warehouse from one supplier

EISENMANN adapts each order to the specific operating conditions of its customers. This is also what happens in Kerava in Finland at the bottler Sinebrychoff, a member of the Carlsberg Group.

In this case, as a specialist for integrated system solutions, EISENMANN implemented a 14-storey high-bay warehouse for finished goods with over 35,000 pallet deposit positions, a 1,300 m-long electric monorail system (EMS) and a pallet conveyor system to connect to the warehouse apron zone.

With 78 trolleys and a throughput of approx. 400 pallets per hour, the EMS system controls material flow between bottling plants, order-picking areas and the truck dispatch area. It also controls the entire system via an EISENMANN material flow computer.



An EISENMANN servicing contract ensures high availability

The EISENMANN branch in Finland is responsible for servicing and preventive maintenance of the system. Using staff specially employed for this, it ensures the contractually agreed high availability of the system.

Planning support with simulation

Before we install the EMS system on your premises, we simulate material flow. Our simulation team avails of many years of experience in this sector.

Simulation tool

For almost 20 years now, we have been working with the well-established tool Plant Simulation (previously Simple++, eMPlant) of the Siemens PLM company. Modeling is done on the CAD layout and this supplies a 2-D animation of your material flow configuration.

Procedure in the simulation project

The procedure for the simulation study is based on VDI Directive 3633. We define the objective of the simulation together with you. The objectives to be pursued differ depending on project phase.

- Planning support by corroboration and development of new concepts and visualization of material flow
- Project planning support by material flow confirmation and determining the number of trolleys
- Execution support by analysis of the effect of malfunctions and testing material flow strategies and contingency concepts

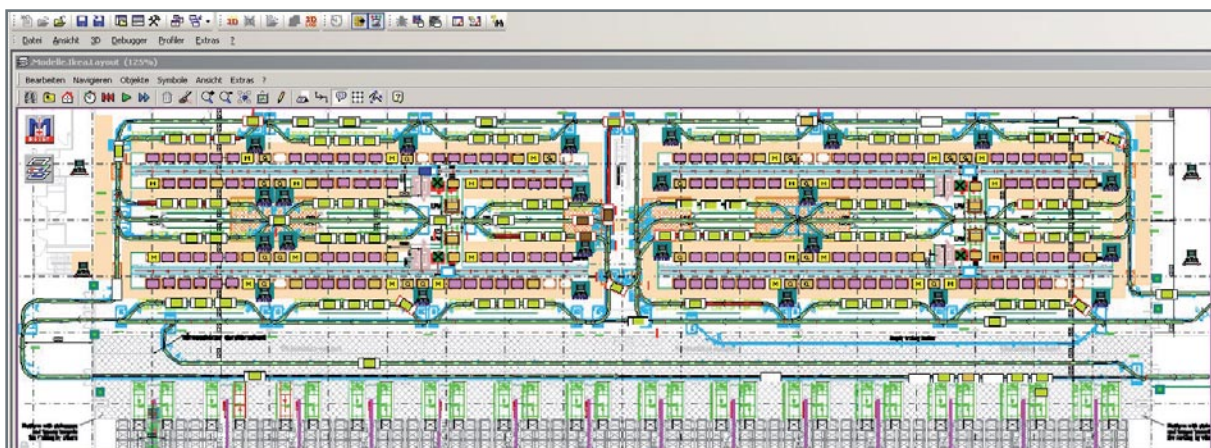
The input data for performing the simulation is acquired. You supply us with the required transport matrix and, if applicable, a working time model. We elaborate the layout and define the conveying characteristics and strategies.

The simulation model is implemented and verified. The input parameters can be varied in various simulation runs.

The simulation experiments are evaluated. Various results, such as the following, for instance, are of interest, depending on the aim of the simulation.

- Throughput values achieved hourly
- Required trolleys
- Capacity utilization of conveyor system components and stations
- Occupancy of buffers/queues
- Effects of planned strategies
- Identification of accumulation or narrow spots

We then present you with the results and submit documentation to you.



Example of a simulation model

Our servicing pledge

The EISENMANN Service offers an extensive range of services. These are tailored individually to the customer's needs, thereby taking the know-how of the customer's employees, the cost structure, the processes and the need for expertise into consideration.

Therefore, we regard ourselves as system providers when it comes to meeting the individual customer's requirements in an optimum way.

Maintenance Management

Inspection

We determine the actual state of your system by conducting inspections and then inform you about the weak spots and possibilities for increasing your performance, or let you know if there is an urgent need to take action.

Servicing

In order to determine the target state of your system, our specialists not only conduct the servicing, but also carry out mechanical and electrical check-ups and safety tests. Routine servicing guarantees an optimum functioning of your system and increases its service life.

Repair

Our maintenance team also carries out any necessary repairs and component replacements of course.

Improvement

The functional security of your equipment will be increased by technical and administrative measures without affecting the functional performance.



Spare Parts Management

Our central spare part management system allows us to ensure high availability of spare parts.

We can offer you advice as regards defining system-specific spare-parts packages and also individual spare parts. We proceed by bundling your orders and tying up tailored packages for safeguarding your production, and also emergency packages.

These make a tremendous contribution to, amongst other things, reducing purchasing processes and ensuring system availability.

Besides the sales we also offer a repair, and spare parts replacement service.

Maintenance Management (DIN 31 051:2003-06)		
Inspection	Servicing	Repair
Determining and evaluating the ACTUAL status	Measures for sustaining the target state	Restoration of NOMIAL status
Measuring Testing Diagnosing	Cleaning, Lubricating, Preserve, Adjusting, Replace	Repair Replace Check function

Our service offering for your EISENMANN systems

EISENMANN

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