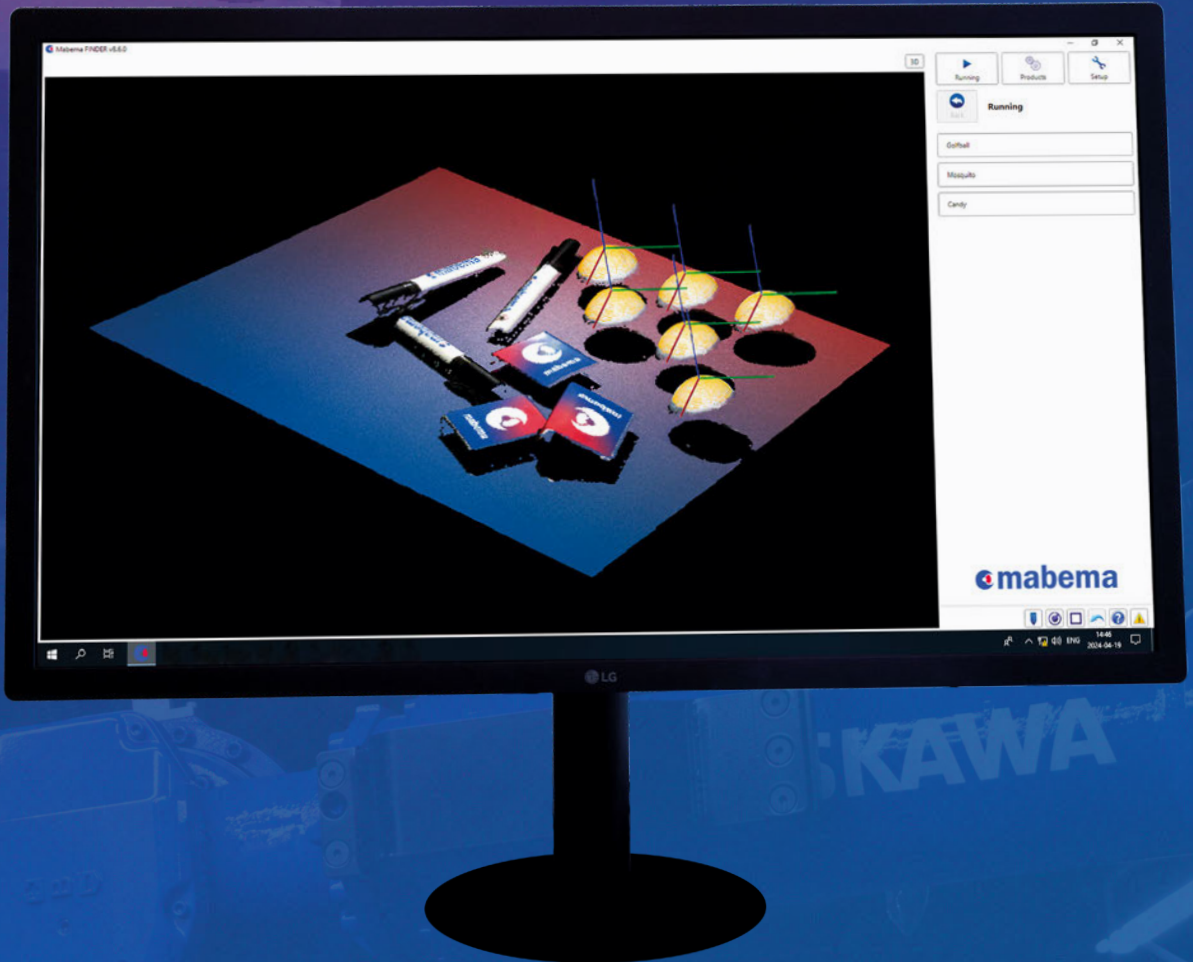


Robot guidance for industrial automation

FINDER




mabema

FINDER.....	4
Automotive.....	6
Metal and machining.....	8
Foundry and forging.....	9
Plastics and rubber.....	10
Consumer goods.....	11
FINDER 2D.....	12
FINDER Stereo.....	15
FINDER 3D.....	16
FINDER Tubes.....	19
FINDER Partners.....	20
Training.....	22
Support and service.....	23



The history of Mabema began in the early 2000's within the Swedish nuclear and automotive industry. Over 20 years later **we analyze more than 300 million images every year** in the most advanced machine vision applications. With our machine vision products, **we want to elevate longevity, performance, and profitability** for our customers.





Machine vision-based robot guidance means **giving eyes to the robot**. The smart cameras find products in the camera field of view and sends picking coordinates to the robot's control system. Machine vision does not only make the system **more flexible and cost-effective** than other robot guidance solutions but also helps in **reducing operating maintenance costs**.

Our robot guidance system FINDER was introduced to the market in 2011, and as of today we have installed more than **500 robot guidance systems** in the manufacturing industry. At the core of FINDER lies its **flexibility, ease-of-use, and adaptability** to meet customer needs. In close collaboration with our automation partners FINDER help ensure increased reliability, lowered costs, and more effective workflows. Our FINDER portfolio consists of **four different products**: FINDER 2D, FINDER 3D, FINDER Stereo and FINDER Tubes. FINDER is configured in terms of camera choice, scripting module, and number of cameras to suit your specific needs. FINDER **supports all the popular robot brands** as well as guidance of multiple robots and collision handling. All FINDER products have **the same user interface**, as well as the ability to mix 2D, 3D and Stereo.

FINDER stands as the ultimate robot guidance solution, regardless of your product.

Automotive

The **automotive industry** is heavily investing in the build-up of the **electric vehicles production**. This adds **new demands** on driveline, battery-manufacturing, and recycling, at the same time as the technical specifications on production up-time, through-put, and product quality remain. **FINDER's flexibility** and the possibility to make **customized solutions** for new and retrofit robot cells aids in a reliable transformation.



Machine tending

The robot picks engine and driveline goods, e.g. gear blanks, shafts, and bearing caps before machining. FINDER guides the handling of structured goods from conveyor or bin without fixturing, as well as in random bin picking.



Engine and driveline assembly

Many components arrive to the assembly robot cells in pallets, separated by spacers or dedicated blisters. FINDER guides the robot(s) picking the parts from the pallet(s) prior to pairing or placing them in the assembly fixture.

Press automation

FINDER is used to verify material position and orientation to ensure yield and avoid damaging the die. FINDER guides the handling of blanks and pressed sheet metal parts before welding or assembly, whether the products are stapled or hanging in a rack.



Painting and sealing

High quality painting and sealing of vehicle bodies requires 3D-positioning. FINDER locates the body based on one or several reference features and guides the robot(s) to the correct starting position(s).



Metal and machining

With the wide range of products, varying in size, shape, and type of material, the metal machining industry **requires a flexible manufacturing process**. The production systems must be **easy to use** for the operators. With FINDER, the most effective vision technology can be selected, and even a **mix of 2D and 3D vision** is supported, with the same user-friendly interface for all. Also, an inspection step can easily be added for subsequent **quality control** of the located products.

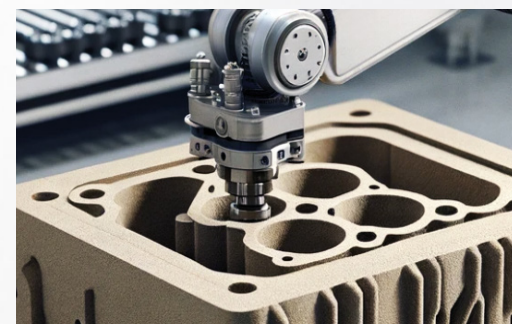
Foundry and forging

The foundry industry strives to increase the value of the delivered goods by improving the level of **product quality and refinement**. Automation is important to **minimize the hazards** of heavy and monotonous manual handling. FINDER provides a proven robot guidance solution for **various material handling and machining applications** using industrial cameras with rugged housings. The platform also allows for **vision-based quality inspection** as an optional feature.



Machine tending

Robots are used to load and unload various machines. Parts can enter the processing cell in a structured fashion (e.g. pre-processed products placed on spacers or in blisters), stacked (e.g. sheet metal profiles), or unstructured (e.g. cast or forged goods in pallets).

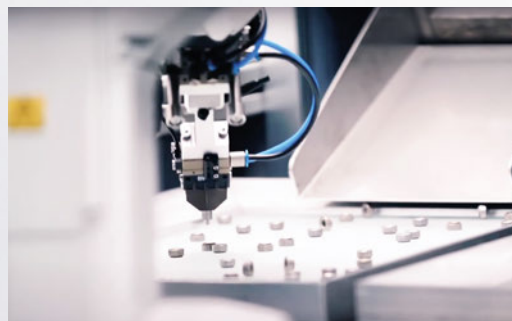


Sand core assembly

The precision of the positioning of the sand cores and flasks is crucial for high quality castings. FINDER provides the picking coordinates enabling automatic assembly in the flasks.

Assembly

Before assembly by welding, screwing, or some other method, the robot picks stacked or structured sub-components from e.g. conveyors or light tables. FINDER provides the products' positions and orientations for correct placing in the assembly fixtures.



Machine tending

The shape and appearance of castings and forged goods vary and require flexible production systems. FINDER locates the gripping points in automated handling before grinding and machining of both steel and aluminum products.



Plastics and rubber

Manufacturers in the plastic and rubber products industry are investing in automation technologies to **reduce production costs, improve productivity and enhance product quality**. FINDER provides **high performance position** of the parts and at the same time checks for e.g. adequate fill grade of the mold cavities or for products defects.

Consumer goods

Increasing the yield in consumer products manufacturing put **demands on cost-effective production and packaging methods**, quality control, and logistics in high-volume flows. The ability to **mix different camera technologies** and its adaptability make FINDER an **unbeatable option** for both the manufacturing process, and the quality control.



Material handling

In injection molding the production is characterized by short cycle times. The products are often semi- or unstructured in boxes or pallets and are located by FINDER before subsequent handling and refinement.

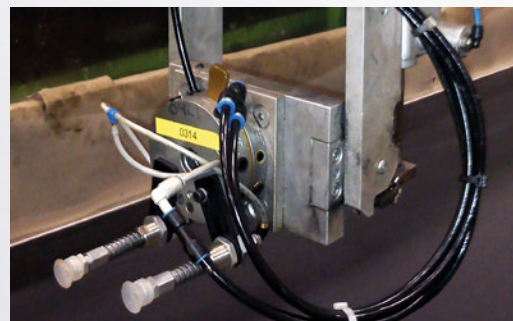


Packaging

With a wide range of products incoming on pallets or on conveyors the robot cell's task is to place the products in cardboard boxes and seal these before storage and transport. FINDER provides the correct coordinates and orientation of the products.

Assembly

The robot's main task is to place the plastic or rubber sub-components in the correct positions in the special mounting fixtures used for assembly. FINDER gives the robot the coordinates to pick parts from e.g. light tables in the various assembly processes.



Material handling

In the production of porcelain sanitary ware several products come mixed on cars moving through the kiln. FINDER is used to identify and to locate the different product types on the line to ensure type specific handling in the downstream processes.



FINDER 2D

FINDER 2D is the solution for **traditional robot guidance** when the products are **picked from a surface with known height**. It is outstanding when locating structured goods **on a conveyor or in a pallet**. Easy configured localization methods and gripper collision detection make the setup very **straight-forward**, which results in **short installation time**.

From conveyor or pallet

Straight-forward

Easy configuration





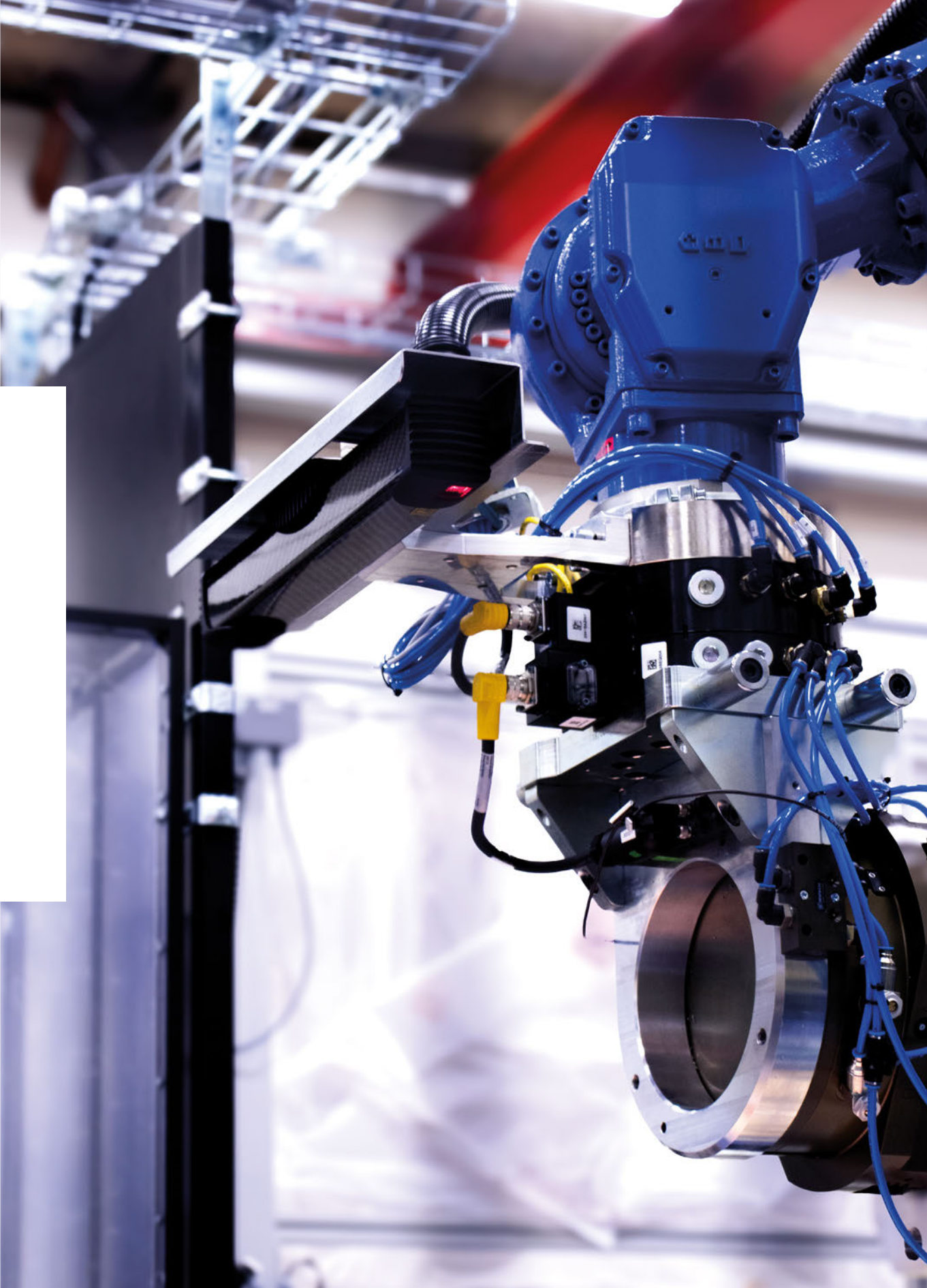
Fast and accurate

Layered pallet picking

Variation in product height

FINDER Stereo

FINDER Stereo is **perfect in layered pallet picking applications** or when there is **variation in product height**, providing 3D positions at a very **attractive price/performance ratio**. A unique matching method is used to provide **fast and accurate results**, and the configuration of the stereo camera pair is as easy as with FINDER 2D.



For complex shapes

Perfect for bin picking

Full 3D coordinate

FINDER 3D

FINDER 3D is excellent when **picking products with complex shapes** as well as for **bin picking applications**. It offers a full 3D coordinate and includes **advanced collision management** in 3D. In case the application requires **re-gripping**, one or several 2D cameras can easily be added to the system.



FINDER Tubes

FINDER Tubes is tailored to provide robot guidance solutions **specialized for picking of pipes, rods, and shafts**. By linear movement of the product or camera and **laser-based 3D scanning technology**, the robot is provided with **fast and lag-free 3D coordinates**.

Tailored product

Fast and lag-free

Full 3D coordinate

FINDER Partners

At Mabema, we work closely with our partners and have built a **solid partner network** with the **very best robot integrators** in the industry over the years. We specialize in machine vision based robot guidance, while our partners excel in automation solutions.

We value **long-term relationships** and believe in the importance of **ongoing communication** and **close collaboration** with our partners. In a typical automation project, you would purchase a robot cell from one of our partners, while we assist in **creating the best robot guidance solution** for your needs.

To increase the likelihood of a successful automation project, we also provide **support throughout the process, from sales to installation.**





Training

We offer training sessions to ensure that our partners have **in-depth knowledge** of machine vision and FINDER in general. Our basic training, **FINDER Basic**, is held several times a year and you can simply register for each session through our website.

We also offer **FINDER Medium, Advanced, and Scripting** sessions on request for those who feel confident in the basics of FINDER and want to learn more. For end customers and users, **we provide customized training sessions** based on specific applications and/or needs. We make sure **our partners are always kept up to date** with the latest in FINDER and are offered continuous participation in our FINDER training sessions free of charge.

Support and service

Support is primarily provided by our partners, who have extensive knowledge of the entire automation solution. At Mabema, **we offer technical support and service** to ensure that FINDER operates smoothly in production, including **model adjustments, calibration, spare parts, and more**.

As a customer, you can also sign a **service agreement** with us at Mabema. The service agreement **guarantees prioritized support** and includes annual service visits, software backups, discount on spare parts, as well as remote support.

We accept support tickets 24/7 via our website.



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