UNLEASH THE POWER

of Your AMR with off-the-shelf Mobile Robotic Equipment

ROEQ
ROBOTIC EQUIPMENT

Mobile Robotic Equipment Completes Your AMR Deployment

Autonomous mobile robots (AMRs) are a relatively new type of wheeled industrial robot that is used to collect, transport and deliver goods and packages in manufacturing and warehouse facilities around the world. But AMRs are not complete systems, ready-to-go out of the box.

To fully unleash the power of your AMR, you need to deploy Mobile Robotic Equipment (MRE) - the top rollers/conveyors, cart solutions, lifter solutions, accessories and software that make safe and effective AMR deployments possible.
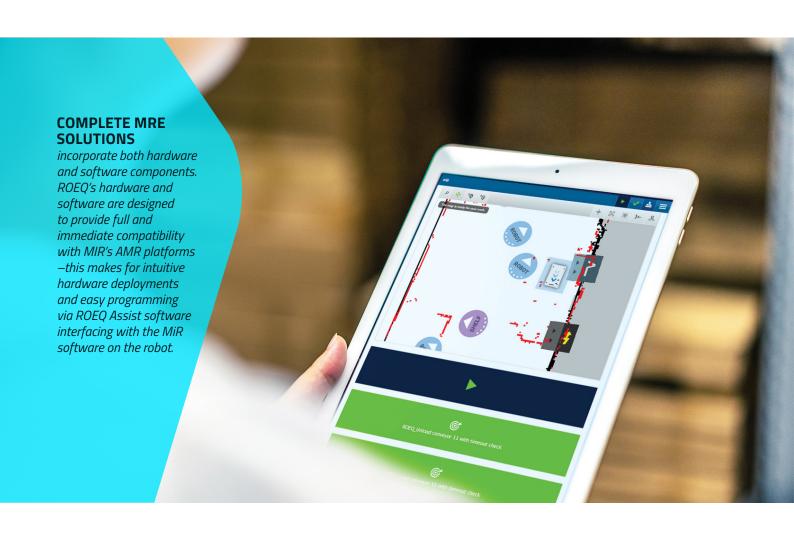
In this e-book, we'll explore the benefits of ROEQ standard MRE hardware, software, and customer support offerings, reveal the safety perils and false economies of DIY/customized MRE and demonstrate how ROEQ's pioneering MRE solutions can improve productivity and drive profits while ensuring a safe environment for workers.

Increasing AMR Adoption & Growing Online Retail Numbers Drive MRE Development

The global market for AMRs, which was valued at USD 1.61 billion in 2021, is expected to reach USD 22.15 billion by 2030, according to a recent report from market analysts Next Move Strategy Consulting. Meanwhile, the analysts at Grand View Research predict that the global AMR market will see a CAGR of 16.8% from 2022 to 2030.

Retail e-commerce sales in the United States are also on the rise with revenue estimated at roughly USD 768 billion U.S. dollars in 2021. The Statista Digital Market Outlook forecasts that by 2025 revenue will exceed 1.3 trillion dollars.

With more goods and packages requiring collection, transportation and delivery than ever before, it's critical that manufacturing and warehouse facilities select and deploy the safest and most efficient MRE solutions.

COMPLETE MRE SOLUTIONS
incorporate both hardware and software components. ROEQ's hardware and software are designed to provide full and immediate compatibility with MIR's AMR platforms –this makes for intuitive hardware deployments and easy programming via ROEQ Assist software interfacing with the MiR software on the robot.

What is Standard Mobile Robotic Equipment (MRE)

AMRs are exciting mobile platforms for automating goods transport, but they are not complete systems. Just as industrial robot arms need end-effectors to perform even the most basic of applications, AMRs need MRE hardware and software to perform basic collection, transportation, and delivery tasks.

MIR are pioneers in the realm of AMR development, and ROEQ is a pioneer in the design and development of standard MRE and accompanying software. And as MIR releases new AMR solutions, ROEQ releases new MRE, closely following MIR's new products and features.

MRE from ROEQ is not just fully compatible with your AMR, it also supports and enables AMR deployments that are fully compliant with applicable safety regulations. DIY/ customized MRE, by contrast, provides no such assurances.

The versatile TML200 can pick up and transport pallets, carts, crates, shelves etc

ROEQ TML200 Top Module with matching accessories (see example above), is a complete, flexible, top module solution designed to work seamlessly with the MiR250 from Mobile Industrial Robots. The TML200 creates exciting deployment possibilities since it can easily lift and transport crates, pallets, racks and even shelf carts to pre-defined locations. The system comes with a built-in cargo sensor for detecting the load on the module, which prevents errors during pickup tasks.

ROEQ cart and rack solutions are designed to eliminate the cost, complexity, and safety hazards generated by customized cart/rack systems. ROEQ solutions come with a set of pre-configured safety zones that enable your AMR to navigate your facility safely. And by leveraging the power of ROEQ Assist Software, which automatically chooses footprints and generates missions, the goal of safe and highly effective mobile robot deployments can be achieved.

EXPERT INSIGHT

"Without top modules, carts, and other mobile robotics equipment, autonomous mobile robots couldn't do what they're meant to do: easily, efficiently and safely perform multiple material handling tasks across manufacturing facilities and warehouses."

Ed Mullen
Vice President of Sales at AMR maker
Mobile Industrial Robots (MiR)
North America.

"The appropriate MRE is absolutely essential for a successful AMR deployment. Just like installing a traditional six-axis robot with the appropriate end effector, designing and/or selecting the right MRE to interface the AMR with your product completes the hardware design of the robot system."

Dana Poling
Robotics Business Developer at
C&E Advanced Technologies.

ROEQ cart solutions

provide AMRs with the tools they need to complete their missions. Here, an AMR fitted with ROEQ's top module and S-Cart500 Ext solution is shown autonomously navigating its way through a large facility to pick up goods for transport. Extended cart solutions from ROEQ are designed to increase tilt stability, enabling the transport of payloads that extend over the edge of your AMR. The E-Stop button is easy to access even when your application involves extended loads.

The Process

Complete AMR application solutions consist of three layers incorporating hardware, software and customer support throughout the application development and deployment process. ROEQ's complete AMR deployment solutions have been engineered to make the entire process as simple as possible, which means less downtime, improved ROI, and in-built safety capabilities.

1 Start the process by defining the scope of your application. Where do you need mobile automation? How will goods be presented to your AMR? Where will goods be dropped off and how? What payloads and dimensions are involved? What type of environment will the AMR be operating in? How will an AMR navigate your facility safely?

2 Select the MRE-AMR combination best-suited to your application, always keeping in mind their combined functionality. This will allow you to determine which MRE-AMR pairing can meet your application requirements. It also helps to ensure a safe deployment.

! **TIP:**
MRE and AMR belong together. Avoid the temptation to purchase an AMR and worry about MRE later.

3 Integrate your MRE and AMR hardware. ROEQ's hardware is designed for easy deployment on both the hardware and software sides. So, in most cases, this step involves simply clicking or fixing your MRE hardware into place and running ROEQ Assist software.

4 Ensure safety. Safety considerations are key to an effective automation deployment. Leveraging the power and simplicity of ROEQ Assist software, ROEQ top modules activate the correct safety zones for your application, ensuring compliance with safety standards and guidelines for mobile robot deployments.

5 Test and tweak the system. ROEQ hardware and software enables easier set up and testing. Local and global support is available if you have queries.

6 Showtime. Your MRE and AMR are fully integrated, tested, and all safety concerns have been addressed, so it's time to deploy.

7 Enjoy the rewards of mobile automation: increased throughput and productivity, enhanced safety and improved operational efficiency, to name just a few.

8 Stay empowered, effective, and informed. In collaboration with its global partner network, ROEQ provides application consulting and support services throughout the entire mobile application lifecycle.

Whether you need feedback on early application designs, guidance on safety, or advice on how to maintain a successful application deployment, ROEQ is ready to assist.

Contact ROEQ directly here >>>

Standard MRE vs DIY/Customized MRE

Building and deploying quality MRE is not a simple engineering challenge. Your MRE has to be fully compatible with your AMR, there are safety regulations to comply with, and the entire system should be easy to use.

In fact, many of ROEQ's customers are former DIYers who have discovered the limitations and false economies of developing their own MRE. To put it bluntly, customized MRE is often more expensive, complex, and time-consuming than simply deploying standard MRE that's ready to go out of the box.

ROEQ's MRE and software eliminate the development and deployment costs that come with building your own MRE, which, in turn, greatly reduces your total cost of ownership and speeds your return on investment.

EXPERT INSIGHT

"ROEQ's customers have realized that if they don't stick to the standard MRE environment that we have created, what seems very, very simple, is actually not all that simple. Developing systems that are safe, robust, reliable, and effective involves taking on multiple, multi-layered engineering challenges. ROEQ has overcome those challenges enabling us to provide our customers with industry-proven MRE systems that are ready to deploy out-of-the-box."

Carsten Sørensen
Partner, ROEQ

Investing in quality, professionally engineered MRE also ensures lower integration, service, support, and maintenance costs, while at the same time ensuring faster deployment times.

Standard, professionally engineered MRE enable compliance with international safety standards and regulations governing AMR deployments. Customized MRE may or may not achieve compliance with applicable safety regulations, but it's going to take a significant amount of time and money to get to that point.

Customized MRE can lead to safety hazards. For example, mobile robots require an emergency stop button that is within 60cm reach so a worker can easily stop the robot if necessary. Almost invariably, customized top modules are either too large themselves to meet that requirement, or they are set up to carry material that is too large to allow access to the emergency stop button. ROEQ's extended top module places the emergency stop button within easy reach even when loaded with oversized goods.

ROEQ has engineered MRE that is fully complaint with safety regulations out-of-the-box, eliminating the need for companies to reinvent the wheel - and potentially jeopardize worker safety - by customizing their own MRE.

Safety

Safety is paramount. ROEQ MRE is developed with safety in focus - products and solutions include safety features and functions, for safe and reliable AMR-MRE deployments.

Standards such as ISO 3691-4 have been incorporated into ROEQ designs. This results for example in built-in safety functions on ROEQ top roller modules. These safety functions protect workers from injury by ensuring safe transferal of goods between robot and conveyor station and they ensure safety whilst goods are transported on the robot.

This focus on safety leverages safe deployment of the AMR technology

By definition, customized MRE also comes from outside the ecosystem of the AMR you have invested in, which almost inevitability leads to performance issues.

In the vast majority of cases, attempting to develop your own MRE turns out to be a false economy and companies that take the DIY route tend to regret it later.

For all of these reasons, companies turn to ROEQ for safe, standardized, fully compatible, industry-ready MRE for material handling applications.

EXPERT INSIGHT

"With the expansion of capabilities in the AMR market, having developed MRE allows for a greater variety of solutions and industries to get up and running quickly at a lower cost with a greater ROI. The ability to pull completely developed solutions into the manufacturing space without the time and expense of design and fabrication allows for a manufacturing facility to realize an improved workflow in a shorter amount of time."

Cale Harbour
Vice President of Product Marketing at Advanced Control Solutions LLC

"An AMR is incapable of transporting the finished products on its own; it requires the means to place the finished products on top of it which is accomplished through the MRE. Thankfully, the variety and standardized ROEQ top modules developed for each MiR product allow tailormade solutions for every customer while using standard, safe, and the regulated MiR-ROEQ pairs, thus improving project's return on investment and decreasing total cost of ownership."

Laurent Jabre
Director, Integrated Control Solutions

Quality Engineering

ROEQ is laser focused on R&D and engineering of high quality MRE systems that enable manufacturing and warehouse facilities to deploy mobile robots safely, quickly, and effectively. Our detailed understanding of today's goods transportation requirements enables us to pioneer new MRE technology solutions for MIR's AMR platforms.

ROEQ GuardCom enables safe, effective and reliable transfer of goods between AMRs and conveyor stations via coded light sensors that provide seamless communication between the equipment.

GuardCom is ROEQ's innovative solution for improving safety and performance when transferring goods between AMRs and conveyor stations. It works together with the ROEQ Top Roller modules and uses coded light sensors to ensure the safe transfer of goods (unlike competing systems, which typically use unreliable WIFI for communication). In 2021, GuardCom was included in Robotics Business Review's RBR50 Robotics Innovation Awards.
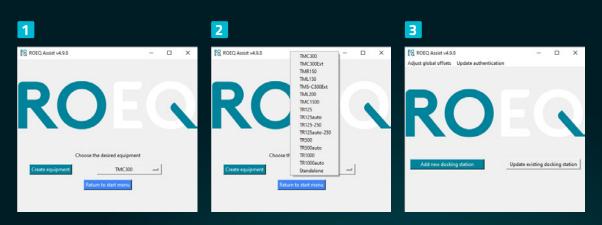
Deceptively Simple Engineering Speeds Deployment, Improves Performance

Quality MRE has safety and ease of use in focus. The red safety button (shown here on the top module) allows the AMR to be deployed on applications where the load is longer than the robot, as the emergency stop button is designed to be easy to reach. Meanwhile, ROEQ Assist enables easy and consistent generation of missions with correct choice of robot footprints, allowing end-users to get transport applications up and running quickly.

ROEQ Assist provides powerful functionality through an intuitive user interface, enabling fast and safe mobile automation deployments.

Proven Technology

ROEQ's MRE solutions have been deployed worldwide and are proven to improve AMR performance and enhance safety across several verticals.

For example, Tyco Electronics deployed six MiR200 AMRs fitted with MRE from ROEQ to increase efficiency in its intralogistics operations. To unleash the power of its AMRs, the company selected three ROEQ TMC300 top modules, 15 ROEQ Cart300E Easy-Pull-Out carts and 10 Easy-Pull-Out docking stations.

The cart's patented fastening mechanism allows safe connection to both the robot and the dock. The deployment has enhanced safety, improved performance, and increased the overall efficiency and throughput of Tyco Electronics' material handling processes.

Elsewhere, Global automotive supplier Visteon Corporation deployed AMRs from MIR fitted with ROEQ top module and Cart300E cart solution to supply raw materials to SMT machines, transport parts from injection molding machines and collect waste. The MRE was easy for Visteon to install thanks to its friendly end-user interface and provided rapid ROI.
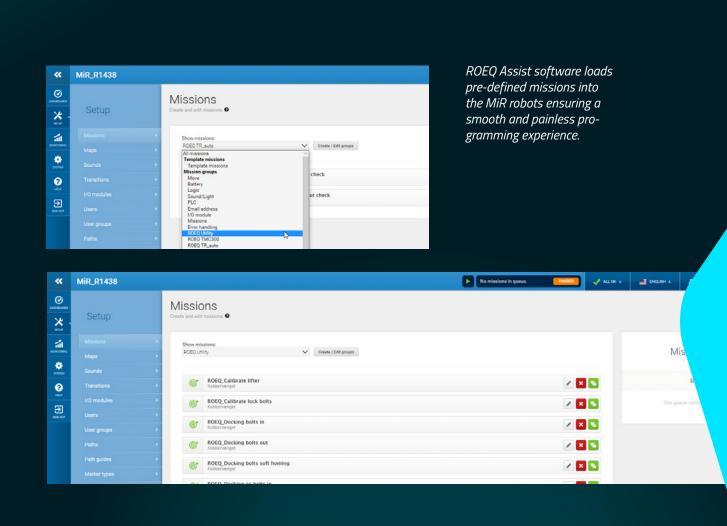
Global deployments mean global product development. Working closely with integrators and end-users, ROEQ constantly feeds end-user insights and requirements into our R&D and product development strategy.

ROEQ provides service and support throughout the application deployment process. Our partner network is global, trained and certified to quickly respond to local end-user needs from application design consulting services to application testing and deployment services.

Complete Your Deployment with ROEQ Assist Software

ROEQ Assist software is an important component of ROEQ's MRE solutions and the final layer in a complete AMR deployment. Designed to simplify integration, enhance productivity, and enable easy setup, ROEQ Assist software loads pre-coded missions into the MIR robot, which can then be modified in the MIR interface, resulting in quick and consistent application deployments for robust AMR setups throughout the facility.

ROEQ Assist has gone through years of development, closely following the progress of MIR's AMR technology platform. For example, pre-defined footprints in ROEQ Assist ensure that the footprint of your AMR deployment is correct and together with the predefined safety zones - which are automatically activated by ROEQ top modules - your robot can safely navigate its missions.

ROEQ Assist software loads pre-defined missions into the MiR robots ensuring a smooth and painless pro-gramming experience.

READY TO LEARN MORE

about how complete MRE-AMR solutions can
enhance productivity and improve your bottom line?

Contact ROEQ directly here: roeq.dk/contact

**Find a local contact through
ROEQ's global partner network here >>>**

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