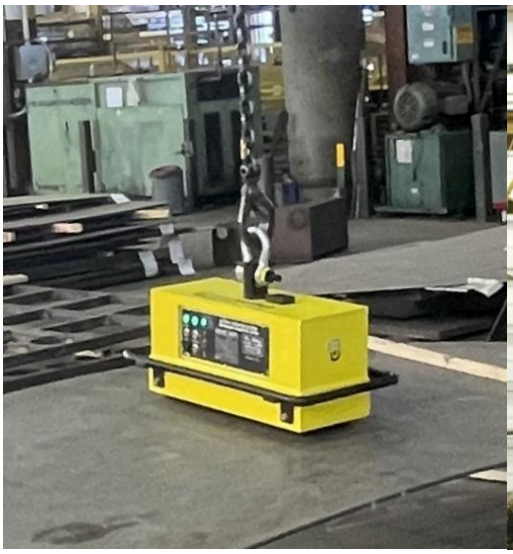
AT EVERY STEP OF THE

CE Lifters Operation Manual

CE 6600 / CE 11000



CE LIFTERS	Lifting Capacity @SWL 3:1 [lb/kg]	Dimensions LxWxH [in/mm]	Weight [lb/kg]
CE 6600	6,600lb 3000kg	26x11x13 (in) 660x280x332 (mm)	419lb 190kg
CE 11000	11,000lb 5000kg	29x16x16.7 (in) 742x410x398 (mm)	1,146lb 520kg

***The Safe Working Load (SWL) is given by the maximum tear-off force divided by a safety factor of 3.**

***IMPORTANT note*: ASME B30.20 standards take precedence over all data provided.**

We strongly advise operators to be familiar with this standard prior to using any underhook lifter.

- **Do not actuate the tool off target.**
- **The magnetic surface of the lifter must be fully covered by the target when it is actuated.**
- **Reference the chart to see reduced hold force on thinner material.**
- **Ensure the surface is clean and free of debris to maximize magnetic hold.**

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CONTENTS

1 GENERAL

1.1 OPERATING INSTRUCTION MANUAL

It is obligatory for the product manufacturer to make documentation about the entire equipment according to the Technical Report DIN 146.

The operating instruction manual provides important instructions for safe and efficient handling and forms the basis of all operations on and with the lifter. It may be considered as a part of the lifter. Thus, store the operating instruction manual in its immediate vicinity to ensure access for the employees working with the lifter at any time required.

The basic prerequisite for safe working with the lifter is compliance with all the given safety and operating instructions.

IMPORTANT note ASME B30.20 standards take precedence over all data provided. We strongly advise operators to be familiar with this standard prior to using any underhook lifter.

1.2 SIGNS, ABBREVIATIONS, TERMS

In this document, signs, abbreviations and special terms are used with the following meaning:

⍰	See under
▶	Enumeration
–	Enumeration
1	Item number
1.	Action steps
Text in italics	Explanations of matters
🕮	Reference to a document included in the document delivered. The location in the document is indicated in italics after the symbol.

1.3 EXPLANATION OF SYMBOLS

Warning and safety instructions

Warning and safety instructions in the manual are marked by pictograms and highlighted in grey.

Warning and safety instructions, which point to basic dangers, are additionally supplemented by SIGNAL words describing the extent of damage. These are structured as follows.

SIGNAL WORD!

Origin of danger.

Consequences of ignoring danger.

– Code of behavior to prevent danger.

- Observe, in every case, all the warning and safety instructions!
- While working, act prudently to avoid accidents, damage to people and objects!

The pictograms in connection with the signal words signify:

DANGER!

Indicates an imminently hazardous situation which, if not avoided, *will* result in death or serious injury. This signal word is reserved for the most extreme situations.

WARNING!

Indicates a potentially hazardous situation which, if not avoided, *could* result in death or serious injury. This is used for significant risks that are not as immediate as those labeled "DANGER."

CAUTION!

Indicates a potentially hazardous situation which, if not avoided, *may* result in minor or moderate injury. It may also be used to alert against unsafe practices.

IMPORTANT!

Points to a possible hazardous situation, which if not prevented, may cause material damage.

Advice and Recommendations

NOTE!

Indicates important information that is not related to personal injury but is essential for proper operation, maintenance, or understanding of the equipment. This may include tips, recommendations, or reminders.

Special safety instructions

In order to point to special dangers, the following pictograms are used in connection with safety instructions:

Electrical Hazard

Indicates the presence of high voltage.

Failure to follow safety instructions *will* result in the risk of electric shock, which may cause serious injury or death.

Crush Hazard

Indicates a risk of injury from moving or mechanical parts.

Failure to follow safety precautions *could* result in serious crushing injuries

Hot Surface Hazard

Indicates the presence of hot surfaces.

Contact may cause burns or serious skin injuries. Allow surfaces to cool before handling.

Falling Object Hazard

Indicates a risk of injury from dropped or falling parts.

Failure to follow safety instructions *may* result in serious injury or death due to impact from falling components.

1.4 RESTRICTION OF LIABILITY

All data, notes and instructions in this manual were created taking into account the current standards and provisions, the state of the art, as well as our long-term knowledge and experience.
The manufacturer does not accept any liability for damages due to:

- ► Ignoring the operating instruction manual
- ► Unintended use
- ► Deployment of not trained and not instructed personnel
- ► Unauthorized changes
- ► Technical modifications
- ► Use of not recommended spare parts

The obligations agreed upon by contract, the manufacturer's General Terms of Business as well as Delivery Conditions and the legal provisions being valid at the date of signing the contract shall apply.

1.5 SERVICE

As for any technical consultation, contact RMA and Magswitch applications engineers.
For more information, contact Magswitch at +1.303.468.0662 or via magswitch.com.

Moreover, our employees are permanently interested in latest information and experience resulting from applications, which may be useful for the improvement of our products.

1.6 COPYRIGHT

2 SAFETY

This section outlines critical safety considerations designed to protect personnel from potential hazards and to promote safe, reliable operation of the equipment.

Failure to follow the safety guidelines, warnings, and instructions provided in this manual may result in serious injury or death. Always read and understand all safety information before operating or servicing the equipment.

2.1 INTENDED USE

The lifter is exclusively designed for the following use in industrial applications:

The lifter is designed for in-plant transport of sheet metal and other materials suspended from a hook, within the operational limits specified in the Technical Data section.

Always operate within the defined load capacities and movement parameters to prevent equipment failure or personal injury.

WARNING! - Risk of Injury Due to Improper Use!

Use of the Lifting system in any manner other than its intended purpose may result in serious injury or death.

► Operate the lifter only as specified in this manual, and strictly within the application limits defined in the Technical Data section.

► This equipment must be used in accordance with the ASME B30.20 standard for "Below-the-Hook Lifting Devices," which outlines proper operation, inspection, maintenance, and training requirements.

WARNING! - Unauthorized Use and Modification Prohibited!

► Use of the lifting system for any purpose other than that explicitly described in this manual is strictly prohibited.

► Operating outside the defined scope may result in hazardous conditions, equipment failure, or serious injury.

► Do not modify, retrofit, or alter the design or any individual component of the lifting system.

► Changes intended to expand or alter the range of application or utility are not permitted and violate the requirements of ASME B30.20, which governs the safe design, inspection, testing, and operation of below-the-hook lifting devices.

► Always follow the manufacturer's specifications and safety guidelines to ensure compliance and safe operation.

► Any claims regarding damage arising from unintended use will not be accepted.
► For any claim due to unintended use the user alone is to be held liable.

2.2 REASONABLY FORESEEABLE MISUSE

WARNING! - Risk of Injury Due to Misuse!

Misuse of the lifter may cause hazardous situations for persons and severe material damage.

► Improper use of the lifting system may result in serious injury to personnel and significant damage to equipment or materials.

► Never misuse the lifter.

► The lifter is not designed or approved for lifting or transporting people or animals under any circumstances.

► Use of this equipment must comply with the intended purpose as defined by the manufacturer and in accordance with ASME B30.20, which prohibits the use of below-the-hook lifting devices for lifting living beings.

2.3 USER'S RESPONSIBILITY

User

A user of a below-the-hook lifting device is any individual or entity responsible for the operation, supervision, or delegation of use of the equipment. This includes those who:

Operate the device directly,

Authorize or assign its use to third parties,

And retain responsibility for ensuring safe operation, proper training, and compliance with applicable safety standards.

The user is responsible for ensuring that all personnel involved in the use of the lifting system are trained, qualified, and operate the equipment in accordance with the manufacturer's instructions and the requirements of ASME B30.20, ASME BTH-1, and applicable OSHA regulations.

⚠ User Responsibilities

Safe Operation of Lifting System

The lifting system is intended for industrial use only. The user is responsible for ensuring compliance with all applicable occupational

safety regulations, including those mandated by OSHA, ANSI, and ASME B30.20.

In addition to the safety instructions provided in this manual, the user must adhere to all relevant local, national, and industry-specific safety, accident prevention, and environmental protection regulations applicable to the use of below-the-hook lifting devices.

The user shall:

- Stay informed of current occupational safety and health regulations applicable to lifting operations.
- Conduct a site-specific risk assessment to identify additional hazards based on the actual working environment and application conditions.
- Ensure compliance with all statutory and regulatory requirements for the safe operation of the lifting system at the worksite.
- Review and update internal operating procedures regularly to reflect current safety standards, regulations, and site conditions.
- Revise operating instructions as needed to align with updated laws, standards (including ASME B30.20), and operational changes.
- Clearly assign responsibilities for installation, operation, maintenance, and cleaning of the lifting system.
- Ensure all personnel working with or near the lifting system have read, understood, and received training on the operating manual and associated hazards.
- Provide appropriate personal protective equipment (PPE) as required by OSHA and recommended by the manufacturer, and ensure its proper use.

Additionally, the user shall:

- Maintain the lifting system in a safe and fully functional condition.
- Perform maintenance at intervals specified by the manufacturer.
- Inspect all safety features and components regularly to verify proper operation and integrity.

2.4 PERSONNEL'S RESPONSIBILITY – Safe Use of Lifting System

The lifting system is intended for use in industrial environments, and all personnel involved in its operation, maintenance, or handling are subject to applicable occupational safety regulations, including those outlined by OSHA, ANSI, and ASME B30.20.

In addition to the safety instructions provided in this manual, personnel must comply with all relevant safety, accident prevention, and environmental protection regulations applicable to the worksite and the equipment.

Each employee shall:

► Stay informed about current labor protection and workplace safety regulations relevant to lifting operations.

► Follow all conduct and operational requirements as specified in the manufacturer's instructions and site-specific procedures.

► Perform assigned duties related to operation, maintenance, and cleaning of the lifting system in accordance with established safety protocols.

► Read and understand the operating instruction manual prior to beginning any work involving the lifter.

► Use all required and recommended personal protective equipment (PPE) as mandated by OSHA and site-specific safety policies.

Additionally, personnel are responsible for ensuring that:

► The lifting system is maintained in safe working condition at all times.

► Scheduled maintenance is performed according to the intervals specified by the manufacturer.

► All safety features and components are regularly inspected to confirm full functionality and compliance with ASME B30.20 standards.

2.5 PERSONNEL'S REQUIREMENTS – Qualification and Conduct

Fundamentals

All tasks involving the lifting system must be performed only by individuals who are trained, qualified, and physically and mentally capable of carrying out their assigned duties safely and reliably.

Personnel must:

► Be competent and authorized to perform tasks related to the operation, maintenance, or inspection of the lifting system.

► Not perform any work under the influence of alcohol, drugs, or medications that may impair judgment, coordination, or reaction time.

► Meet all age, occupational, and legal requirements applicable to the worksite and the specific tasks assigned.

► Comply with all site-specific safety policies and regulatory requirements as defined by OSHA, ASME B30.20, and other applicable standards.

Qualification

WARNING! – Inadequate Qualification May Cause Injury!

► Only trained and qualified personnel shall perform tasks involving the lifting system.

► Improper handling by unqualified individuals may result in serious injury or equipment damage.

Authorized Personnel

Individuals who have received documented instruction specific to their assigned tasks and the associated hazards.

They must demonstrate understanding of the equipment, procedures, and safety measures before performing any work involving the lifting system.

Qualified Personnel

A qualified person is defined as someone who, by possession of a recognized degree, certificate, or professional standing, or by extensive knowledge, training, and experience, has successfully demonstrated the ability to perform assigned tasks safely and in compliance with applicable regulations.

This includes the ability to identify existing and predictable hazards and take appropriate corrective actions.

Qualified Electricians

Only qualified electricians are permitted to perform work in the battery installation area.

A qualified electrician is an individual who, through formal training and experience, is familiar with the construction, operation, and hazards of electrical equipment and installations, and is capable of identifying and avoiding risks such as electric shock, arc flash, and contact injuries, in accordance with NFPA 70E, OSHA 1910 Subpart S, and ASME B30.20.

Unauthorised Persons

WARNING! – Unauthorized Personnel Prohibited!

- ► Untrained or unauthorized individuals are not permitted within the operating area of the lifting system.
- ► Such individuals may be unaware of existing hazards and pose a risk to themselves and others.
- ► Restrict access to the work zone to authorized and trained personnel only.
- ► If unauthorized persons are present, halt all operations immediately until the area is secured.
- ► Politely instruct unauthorized individuals to leave the hazardous area.

2.6 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Requirements:

To minimize the risk of injury during operation, maintenance, or inspection of the lifting system, personnel must wear appropriate personal protective equipment (PPE) as required by OSHA 29 CFR 1910 Subpart I, ANSI/ISEA standards, and site-specific safety protocols.

General Requirements:

- ► PPE must be worn at all times when working in or around the lifting system.
- ► Don PPE before beginning any task, and ensure it is properly fitted and maintained.

► Observe posted PPE signage and pictograms within the work zone; these indicate mandatory protective equipment based on task-specific hazards.

As a rule: Wear the PPE.

Required PPE Includes:

Protective Clothing

Wear close-fitting, tear-resistant workwear with snug sleeves. Avoid loose garments, jewelry, or accessories that could become entangled in moving parts.

Safety Gloves

Use industrial-grade gloves to protect hands from abrasions, cuts, punctures, and other contact-related injuries.

Safety Footwear

Wear steel-toe or impact-resistant safety shoes to prevent injuries from dropped objects and slips on slick surfaces.

Hard Hat

Use an industrial safety helmet to protect against head injuries caused by falling or flying objects.

Hearing Protection

Wear earplugs or earmuffs in high-noise environments to prevent hearing damage.

Safety Goggles or Face Shield

Protect eyes from flying debris, splashing liquids, and compressed air discharge.

2.7 HAZARD IDENTIFICATION AND RISK MANAGEMENT

The lifting system has undergone a formal risk assessment in accordance with applicable safety standards. Identified hazards have been mitigated or eliminated where feasible. However, residual risks remain and are outlined in the following section.

To ensure safe operation:

► Always follow the warning labels, safety instructions, and operational procedures provided in this manual.

► These measures are essential to prevent injury, equipment damage, and unsafe working conditions.

2.7.1 RISKS BY MECHANICAL HAZARDS

Moving Parts

WARNING! – Moving parts can cause serious injury!

► Keep all personnel away from the hazardous area.

- Do not disable, modify, or bypass any safety devices or functions.
- Before entering the hazardous zone, disconnect the power supply and lock out/tag out to prevent accidental re-energization.
- Ensure all moving components have come to a complete stop after power is disconnected before beginning any work in or near the danger zone.

Crushing Spots on Moving Parts

WARNING! – Crushing Hazard!

- Moving parts can cause serious injury or death.
- Do not operate, service, or troubleshoot the equipment without proper training.
- Keep hands, feet, and other body parts away from moving components during operation.
- During setup, maintenance, or troubleshooting, stay alert and exercise extreme caution near pinch points and crushing zones.
- Always wear appropriate personal protective equipment (PPE) when working in hazardous areas.
- Never walk under a suspended load or move a suspended load above people or equipment.

2.7.2 RISKS BY BATTERY HAZARDS:

Battery power supply

DANGER! Electrical Hazard - Battery Power Supply

Risk of severe injury, fire, or equipment damage due to improper handling of battery power.

- Do not touch both positive (+) and negative (–) terminals simultaneously. This may cause short circuits, damage to the battery, or failure of insulation and components.
- Before beginning any installation work, disconnect the battery power supply. Always verify that power is fully shut off.
- Before performing maintenance, cleaning, or repairs, switch off the battery power and lock out/tag out the power source to prevent accidental re-energization.
- If any damage is found in the battery insulation or wiring, immediately shut down the system and contact qualified service personnel.
- Never bypass or disable fuses.
- Replace blown fuses only with new fuses of the same type and rating.

- ► Protect all live components from exposure to moisture and humidity.
- ► Only qualified electricians are permitted to work on battery installations.

2.7.3 RISK BY DROPPING PARTS:

WARNING! Falling Object Hazard

Risk of serious injury or death from falling parts during operation.

- ► Do not enter the danger zone while equipment is in operation.
- ► Never stand or work beneath suspended loads.

2.7.4 Risks with pacemakers or active implants

DANGER! Magnetic Field Hazard

Strong magnetic fields may interfere with medical implants and pose serious health risks.

- ► Persons with pacemakers or other active implants must not enter areas with magnetic fields.
- ► Maintain a safe distance from magnets at all times.

2.8 SAFETY DEVICES

WARNING! Safety System Tampering Hazard

Disabled or malfunctioning safety systems cannot provide protection and may result in serious injury.

- ► Before beginning work, verify that all safety systems are properly installed and fully operational.
- ► Never disable, bypass, or tamper with safety systems.
- ► Ensure safety systems remain unobstructed and easily accessible at all times.

NOTE!

For safety installation instructions, please refer to Chapter 4: Design & Function

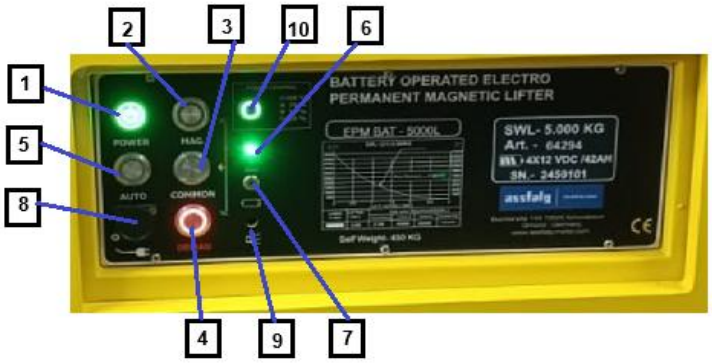
Warning Devices

➢ **Emergency STOP switch**

- The lifter is equipped with two safety features.
- The battery ON/OFF Push switch may be used in emergency to cut-off supply to the lifter.

➢ **Warning lights with acoustic warnings**.

Short acoustic alerts, which are integrated into the optical warning signals, indicate magnetization-demagnetization – Inching or error.



Front Side	
(1) Power on Push Button.	(6) ADPREM Indication (Green).
(2) MAG Push Button.	(7) Low Battery Indication - (Red).
(3) Common Push Button.	(8) Battery Charging Point.
(4) Demag Push Button.	(9) Buzzer.
(5) Auto Push Button.	(10) Power Control.

System Error - Immediate Action Required

When all indicator lights illuminate and an audible alert sounds simultaneously, a system fault has occurred.

Follow these steps:

- Lower the load safely.
- Secure the load to prevent movement or instability.
- Shut down the lifting system by switching off the power supply.
- Contact qualified service personnel to inspect and resolve the issue.
- Do not resume operation until the fault has been diagnosed and corrected by authorized personnel.

➢ **Safety Button - YELLOW / COMMON Button**

The yellow safety button is located on the remote controller and the front panel has the COMMON button. This ► button has always to be pressed in addition to either MAG-button green or DEMAG -button red. This is necessary to prevent unintentional actuation of a function.

➢ **ADPREM - Safety Feature**:

Automatic **D**emagnetization **PRE**vention **M**echanism (ADPREM)

This safety installation prevents the EPMagnet lifting system from getting demagnetized under load.

The magnetic bolt on the shackle of the load eye releases the control through the proximity switch (Reed-switch) on the top of the lifter only, when the load-lifting chains are slacked off and the magnetic bolt gets closely positioned to the Reed-switch.

2.9 SPARE PARTS

Original spare parts can be directly purchased from Magswitch Technology Group.

WARNING! - Use of Non-Approved Spare Parts May Cause Injury or Equipment Failure

- ► The use of unauthorized or incompatible spare parts can compromise the safety, reliability, and performance of the lifter system.
- ► Only use original or manufacturer-approved spare parts to ensure compliance with safety standards and maintain proper system function.

2.10 SECURING AGAINST RE-CONNECTING

WARNING! - Hazard from Uncontrolled Reconnection

Unauthorized re-energizing of the lifting system during maintenance or servicing may result in serious injury.

- ► Follow lockout/tagout procedures as outlined in the “Actions to Be Taken” section of this manual, in accordance with OSHA 29 CFR 1910.147.
- ► Before working on components, subassemblies, or individual parts, ensure the system is properly isolated and secured against accidental restart.

2.11 EMERGENCY RESPONSE PROCEDURES

Preventive Measures

To ensure readiness in the event of an emergency:

- ► Maintain readily accessible first-aid supplies (e.g., first-aid kits, emergency blankets) and fire extinguishers in the work area.
- ► Ensure all personnel are trained in emergency procedures, including alarm signals, first aid, and use of rescue equipment.
- ► Keep emergency access routes clear at all times for fire and medical response vehicles.

In the Event of an Emergency

If a hazardous situation or accident occurs:

- ► Immediately disconnect power using the Battery ON/OFF push switch.

- ► Administer first aid as appropriate.
- ► Evacuate injured persons from the danger zone, if it is safe to do so.
- ► Notify the designated on-site supervisor or safety officer.
- ► For serious injuries or fire, dial 911.
- ► Ensure access roads remain unobstructed for emergency responders.

2.12 SAFETY LABELS AND SIGNAGE REQUIREMENTS

The lifting system is equipped with safety labels, pictograms, and warning signs to identify potential hazards and communicate essential safety information to operators and nearby personnel.

Illegible Signs

WARNING!

Illegible or Missing Safety Labels:

- ► Can lead to Injury.
- ► Damaged, faded, or unclear safety signs may fail to properly identify hazardous areas or conditions, increasing the risk of injury.

To maintain compliance and safety:

- ► Ensure all safety labels, warning signs, and operating instructions remain legible and intact.
- ► Immediately replace any damaged, defaced, or missing labels or pictograms.
- ► Regularly inspect signage as part of routine maintenance and safety checks.

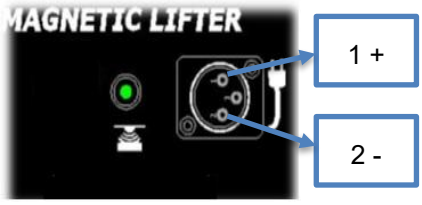
3 TECHNICAL DATA

3.1 DIMENSIONS-WEIGHTS-LOADS DIMENSION

Type	CE 6600	CE 11000
Length [in/mm]	25.98in, 660mm	29.21in, 742mm
Width [in/mm]	11.02in, 280mm	16.14in, 410mm
Height of Body [in/mm]	13.07in, 332mm	15.67in, 398mm
Recommended Lifting Capacity @SWL 3:1 [lb/kg]	**6,600lb** **3,000kg**	**11,000lb** **5,000kg**
System weight [lb/kg]	419lb, 190kg	1,146lb, 520kg

3.2 BATTERY CONNECTIONS:

Specification	Value	Unit
Voltage / Ah/ Nos. CE 6600 CE 11000	 12 / 42 / 2 12 / 42 / 4	 V / A / Nos V / A / Nos
Admissible Voltage Tolerance	± 5	%
Rated Current	32/40	A
Max. Back-up Fuse	32/40	A



Monthly Inspection and Battery Check Procedures

To ensure safe and reliable operation of the lifting system, the following checks must be performed monthly by qualified personnel in accordance with manufacturer guidelines and applicable safety standards.

Battery Charging and Power-On Verification:

- Fully charge the battery until the charger indicates completion.
- Power on the lifting system and verify that the audible buzzer activates for approximately one second, confirming system readiness.

Battery Voltage Check:

- Using a calibrated digital multimeter, measure the battery voltage by placing probes on charging socket pins 1 and 2.
- A fully charged battery should read approximately 26V or 50V, depending on system configuration.

Magnetization / Demagnetization Voltage Drop:

- Activate magnetization and observe voltage drop; a decrease of 5-6 volts is expected under normal battery conditions.
- Activate demagnetization and observe similar voltage behavior.

Battery Condition Assessment:

- If voltage drops below 22V or 44V during MAG/DEMAG operations - even after full charging - inspect the battery for degradation.
- Replace the battery if it fails to recover or meet minimum voltage thresholds.

3.3 OPERATING CONDITIONS:

Working Range

Specification	Value	Unit
Temperature Range (C)	-4 to +80	°C
Temperature Range (F)	25 to 176	°F
Max Relative Air Humidity	78	%
Min Illumination of the Working Site	500	lux
Conditions	Protect the lifter from direct sun and radiated heat.	
	Avoid direct contact of moisture and frost.	
	Operate the lifter in closed rooms only.	

Operating Time

Specification	Value	Unit
Continuous operation	Designed for continuous operation	
Operating break	Not required	
Min Maintenance intervals (battery as required)	500	hours
Service life (excluding battery)	>10	years

3.4 OPERATING ENVIRONMENT AND LIFTING SITE REQUIREMENTS

Permitted Operating Conditions

- The lifting system is designed for use in non-hazardous, indoor industrial environments.
- Do not operate the equipment in areas classified as explosion-risk zones or in environments that do not meet the required safety and ventilation standards.

Lifting Site Requirements

Before initiating any lifting operation:

- Select a lifting area that provides adequate space for safe movement of the load and equipment.
- Ensure escape routes and walkways remain unobstructed at all times.

- ► Confirm that the lifting site complies with local facility safety policies and regulatory requirements.
- ► Review the lifter layout and clearance zones to prevent collisions or unsafe load handling.

3.5 STORAGE REQUIREMENTS FOR LIFTING SYSTEM AND COMPONENTS

To maintain equipment integrity and ensure safe future operation, the lifting system and its components must be stored under controlled conditions.

General Storage Guidelines

► Store indoors only in a clean, dry, and well-ventilated environment.

► Avoid exposure to corrosive substances, direct sunlight, and extreme temperatures.

► Protect equipment from mechanical impact or vibration during storage.

► Maintain a storage temperature between +5°C and +40°C +(41°F and +104°F).

Keep relative humidity below 78% to prevent moisture-related damage.

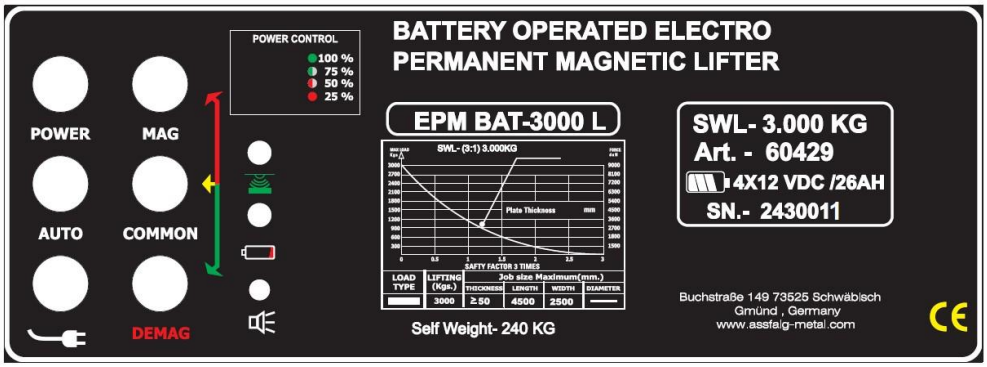
Long-Term Storage (Over 3 Months):

► Conduct periodic inspections of all components and packaging.

► If signs of degradation or corrosion are found, restore or replace protective measures as needed.

3.6 NAMEPLATE:

The nameplate is fixed on the outside of the lifter.



3.7 FACTORS THAT INFLUENCE MAGNETIC FORCE

3.7.1 ELECTRICAL LOAD MANAGEMENT - MAGNETIZATION TIMING PRECAUTIONS

CAUTION! - Magnetization Timing Precautions

Repeated magnetization cycles within short intervals can result in excessive current pulses, which may cause:

- ► Overheating of components
- ► Electrical short circuits
- ► Damage to internal systems

To prevent equipment failure:

- ► Do not activate magnetization more than once within a 20-second period.
- ► Allow sufficient time between cycles for the system to stabilize.
- ► Proper timing and control of magnetization cycles are essential for maintaining safe operation and protecting the integrity of the lifting system.

3.7.2 RISK OF INJURY OR FATALITY DUE TO IMPROPER LOAD POSITIONING

HAZARD! - Risk of Injury or Fatality Due to Improper Load Positioning

Improper alignment of the lifting system can significantly reduce magnetic holding force, increasing the risk of dropped loads and severe injury or death.

- ► Always position the electro-permanent magnet (EPM) system at the load's center of gravity to ensure balanced lifting.
- ► Avoid oblique or uneven suspension, which can reduce holding force by up to 70%.
- ► A dropped load poses a critical safety hazard to personnel and equipment.
- ► Proper load alignment is essential for safe lifting operations. Only trained and qualified personnel should perform load setup and positioning.

3.7.3 RISK OF INJURY DURING MANUAL WORKPIECE REMOVAL

HAZARD! - Risk of Injury During Manual Workpiece Removal

In the event of a power failure, the workpiece may remain magnetically engaged with the electro-permanent magnet (EPM). Improper removal techniques can result in serious injury.

To safely release the workpiece:

- ► Do not attempt vertical separation, which requires overcoming the full magnetic holding force.
- ► Instead, slide or shift the workpiece laterally, which requires significantly less force and reduces risk.

Note: *Maximum magnetic adhesion occurs when full magnetic flux is active. Manual removal must be performed with caution and only by trained personnel.*

The magnetic flux may vary depending on:

3.7.4 WORKPIECE MATERIAL

The strength of the magnetic holding force depends significantly on the material properties of the workpiece.

► Low-carbon steels such as S235 or C45 (commonly referred to as mild steel) offer optimal magnetic permeability, making them ideal for use with electro-permanent magnet systems.

► Alloyed, hardened, or cast materials - including steels containing higher levels of carbon, nickel, chromium, or cobalt - exhibit reduced magnetic permeability, which can diminish holding performance.

► The hardness and chemical composition of the material directly affect how efficiently magnetic flux is transferred through the workpiece.

► Proper material selection is critical to achieving safe and effective lifting operations.

Please consult Magswitch Applications Engineers for assistance with specific applications.

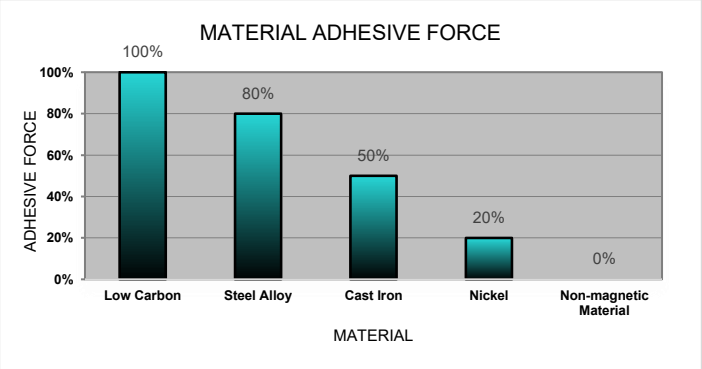
3.7.5 MAGNETIC ADHESIVE AREA

The magnetic adhesive force increases with the contact area between EPMagnet and workpiece.

Additionally, the composition of the workpiece material significantly affects magnetic performance. As the proportion of alloying elements (such as nickel, chromium, or cobalt) increases, the material's magnetic permeability typically decreases - reducing the overall holding force.

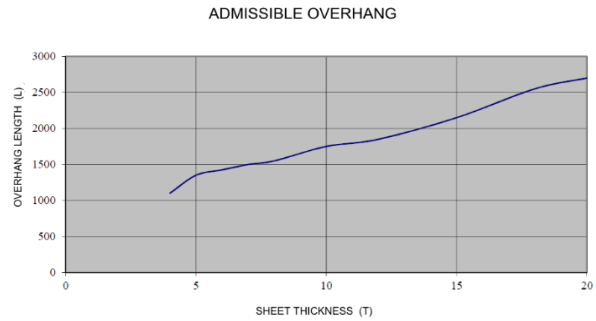
Proper material selection and full surface contact are essential for safe and effective lifting operations.

3.7.6 WORKPIECE OVERHANG



SAFE LIFTING OF SHEET METAL – OVERHANG AND MATERIAL THICKNESS CONSIDERATIONS

The maximum allowable overhang when lifting sheet metal depends primarily on the material thickness and overall dimensions of the sheet.



If the sheet is too thin or too large, the ends may bend or flex, causing partial separation from the magnet surface, which significantly reduces holding force.

This condition increases the risk of load instability or detachment.

When using multiple electro-permanent magnets, improper load distribution can result in excessive stress on adjacent sheets, potentially triggering a progressive peeling effect (also known as a domino effect).

To prevent unsafe lifting conditions:

- ► Always evaluate sheet thickness, size, and magnet placement before lifting.
- ► Ensure uniform contact and balanced load distribution across all magnets.
- ► Follow manufacturer guidelines for maximum overhang limits based on material specifications.

3.7.7 EFFECT OF WORKPIECE THICKNESS ON MAGNETIC HOLDING FORCE

The strength of the magnetic holding force is influenced by the thickness of the workpiece.

Magnetic flux travels in a curved path through the workpiece, with a radius approximately equal to the distance between the magnet's north and south poles.

If the workpiece is thinner than this radius, it cannot fully absorb the magnetic flux, resulting in reduced holding force due to flux leakage.

In contrast, thicker workpieces allow for more complete magnetic flux transfer, improving adhesion and lifting reliability.

Consider: The closer the magnetic poles are located; the flatter is the magnetic field.

NOTE!

The closer the magnetic poles are positioned, the flatter and more concentrated the magnetic field becomes, which can affect how the field interacts with the workpiece.

3.7.8 IMPACT OF AIR GAPS ON MAGNETIC HOLDING FORCE

Any interruption between the magnet surface and the workpiece - commonly referred to as an air gap - can significantly reduce magnetic holding strength.

Causes of Air Gaps:

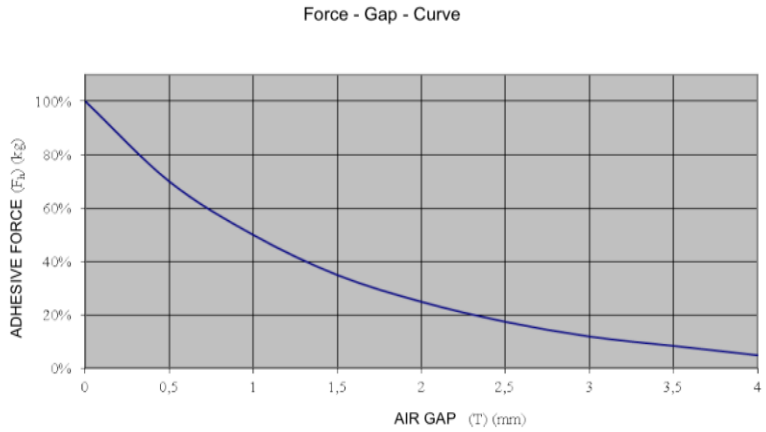
- ► Surface contaminants such as metal chips, rust, welding residue, or dirt.
- ► Irregular contact surfaces, including concave, uneven, or wavy profiles.
- ► Non-magnetic materials (e.g., stainless steel, aluminum, plastic, wood, glass) placed between the magnet and workpiece act as barriers to magnetic flux.

Effect on Performance:

► Air gaps diminish magnetic permeability, weakening the magnetic flux and reducing the adhesive force.

► Even small gaps can lead to unsafe lifting conditions or load instability.

Always ensure full, clean contact between the magnet and the workpiece to maintain optimal holding force. Refer to the holding force vs. air gap chart for visual guidance.



3.7.9 WORKPIECE TEMPERATURE AND MAGNETIC PERFORMANCE

Electro-permanent magnet (EPM) systems are designed for use under standard ambient conditions.

► For safe and effective operation, the recommended temperature range is +4°C to +80°C.

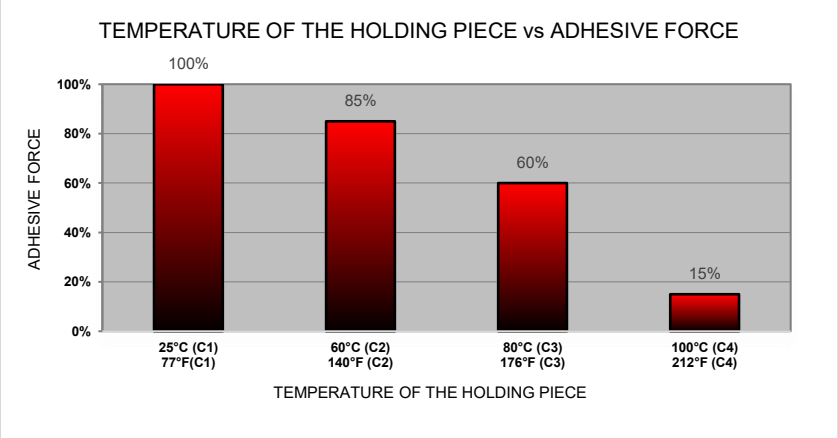
► Use outside this range may affect magnetic performance and system reliability.

If operation is required beyond these limits:

► Consult qualified personnel or the equipment manufacturer for guidance on appropriate precautions and system adaptations.

Be aware that elevated temperatures can reduce magnetic holding force, as shown in the corresponding performance graph.

Maintaining proper temperature conditions is essential for safe lifting and optimal magnetic adhesion.



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4 DESIGN AND FUNCTION

The electro-permanent magnet (EPM) lifter is designed for in-plant handling and transport of sheet metal materials.

The system must be used in conjunction with cranes or hoisting equipment rated for a minimum lifting capacity of 4 tons (CE6600) and 6 tons (CE11000).

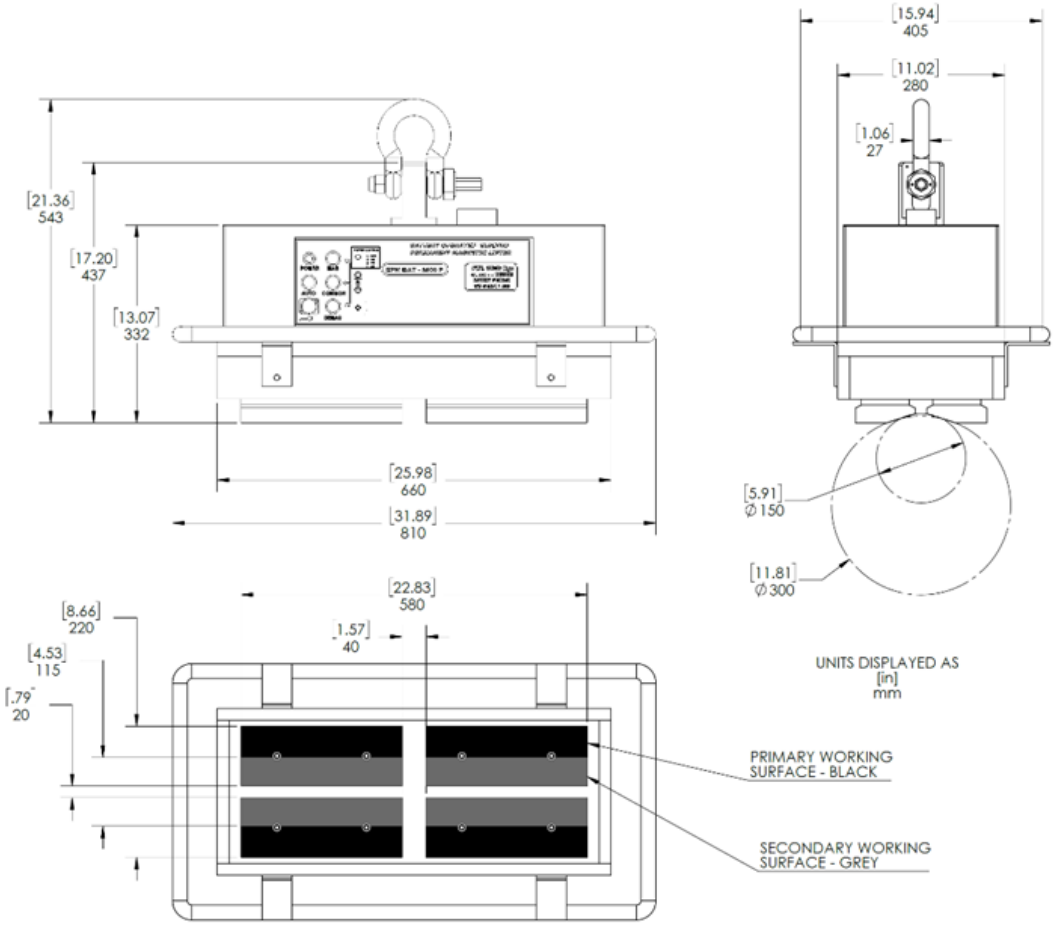
The EPM units are mounted on the underside of the lifter beam, while the control cabinet is positioned on the main beam structure for centralized operation and monitoring.

For detailed operating procedures, refer to Section 7: Operation of this manual.

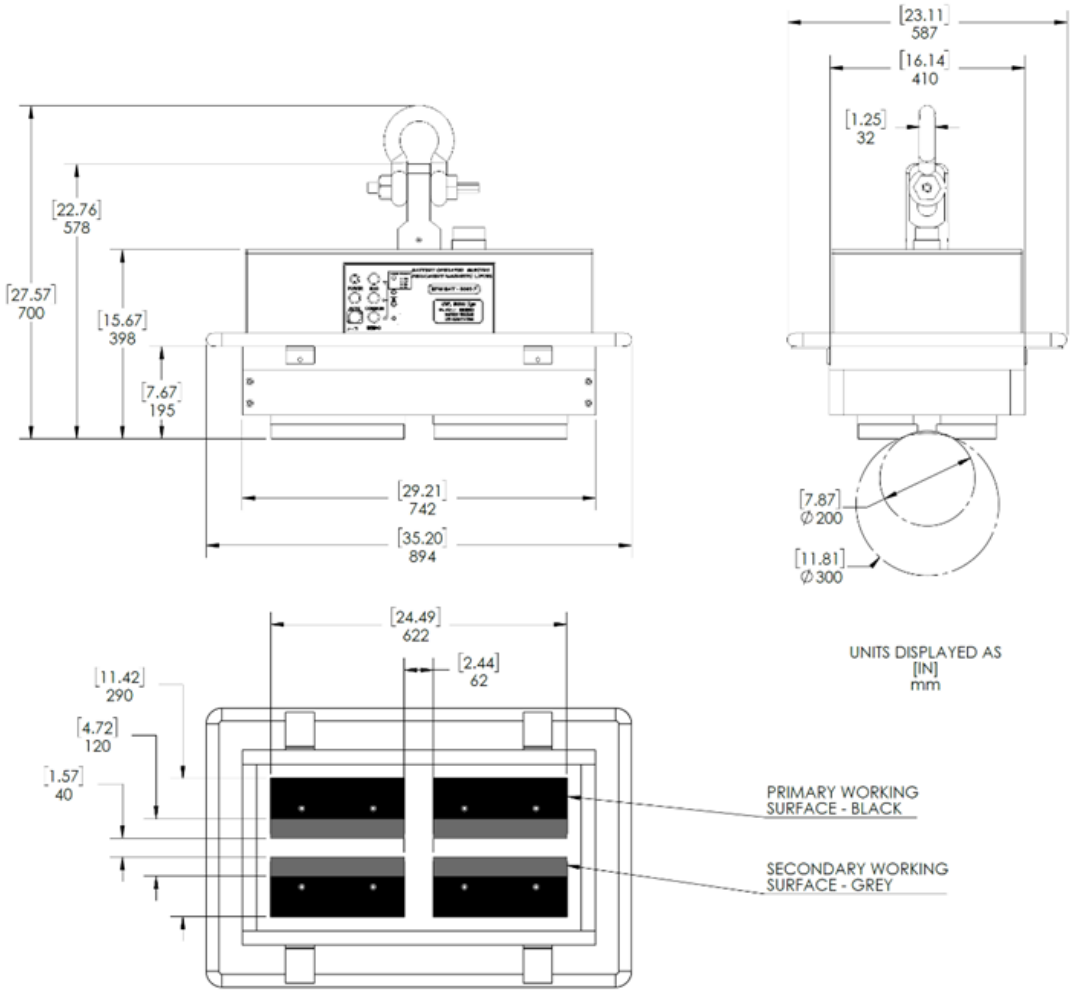
4.1 GENERAL ASSEMBLY

- The controller cabinet is centrally mounted on the lifter body, adjacent to the wireless remote receiver for streamlined access and signal transmission.
- The cabinet houses all electronic components required for operating the lifting system.
- Power is supplied via a 48 VDC battery bank (26 Ah), connected through a main circuit breaker (MCB) for electrical protection.
- The system's core logic is managed by a printed circuit board (PCB), which controls and monitors magnetization cycles using a microcontroller-based architecture.
- Refer to the General Assembly drawings below for a detailed layout of the battery lifting system and component placement.

CE 6600 DRAWING



CE 11000 DRAWING



4.2 OPERATION AND USE - SAFE MAGNET ACTIVATION PROCEDURE

Before activating the lifting magnet:

Inspect the magnet poles and the workpiece contact surface to ensure they are clean, flat, and free of debris.

Contaminants such as metal chips, grinding dust, welding residue, rust, or surface irregularities can create air gaps and significantly reduce magnetic holding force.

Magnet Activation:

Press the ON/OFF button [1] located on the front panel to activate the magnet.

The DEMAG indicator [4] will illuminate red, signaling that the system is powered and in a demagnetized (ready) state.

Load Positioning:

Carefully position the magnet at the center of gravity of the workpiece to ensure balanced lifting.

Always verify that the material thickness and overhang are within safe operating limits as specified by the manufacturer.

4.3 MODES OF OPERATION

MANUAL OPERATION

Ensure the magnetic lifter is fully seated on the load surface. The ADPREM indicator (6) must be illuminated to confirm proper contact and readiness for lifting.	
To initiate magnetization: Simultaneously press the MAG [2] and COMMON [3] buttons. The yellow process indicator will illuminate, signaling the start of the magnetization cycle. After approximately 2 seconds, the green MAG indicator will turn on, confirming that the load is magnetized and ready for lifting or transport. Refer to Section 6.3 for inching operation via remote control.	
Demagnetization Procedure: Before demagnetizing, ensure the ADPREM indicator (6) is illuminated, confirming proper contact. Simultaneously press the DEMAG [4] and COMMON [3] buttons to initiate the demagnetization cycle. The yellow process lamp will light up, indicating the start of the cycle. Within approximately 2 seconds, the red DEMAG indicator will illuminate and the yellow lamp will turn off, signaling completion of the demagnetization process.	

4.4 POWER CONTROL

Select the appropriate control method based on the configuration of your lifting system.

Refer only to the subsection that corresponds to your lifter type - either push-button control or rotary switch control - to ensure proper operation and compliance with equipment specifications.

4.4.1 PUSH BUTTON

Setting the magnetisation intensity takes place via a push button with 25% being the lowest and 100%being the highest magnetisation.

There are 4 levels for performance regulation, with the levels being defined as follows:

Level 4 : Green light is continuously glowing (Max)

Level 3 : Green light is blinking

Level 2 : Red light is blinking

Level 1 : Red light is continuously glowing (Min)

In normal operation always select level i.e. Level 4.

A change of magnetisation can be selected always only before magnetisation.

Note: During Power On, 100% is automatically selected by default.

4.4.2 ROTARY SWITCH

Setting the magnetisation intensity takes place via a rotary switch in four steps, with step 1 being the lowest and step 4 being the highest magnetisation.

There are 4 levels for performance regulation, with the levels being defined as follows:
Level 1: up to 20 mm (0.787in)
Level 2: up to 20 to -40 mm (0.787in to 1.575in)
Level 3: up to 40 mm to -60 mm (1.575in to 2.362in)
Level 4: larger than 60 mm (2.362in)

In normal operation, the highest level is the preferred one.

A change of magnetisation can be selected always only before magnetisation.

4.5 AUTOMATIC OPERATION

CRITICAL SAFETY CHECK - REQUIRED BEFORE STARTING AUTO MODE EACH SHIFT

To ensure safe and reliable operation of the magnetic lifter in Auto Mode, the following steps must be completed at the start of every shift. Failure to perform these checks may result in unsafe lifting conditions, equipment malfunction, or serious injury.

Pre-Operation Safety Checklist:

► Verify that the ADPREM magnet is securely fastened to the lifter body. Loose or improperly mounted components can compromise lifting integrity.

► Confirm that the ADPREM function is operating correctly. All indicators and response signals must be functioning as intended.

► Manually perform one complete load cycle to validate system readiness and mechanical response.

► Run Auto Mode through one full cycle to ensure all automated functions operate properly and safely.

► If Auto Mode is interrupted:

Immediately power down the system and place the lifter in a safe resting state.

To restart:

► Press the Power ON button.

► Demagnetize the system to reset the magnetic state.

► Repeat all pre-operation steps above before re-engaging Auto Mode.

IMPORTANT SAFETY NOTICE — Magnet Reinitialization Required

► Any load that has remained stationary for an *extended period* must be fully powered off and restarted before lifting.

► Electro-permanent magnets may experience gradual demagnetization over time when left energized without active cycling. This can result in reduced holding force, posing a serious risk of load detachment and injury.

To ensure safe lifting:

► Always reinitialize the system by powering off, then back on, and performing a full magnetization cycle before attempting to lift any idle load.

Activating Auto Mode — Operational Sequence

To begin automatic operation:

► Press the AUTO button [5] to activate Auto Mode.

► Once the lifter is properly seated on the load and the ADPREM indicator (6) is illuminated, the system will automatically initiate the full magnetization cycle.

Auto Cycle Sequence:

► The yellow process lamp (3) will illuminate for approximately 2 seconds, indicating the start of the magnetization process.

► The green MAG lamp (2) will then turn on, signaling that the load is magnetized and ready for lifting and transport.

After Load Placement:

► When the load is placed down and the ADPREM indicator (6) reactivates, the system will automatically begin the demagnetization cycle:

► The yellow process lamp (3) lights up for 2 seconds.

► The red DEMAG lamp (4) then illuminates, confirming the load has been safely released.

► The lifter is now in a demagnetized state and ready to return for the next load. Once it is rested on the next workpiece and the ADPREM indicator is on, the cycle will repeat automatically.

4.6 WIRELESS REMOTE CONTROL WITH AUTOMATIC MODE

The wireless remote control is designed to support safe and efficient operation of the lifting system in automatic mode. It mirrors the functionality of the onboard controls and allows the operator to manage lifting cycles from a safe distance.

This remote is particularly useful when employing the inching function, which enables controlled release of individual sheets when multiple sheets have been unintentionally lifted. This feature helps prevent unsafe load handling and supports precise material separation.

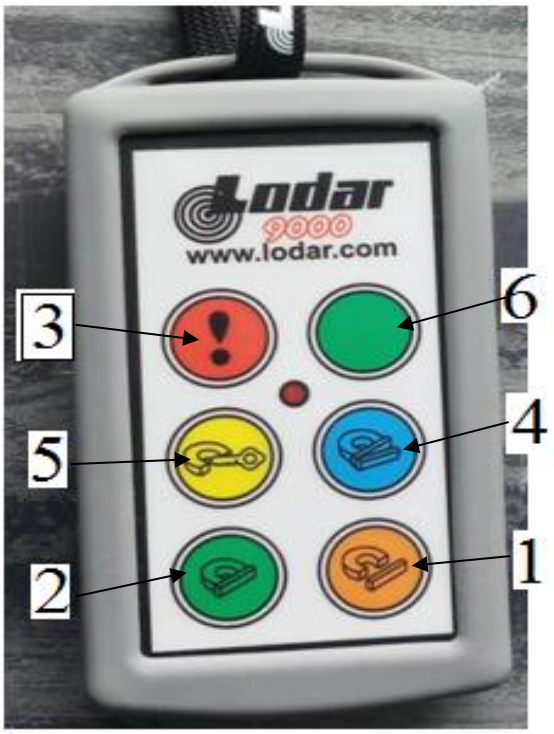
The operating range of the remote control is approximately 10 to 15 meters, allowing the operator to maintain a safe position while retaining full control over the lifting process.

Operators must be trained in the proper use of remote functions and should always maintain clear visibility of the load and surrounding area during remote operation.

4.7 WIRELESS REMOTE CONTROL

The effective operating range of the remote control is approximately 10 to 15 meters, ensuring the operator can maintain a safe position while retaining full control.

The unit is powered by a standard 9V battery, which must be checked and replaced as part of routine maintenance to ensure uninterrupted operation.



No.	Button functions
1	Demagnetization (DEMAG PUSH 1 and YELLOW KEY PUSH 5)
2	Magnetization (MAG PUSH 3 and YELLOW KEY PUSH 5)
3	Deactivation of the remote controller (OFF PUSH 3)
4	Pressing the INCHING PUSH [4] button gradually reduces magnetic holding force, allowing individual sheets to be released one at a time when multiple sheets have been lifted. ⚠ Note: *Thin, oily sheets with low surface roughness may adhere to each other due to residual surface tension. In such cases, a mechanical separator or floater may be required to assist in safe separation.*
5	The COMMON safety switch (YELLOW KEY PUSH [5]) must be pressed simultaneously with either the MAG or DEMAG button to activate those functions. This dual-action requirement helps prevent accidental or unintended operation, ensuring safe and deliberate control of the lifting system.
6	Synchronization ON (ON PUSH 6)

Remote Controller Standby Mode

To conserve battery life, the wireless remote control automatically enters standby mode after 10 minutes of inactivity.

To reactivate the remote, press the Synchronization button [6] once.

Always verify remote functionality before resuming lifting operations to ensure safe and uninterrupted control.

Regular battery checks and proper activation procedures are essential for maintaining safe and reliable operation.

Wireless Remote Controller Synchronization Procedure

Proper synchronization of the wireless remote controller is essential for safe and reliable operation of the lifting system. Follow the steps below based on your controller model:

Part Number 8140979 - Registration & Setup

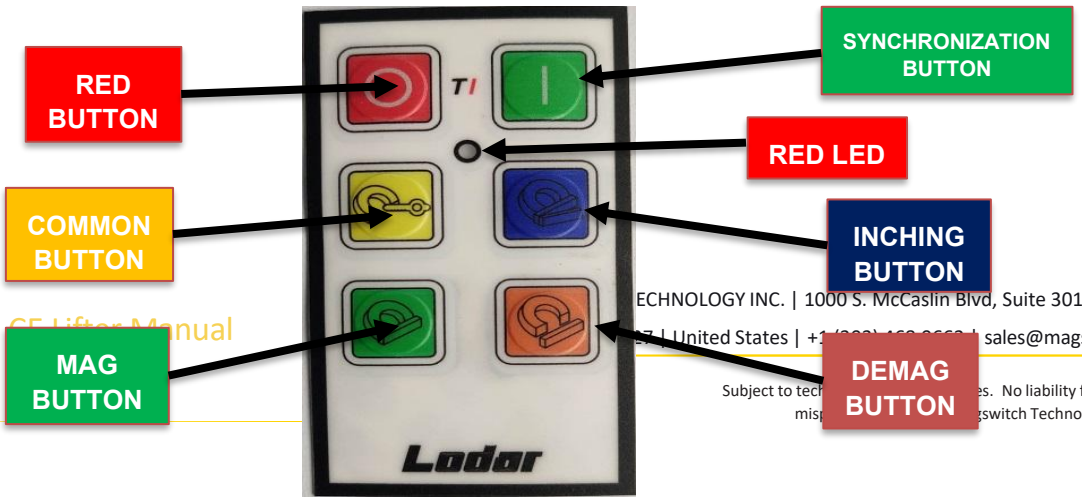
- Power OFF the lifter and wait at least 3 seconds.
- Power ON the lifter again.
- Immediately press and hold the Green Synchronization and Common (Key) buttons on the remote controller for at least 5 seconds.
- During this time, the SET LED on the receiver inside the lifter will illuminate, indicating synchronization mode.
- Press the Green Synchronization button on the remote controller to complete the reset and finalize synchronization.

Part Number 8140980 - Registration & Setup

- Power off the lifter.
- On the remote controller, press the Red button once.
- Then press and hold both the Red and Green buttons simultaneously.
- The LED will light up and remain on while the buttons are pressed.
- Continue holding until the LED turns off.
- Power on the lifter.
- Press and hold the Green button on the remote controller for 5 seconds, until the LED turns off.
- This confirms successful synchronization.

⚠ **Important:**

Always verify remote functionality after synchronization. Ensure all control signals are properly received before initiating lifting operations. Only trained personnel should perform setup and testing procedures.



5 TRANSPORT, INSTALLATION, AND INITIAL SETUP

Important Safety Notice:

Only qualified personnel authorized by the manufacturer are permitted to transport, install, and commission the lifting equipment. Unauthorized handling may result in equipment damage or personal injury and may void safety certifications.

If necessary, the user's trained operating or maintenance staff may assist during these procedures, but only under the direct supervision of authorized personnel and in strict accordance with the safety and handling instructions provided in this manual.

All activities must comply with applicable workplace safety regulations and follow proper lifting, rigging, and electrical safety protocols.

5.1 SAFETY INSTRUCTIONS FOR TRANSPORT

WARNING! - Risk of Serious Injury or Death from Dropped Loads
Danger by dropping loads!

Dropped loads pose a critical safety hazard and may result in severe injury or fatality.

To prevent accidents:

- ► Never stand beneath a suspended load.
- ► Loads may shift, fail, or detach unexpectedly.
- ► Stay clear of the swing or swivel range of any lifting equipment during operation.
- ► Always wear an approved industrial hard hat when working in or near crane-lifting zones.
- ► Strict adherence to these precautions is essential for maintaining a safe work environment during lifting operations.

WARNING! - Risk of Injury from Swinging Loads

Loads with an offset center of gravity may swing unpredictably during lifting and transport, posing a serious risk of injury to nearby personnel.

To prevent accidents:

- ► Never enter the swing or swivel range of a lifting unit while it is in operation.
- ► Maintain a safe distance from suspended or moving loads at all times.
- ► Observe all handling instructions and warning labels affixed to the load or lifting equipment.
- ► Always wear an approved industrial hard hat when working in crane zones or under suspended loads.

► Uncontrolled swinging can result in impact injuries or collisions. Proper load positioning and operator awareness are essential for safe lifting operations.

CAUTION! - Risk of Equipment Damage Due to Improper Handling

Improper transport or handling of the equipment can result in serious damage to the lifting system, surrounding property, or packaging materials.

To ensure safe and compliant handling:

► Only trained and authorized personnel should perform in-plant transport, loading, and unloading operations.

► Follow all handling instructions and warning labels affixed to the packaging or equipment.

► Remove transport locks or restraints only immediately before installation, and under the supervision of qualified personnel.

► Proper handling procedures are essential to maintain equipment integrity and ensure safe commissioning.

5.1 TRANSPORT INSPECTION – INCOMING GOODS

Upon receipt of equipment or components, a thorough inspection must be conducted immediately to verify completeness and detect any signs of damage.

If visible transport damage is present:

► Do not accept the shipment outright. Accept only under reservation or refuse delivery if damage is severe.

► Document the damage clearly on the shipping bill and delivery note provided by the carrier.

► Initiate a damage claim immediately with the shipping provider. Claims must be filed within the designated claim period to remain valid.

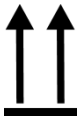
IMPORTANT!

Any defects or damage must be reported at the time of delivery. Failure to do so may result in loss of eligibility for compensation or warranty support.

5.2 TRANSPORT SYMBOLS

To ensure safe handling, transport, and storage of equipment and components, standardized transport symbols are affixed to the exterior of packaging. These symbols communicate critical handling instructions and must be clearly understood and followed by all personnel involved in logistics and material handling.

Meaning of the Transport Symbols The following transport symbols may be attached to transport goods:



Top

Arrows marked on the packaging indicate the correct upright position.

► Always keep these arrows pointing upward to prevent internal damage during transport or storage.

Protect from Humidity

► Keep transport goods dry and shielded from moisture to prevent corrosion or damage.

Load-Fastening Point

► Attach lifting equipment only at designated fastening points to ensure safe and balanced handling.

Centre of Gravity

► This symbol marks the load's center of gravity. Always align lifting equipment accordingly to prevent tipping or instability.

5.3 TRANSPORTING AND STORING

Handling of Packing Materials

Transport goods are packaged to protect components from damage and corrosion during transit and storage. Packaging is designed to meet expected transport conditions and environmental standards.

► Do not remove packaging or transport locks until immediately before installation.

► Dispose of packaging materials in accordance with local environmental regulations.

CAUTION! - Environmental Hazard from Improper Disposal

Packaging materials are valuable resources and may be reused or recycled.

► Improper disposal can result in environmental harm and may violate local waste management laws.

► Always dispose of packaging in an environmentally responsible manner.

► If needed, use a licensed waste disposal service to handle materials in compliance with local statutes.

DANGER! - Improper Transport Method May Cause Injury or Damage

When transporting the lifting system by forklift, do not use hoisting slings or lifting straps.

Improper lifting methods can result in equipment damage, instability, or personal injury.

Use only approved lifting points and equipment as specified by the manufacturer.

Safe Lifting and Transport Using Hoisting Equipment

Transport goods marked with designated load-fastening points may be lifted directly using a hoisting unit, provided the following safety conditions are met:

► Ensure the hoisting equipment is rated for the full transport weight of the load.

► Only authorized and trained personnel may operate the hoisting unit.

Lifting Procedure:

► Lift the load slowly and steadily, verifying that it remains vertically suspended without tilting or swinging.

► If the load is unbalanced, adjust the lifting point to align with the center of gravity before proceeding.

► Once stabilized, transport the load carefully to its destination, maintaining control and clear visibility throughout the movement.

⚠ *Always follow site-specific lifting protocols and ensure the area is clear of personnel during hoisting operations.*

Transport Restriction — Pallet Handling

The lifter system must not be transported on pallets.

Pallet-based handling does not provide adequate support or stability for this equipment and may result in structural damage or unsafe lifting conditions.

Always use approved lifting methods and equipment as specified by the manufacturer to ensure safe transport.

6 INSTALLATION AND FIRST START-UP

6.1 SAFETY INSTRUCTIONS FOR INSTALLATION

WARNING! - Risk of Injury Due to Improper Installation

Improper installation procedures can result in serious injury, equipment failure, or life-threatening hazards during startup and operation.

To ensure safe installation:

► All installation work must be performed exclusively by trained and authorized personnel designated by the user.

► Before beginning, ensure the assembly area is clear, spacious, and free of obstructions.

► Maintain a clean and organized work zone throughout the installation process to prevent slips, trips, and interference with equipment setup.

► Strict adherence to installation protocols is essential for safe commissioning and long-term operational reliability.

DANGER! - Risk of Injury or Equipment Damage from Battery Power Supply

Improper handling of the battery system can result in electric shock, component failure, or serious injury.

Never touch both positive and negative terminals simultaneously, as this may cause short circuits or damage to battery insulation and internal components.

► Only qualified electricians are permitted to connect, test, or measure electrical components.

► If any defect or malfunction is detected, immediately disconnect the power supply and contact authorized service personnel.

► Keep all live electrical parts dry and protected from moisture to prevent corrosion and electrical hazards.

6.2 INSTALLING AND STARTING-UP

6.2.1 INSTALLING

The lifter is delivered in complete state.

6.2.2 START-UP

Personnel Requirements

► Only **qualified electricians** shall perform electrical installation, testing, or maintenance tasks. These individuals must possess the necessary training, experience, and authorization to safely work with electrical systems and components.

Required Personal Protective Equipment (PPE)

To ensure safety during operation, installation, and maintenance, all personnel must wear appropriate PPE, including:

► **Protective Work Clothing**: Close-fitting garments made of durable, low-flammability materials to prevent entanglement or injury.

► **Heavy-Duty Protective Gloves**: To safeguard hands from cuts, abrasions, and contact with sharp or hot surfaces.

► **Safety Goggles or Face Shield**: To protect eyes from flying debris, dust, or accidental exposure to hazardous materials.

► **Industrial Hard Hat**: To protect against head injuries from falling objects or overhead hazards.

All PPE must meet applicable **ANSI/ISEA standards** and be inspected regularly for wear or damage. Use of PPE is mandatory in all designated work zones and during any lifting, electrical, or mechanical operations.

Initial Setup — Suspension and Power Connection

Before the first startup, the lifting system must be securely suspended from the designated crane hook using a bolt connection via the customer-supplied adapter. This ensures proper load distribution and safe lifting alignment.

Electrical power is supplied through a multi-contact round plug or compatible connector, also provided by the customer. All electrical connections must be made by qualified personnel and verified for proper voltage and phase continuity before energizing the system.

⚠ **Important:** *Ensure the crane and lifting components meet or exceed the rated load capacity of the lifting system, including its own weight and maximum lifting load.*

WARNING! - Serious Injury or Fatality Risk Due to Improper Installation

Improper installation of the lifting system can result in severe injury, equipment failure, or life-threatening hazards during startup and operation.

To ensure safe installation:

► Only trained and authorized personnel should perform installation tasks in accordance with the manufacturer's instructions and applicable safety standards.

► Verify that the crane's minimum rated load capacity is sufficient to support the combined weight of the lifting system and its maximum rated lifting load.

► Never exceed the crane's rated capacity, and always confirm that lifting equipment is properly sized and configured before suspending the lifter.

*NOTE! - **Electrical Supply Verification***

Before energizing the system, verify that all phases of the electrical power supply are live and delivering the correct voltage.

Failure to confirm proper voltage across all phases may result in equipment malfunction or unsafe operating conditions.

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6.3 SAFETY INSTRUCTIONS FOR OPERATION

WARNING! - Risk of Injury Due to Improper Operation

Improper use of the lifting system can result in serious injury or hazardous conditions during operation.

To ensure safe operation:

► The lifter must be operated only by trained and authorized personnel designated by the employer.

► Before beginning any operation, verify that all safety devices and protective systems are correctly installed and fully functional.

► Never bypass, disable, or remove safety features under any circumstances.

► Maintain a clean, organized, and obstruction-free work area. Loose tools, components, or debris can create tripping hazards and interfere with safe operation.

► Do not allow the suction head to drag on the floor or come into contact with sharp edges, as this may damage the equipment and compromise safety.

► Never leave the lifter suspended without a load, as this may cause instability or unintended movement.

► When placing the lifter on the ground for storage, lower it slowly and carefully to avoid impact damage or tipping.

► Strict adherence to these safety practices is essential to prevent accidents and ensure reliable, hazard-free operation.

DANGER! - Electrical Hazard from Battery Power Supply

Improper handling of the battery system can result in electric shock, equipment damage, or serious injury.

► Never touch both the positive (+) and negative (–) terminals simultaneously, as this may cause a short circuit and damage internal components or battery insulation.

► In the event of a fault or component failure, immediately disconnect the power supply and contact qualified service personnel for inspection and repair.

► Keep all live electrical components dry and protected from moisture or humidity to prevent corrosion and electrical hazards.

► Only qualified electricians should perform electrical work, including testing, measuring, or connecting components.

WARNING! - Risk of Injury from Moving Parts

Moving components can cause serious injury during operation.

► Stay clear of hazardous areas and never disable or bypass safety devices.

Personnel	► Instructed personnel
Personal protective equipment	► Labor protective clothing ► Solid protective gloves ► Industrial hard hat

6.1.1 BATTERY CHARGING AND LOW POWER INDICATION

General Charging Information

- A full battery charge supports approximately 300 - 400 magnetization cycles (ON + OFF).
- Charging time is approximately 8 hours.
- Battery replacement or servicing must be performed by qualified personnel only.

Low Battery Indicators

- First Warning: Red LED blinks - system remains operational for ~100 more cycles.
- Second Warning: Red LED blinks + intermittent buzzer - ~50 cycles remaining.
- Critical Warning: Red LED + continuous buzzer - immediate charging required; only DEMAG function remains active.

Charging Procedure

- Connect the charger to the battery lifter.
- Plug the charger into a 220V AC power supply.
- The LED will display red during charging and turn green when charging is complete.

Always verify that the charger and power supply are in good condition and that charging is performed in a dry, well-ventilated area by trained personnel.

Always complete the full charging cycle.

Consistently charging to full capacity helps extend battery life and maintain optimal system performance.

6.2 ROUTINE OPERATING SEQUENCE – START-UP PROCEDURE

Follow the steps below to ensure safe and proper operation of the lifting system:

1. Connect the system to the power supply using the designated push switch.

2. Activate the wireless remote control by pressing and holding the green synchronization button for two seconds.

3. Lower the lifter until it makes full contact with the workpieces.

NOTE!

Lower the lifter far enough to slacken the chains and fully release the crane hook from the load. This ensures stable load engagement and prevents unintended lifting forces on the crane system.

4. Select Adhesive Force Level. On the control panel, set the adhesive force to Level 4 (refer to Section 7.1.3 for details). This ensures sufficient magnetic holding force for standard sheet metal handling**.**

5. Initiate Magnetization. Simultaneously press the COMMON and MAG buttons to begin the first magnetization cycle (see Section 4.1.7). This activates the electro-permanent magnet system.

NOTE!

The initial magnetization cycle may take up to 12 seconds. During this process:

The green indicator lamp remains illuminated.

The yellow process lamp flashes.

An audible alert sounds to indicate the magnetic transition phase is in progress.

These signals confirm that the system is actively magnetizing and preparing for load engagement

6. After magnetization, lift the workpiece approximately 300 mm (12in) to verify secure attachment and load stability.

NOTE!

Ensure the load is evenly distributed and that only a single workpiece has been engaged.

If the load is tilted or misaligned:

- ► *Lower the workpiece safely.*
- ► *Demagnetize the lifter.*
- ► *Reposition the lifter for proper alignment.*

For telescopic systems, use the extension/retraction controls (buttons <–> or >–< on the control cabinet or remote) to adjust the lifter arms for optimal load balance.

Proper load alignment and single-sheet handling are essential to prevent dropped loads and ensure safe lifting operations.

Inching Function — Controlled Sheet Separation

If multiple workpieces are unintentionally lifted:

► *Press and hold the blue INCHING button (see Section 4.2) to gradually reduce the magnetic holding force.*

This function allows individual sheets to be released one at a time, ensuring safe and controlled separation.

NOTE!

Inching is typically not required for circular workpieces.

During inching:

- ► *The green indicator lamp turns off.*
- ► *The yellow process lamp flashes.*
- ► *The red DEMAG lamp illuminates.*

Short acoustic alerts will sound, indicating the system is in the magnetic release phase.

Continue holding the INCHING button until only one sheet remains securely attached to the lifter.

7. To complete the magnetization process and ensure maximum holding force. Simultaneously press the COMMON and MAG buttons to initiate the second magnetizing cycle.

NOTE!

After the second cycle completes:

- ► *The acoustic alert will stop.*
- ► *The green indicator lamp will remain illuminated, confirming that the load is fully magnetized and safe for transport.*

If the second cycle is not manually initiated, it will automatically begin 30 seconds after the first cycle completes.

8. Once the load has been securely lifted and transported, lower the workpiece to the designated location with care and control.

NOTE!

Lower the lifter until the chains are fully slack and the crane hook is completely unloaded. This ensures the load is fully supported by the

surface and prevents unintended tension or instability in the lifting system.

9. To safely release the load: Simultaneously press the COMMON and DEMAG buttons to initiate the demagnetization cycle.

NOTE!

The lifter is fully demagnetized and safe to remove from the workpiece when the red indicator lamp illuminates.

Always confirm visual and audible signals before disengaging the load-lifting device.

6.3 EMERGENCY SHUTDOWN PROCEDURE

In the event of a hazardous situation, the lifting system must be immediately stopped, and the power supply disconnected to prevent injury or equipment damage.

Emergency Shutdown Steps

In case of danger:

1. Turn off the battery power supply using the main switch and apply lockout/tagout procedures to prevent accidental re-energization.

2. Rescue any injured personnel and administer first aid as needed.

3. If necessary, contact emergency services (medical or fire response).

4. Notify the designated on-site supervisor or safety officer.

5. Ensure all access routes remain clear for emergency responders.

Post-Emergency Actions

1. If applicable, report the incident to the appropriate regulatory authority.

2. Arrange for qualified personnel to inspect and repair the equipment before resuming operation.

DANGER - Uncontrolled Restart Hazard!

Before restarting the system:

Confirm that no personnel are present in the hazard zone.

3. Thoroughly inspect the lifter for damage or faults. Ensure all safety devices are properly installed and fully functional.

7 MAINTENANCE

7.1 SAFETY INSTRUCTIONS

WARNING! - Risk of Injury from Improper Maintenance

Improper or unauthorized maintenance can result in serious injury or unsafe equipment operation.

- ► Maintenance must be performed only by trained and authorized personnel.
- ► Ensure adequate workspace is available before beginning any maintenance tasks.
- ► Before restarting the system, verify that all safety devices are properly reinstalled and fully operational.
- ► Confirm that no personnel are present in the hazard zone prior to re-energizing the system.

WARNING! - Hazard from Unauthorized Reconnection

Unexpected re-energization during maintenance can cause serious injury.

- ► Disconnect the battery power supply before working on any components.
- ► Apply lockout/tagout procedures to prevent accidental reconnection.

DANGER! - Electrical Shock Hazard

Contact with live electrical parts can result in severe injury or death.

- ► De-energize the system and apply lockout/tagout before performing any maintenance or repair.
- ► Keep battery components dry and protected from moisture at all times.
- ► Inspect insulation and components for damage before re-energizing.

WARNING! - Hazardous Substances

Some components may contain hazardous materials that can cause poisoning, burns, or skin irritation.

- ► Always consult the manufacturer's Safety Data Sheets (SDS) before handling such substances.
- ► Avoid inhalation, ingestion, and skin or eye contact.
- ► Do not eat, drink, or smoke while handling hazardous materials.

► Prevent environmental contamination by avoiding improper disposal or aerosolization.

WARNING! - Use of Non-Approved Spare Parts

Using unapproved or defective spare parts can compromise equipment safety and performance.

► Always use original or manufacturer-approved spare parts to maintain compliance and ensure safe operation.

7.2 MAINTENANCE OVERVIEW AND DOCUMENTATION REQUIREMENTS

The following sections outline the routine maintenance activities required to ensure the safe, reliable, and efficient operation of the lifter system.

► Maintenance intervals must be adjusted based on observed wear and tear during regular inspections. Increased usage or harsh operating conditions may require more frequent servicing.

► All maintenance actions must be documented in a maintenance log or protocol. This documentation supports:

- Accurate fault diagnosis
- Adjustment of service intervals to match real-world conditions
- Validation of warranty or guarantee claims

► Maintenance tasks are scheduled based on elapsed time and/or operating hours. Always follow the shorter of the two intervals to ensure compliance and safety.

► For questions regarding specific maintenance procedures or interval adjustments, contact the equipment manufacturer or an authorized service provider.

Interval	Component	Maintenance work	Personnel
Daily	Entire lifter	Inspect all the connections.	Operator
		Inspect the legibility of all the safety signs.	Operator
		Inspect the lifter for damage.	Operator
		Test the function and take sight check of the FIX BEAM arms.	Operator
		Inspect and if required, clean the surface areas of the EPmagnets..	Operator
		Check that the ADPREM, that it is firmly fixed.	Operator
Monthly	Entire lifter	Inspect the load-fastening points, hooks as well as all the other materials for wear and tear and/or damage or deformation.	Trained skilled personnel

	Magnetic areas	Make visual inspection for damage or contamination on the magnetic surface areas and if required, clean or replace.	Trained skilled personnel
	Entire lifter	Make visual inspection for damage or contamination on the magnetic surface areas and if required, clean or replace.	Trained skilled personnel
Yearly	Entire lifter	Take the statutorily prescribed checks according to the provisions of the local authorities and document the results.	Trained skilled personnel
		Check all the Battery connections and cables.	Trained skilled personnel
		Check the switch cabinet and control box as well as test all the lights and replace, if required.	Trained skilled personnel
	Magnets	Electrical test of the EP Magnets according to DIN VDE 0100-600 Insulation measurement >= 1000 Ohm Measure the cross-section of the PE-earth conductor.	Skilled electricians

7.3 MAINTENANCE WORK – CLEANING PROCEDURES

CAUTION! - Risk of Equipment Damage from Improper Cleaning

Improper cleaning may cause severe injuries.

- ► Improper cleaning methods can result in equipment damage or personal injury.
- ► Cleaning must be performed only by trained and authorized personnel.
- ► Do not use water or high-pressure cleaners on the lifter system, as moisture can damage electrical components and compromise insulation.
- ► Before restarting the system, ensure the work area is clear and no personnel are present in the hazard zone.

Authorized Personnel

► Only instructed personnel trained in proper maintenance procedures may perform cleaning tasks.

Required Personal Protective Equipment (PPE)

► Protective work clothing to prevent entanglement or exposure to contaminants.

► Heavy-duty gloves for general cleaning tasks.

► Chemical-resistant gloves when handling hazardous substances.

► Safety shoes to protect against dropped tools or components.

► Protective goggles with side shields when working near pressurized systems or chemical agents.

Cleaning Instructions

► Clean the lifter regularly to prevent buildup of debris and contaminants.

► Use a clean, lint-free cloth and a neutral, non-corrosive detergent to wipe down surfaces.

► For magnetic contact areas, use a copper wire brush to remove stubborn residues without damaging the surface.

7.4 LUBRICATION CHART

No lubrication required.

7.5 POST-MAINTENANCE SAFETY CHECKLIST

Before returning the lifting system to service after maintenance, the following steps must be completed to ensure safe operation:

1. Verify all fasteners and mechanical connections that were loosened or removed during maintenance are properly re-tightened and secured.
2. Inspect all safety devices and protective systems to confirm they have been correctly reinstalled and are fully functional.
3. Remove all tools, materials, and maintenance equipment from the work area to prevent interference with operation.
4. Clean the work zone, ensuring any spilled substances (e.g., fluids, debris, or residues) are thoroughly removed to prevent slips, contamination, or equipment damage.
5. Test all safety systems and interlocks to confirm proper operation before re-energizing or restarting the equipment.

WARNING! - Risk of Injury from Uncontrolled Restart

Never restart the system until the entire work area is clear of personnel and all safety checks have been completed.

8 FAILURES

8.1 SAFETY INSTRUCTIONS FOR TROUBLESHOOTING AND FAULT ELIMINATION

WARNING! - Risk of Injury from Improper Fault Elimination

Improper troubleshooting or repair procedures can result in serious injury or unsafe equipment conditions.

To ensure safe fault elimination:

► All repair and troubleshooting work must be performed only by trained and authorized personnel.

► Ensure adequate workspace is available before beginning any repair activities.

► Maintain a clean and organized work area. Remove all tools, components, and materials that could pose tripping or interference hazards.

► After replacing any components, verify correct installation, including proper alignment and tightening of all fasteners to specified torque values.

► Before restarting the system, inspect and test all safety devices to confirm they are correctly reinstalled and fully operational.

► Ensure no personnel are present in the hazard zone before re-energizing the system.

WARNING! - Hazard from Unauthorized Reconnection

Unexpected power restoration during maintenance or repair can result in serious injury.

► Disconnect the battery power supply before working on any individual components.

► Apply lockout/tagout procedures to prevent accidental reconnection.

DANGER! - Electrical Hazard

Contact with live electrical components can result in severe injury or death.

► De-energize the system before beginning any maintenance or repair work.

► Apply lockout/tagout measures to prevent unintentional re-energization.

► Keep battery components and electrical parts dry and protected from moisture to prevent short circuits or insulation failure.

8.2 EMERGENCY RESPONSE – ACTIONS IN CASE OF EQUIPMENT FAILURE

In the event of a failure that poses an immediate risk to personnel or equipment, the following steps must be taken without delay:

1. Immediately shut down the power supply using the battery ON/OFF push switch to stop all system functions.
2. Disconnect and lock out all power sources using appropriate lockout/tagout procedures to prevent accidental re-energization.
3. Notify the designated on-site supervisor or safety officer of the incident.
4. Based on the nature of the failure, ensure that only qualified and authorized personnel investigate the root cause and perform corrective actions.

IMPORTANT!

Never attempt to troubleshoot or repair the system without proper training and authorization. Always follow established safety protocols and documentation procedures.

8.3 FAILURE TABLE

Failure	Possible Cause	Inspection	Solution
No optical indication by the signal lamps	Signal lamps defect	Lower the lifter	Replace the defect part
No acoustic alert	Faulty horn; Defect cable	Lower the lifter	Replace the defect part
No magnetization	Defect magnet	Lower the lifter	Replace the defect part
Remote control unit does not response.	Defective remote control unit	Lower the lifter - emergency operation initiated with the push-button on the battery controller	Replace the defect part
The battery controller does not perform.	Defective battery controller	Lower the lifter after disconnecting power	Replace the defect part
Auto Mode not working Failure of ADPREM may lead to safety hazard.	Screws get loosened.	Because of vibrations or shock	Secure or replace ADPREM

8.4 RESTORING WIRELESS CONNECTION

If the wireless connection between the remote control and the lifting system is lost, the system will not respond to remote commands. In such cases, the connection must be re-established before resuming remote operation.

NOTE!

In the event of wireless failure, manual operation can continue using the pushbuttons located on the battery controller.

Steps to Restore Wireless Communication:

1. Press the synchronization button [6] on the remote control.
2. Hold the button for at least 2 seconds to re-establish the transmission link.

NOTE!

If synchronization fails:

► *Replace the remote control battery or the entire wireless controller unit, as needed.*

► *Always verify successful signal transmission before resuming remote-controlled operations.*

8.5 POST-FAULT ELIMINATION – SAFETY CHECKLIST BEFORE RESTART

After completing fault elimination or repair work, the following steps must be taken to ensure the system is safe to return to service:

1. Inspect and re-tighten all previously loosened fasteners to ensure mechanical integrity.
2. Visually confirm that all safety devices and protective systems removed during troubleshooting have been correctly reinstalled.
3. Clear the work area of all tools, spare parts, cleaning materials, and any other equipment used during the repair process.
4. Clean the surrounding area, removing any spilled substances such as fluids, debris, or other materials that could pose a hazard.
5. Test all safety systems and interlocks to verify they are functioning correctly and meet operational safety requirements.

IMPORTANT!

Do not restart the system until all safety checks are complete and the area is confirmed clear of personnel.

9 DISASSEMBLY AND ENVIRONMENTALLY RESPONSIBLE DISPOSAL

Once the lifting system has reached the end of its designated service life, it must be safely decommissioned and disassembled by qualified personnel.

All disassembly activities must be performed in accordance with applicable safety procedures and local environmental regulations.

Components should be sorted and disposed of or recycled in an environmentally responsible manner, following local waste management and hazardous material handling guidelines.

Electrical and battery components must be handled with care to prevent environmental contamination or injury.

NOTE!

Always consult the manufacturer or a certified disposal service for guidance on proper disassembly and recycling of specialized components.

9.1 SAFETY INSTRUCTIONS FOR DISASSEMBLY AND DISPOSAL

WARNING! - Risk of Injury During Disassembly and Disposal

Improper disassembly of the lifter system can result in serious injury or equipment damage.

To ensure safe and compliant decommissioning:

- Disassembly must be performed only by trained and authorized personnel designated by the user.
- Ensure adequate workspace is available and maintain a clean, organized work area to prevent slips, trips, and other hazards.
- Be cautious of sharp edges, corners, and pointed components during handling.
- Prevent components from falling or tipping during disassembly by using proper lifting and support equipment.
- Disassemble components using appropriate tools and techniques, following environmental protection guidelines for disposal and recycling.
- In case of uncertainty, consult the equipment manufacturer for guidance.

DANGER! - Electrical Hazard

Contact with live electrical components can result in severe injury or death.

- Before beginning disassembly, ensure all power sources are completely shut off and secured using lockout/tagout procedures.
- Battery disconnection and removal must be performed by qualified electricians.
- Keep all battery components dry and protected from moisture to prevent electrical hazards

Authorized Personnel	► Only instructed personnel authorized by the user may perform disassembly and disposal tasks.
Required Personal Protective Equipment (PPE)	To ensure safety during disassembly: ► Protective work clothing to prevent cuts and abrasions. ► Heavy-duty gloves for handling components. ► Chemical-resistant gloves when working with hazardous substances. ► Anti-slip safety footwear to prevent slips and protect against dropped objects. ► Protective goggles or face shields when working near pressurized or hazardous systems.

9.2 DISASSEMBLY PROCEDURE – SAFE KNOCK-DOWN OF LIFTER SYSTEM

To safely disassemble the lifting system at the end of its service life, the following steps must be followed by trained and authorized personnel:

1. Shut down the lifting system and apply appropriate lockout/tagout procedures to prevent accidental re-energization!
2. Fully disconnect the power supply, including battery and control connections. Discharge any residual energy and verify the absence of voltage and pressure using appropriate testing equipment.
3. Remove all consumables, auxiliary materials, and residual substances (e.g., lubricants, cleaning agents) and dispose of them in accordance with local environmental regulations.
4. Clean all components and assemblies before disassembly. Dismantle the system using proper tools and techniques, in compliance with local labor safety and environmental protection laws.

NOTE!

If there is any uncertainty regarding disassembly procedures or environmental handling, contact the manufacturer or a certified service provider.

9.3 DISPOSAL OF DECOMMISSIONED COMPONENTS

If no formal agreement has been made with the manufacturer regarding return or disposal, all disassembled components must be sorted and processed for recycling in accordance with local environmental regulations.

► Scrap all metallic components through certified recycling facilities.

► Recycle synthetic materials (e.g., plastics, composites) using appropriate waste streams.

► Sort and dispose of remaining materials based on their composition (e.g., electronics, rubber, insulation) following applicable hazardous and non-hazardous waste handling procedures.

IMPORTANT!

Always follow local, regional, and national environmental protection laws when disposing of industrial equipment and materials.

CAUTION! - Environmental Hazard from Improper Disposal

Improper or negligent disposal of equipment and materials can result in significant environmental contamination and may violate local regulations.

To ensure environmentally responsible disposal:

- Electronic waste, batteries, lubricants, and other consumables must be disposed of by certified waste management providers.
- For any hazardous substances, follow the handling and disposal procedures outlined in the manufacturer's Safety Data Sheets (SDS).
- If unsure about proper disposal methods, consult the equipment manufacturer, local environmental authorities, or licensed disposal companies for guidance.
- Proper disposal protects both the environment and public health, and ensures compliance with applicable laws and standards.

10 BILL OF MATERIALS

BILL OF MATERIALS						
SL. No.	**NAME OF COMPONENT**	**SPECIFICATION**	**MAKE**	**ITEM CODE**	**POSITION**	**QTY.**
1	Printed Circuit Board	EPM BAT 3 TON V1.3	Shree magnets	PCB	MAGNET	1
2	Battery circuit Breaker	C32 /C40 Amps,2 Pole BB203220C /BB20400C	L&K	MCB	MAGNET	1
3	Power control Push switch	GQ16F-10E/J/31/RG/6V	ONPOW	PC 1	MAGNET	1
4	Power ON/OFF Push switch	GQ22-11ZT/G/24V	ONPOW	pp1	MAGNET	1
5	Auto Push switch	GQ22-11ZE/B/24V	ONPOW	AP 1	MAGNET	1
6	MP, DP, CP ILLUMINATED PUSH	GQ22-11E/G, R, Y/24V	ONPOW	MP, DP, CP	MAGNET	3
7	LOW BATTERY & RESTING LED	GQ8F-D/G&R, /24V	ONPOW	LB1 & RL1	MAGNET	2
8	Buzzer	ABI-006-RC	Shree magnets	BZ	MAGNET	1
9	RRC	TX1004/11RX04(111004)	LODAR	TX-1, RX1	MAGNET /HAND	1 SET
10	Battery	12V /42/AH X 2	EXIDE	BB	3000P MAGNET	2
11	Battery charger	24 VDC 4 Amps	Power first	CHR	3000P MAGNET	1
12	Battery	12V /26/AH X 4	EXIDE	BB1	3000L MAGNET	4
13	Battery charger	48 VDC 3 Amps	Power first	CHR1	3000L MAGNET	1
14	Battery	12V /42/AH X 4	EXIDE	BB2	5000P&L MAGNET	4
15	Battery charger	48 VDC 4 Amps	Power first	CHR2	5000P&L MAGNET	1

11 EC – Declaration of Conformity According to EC-Machine-Standard Guideline (2006/42/EG)

magswitch®

We, Magswitch Technology

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Declare with sole responsibility that the machinery

Magswitch CE 440 / CE 1100 / CE 2100 / CE 6600 / CE 11000 or other tool designations containing the “CE” description and any accessories for these designations covered by these directives

Fulfils the relevant provisions of the following Union harmonisation legislation/directives:

- EC-Machinery Directive (2006/42/EG) The protective goals of the Low Voltage Directive 2014/35/EU and electromagnetic compatibility EMC 2014/30/EU are fulfilled.

Conformity is shown by compliance with the applicable requirements of the following documents:

EN ISO 12100:2010 machinery safety and general principles of design - risk assessment and risk mitigation.

EN ISO 60204 machinery safety - Electrical equipment of machines.

EN ISO 13155 cranes – not fixed load fittings

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