



AT EVERY STEP OF THE WAY



Operating Manual

Battery-powered Electro-permanent Load Lifting Magnet

CE LIFTERS

CE 440 / CE 1100 / CE 2100



CE LIFTERS Lifter	Lifting Capacity SWL Flat Plate [kg] 	Lifting Capacity SWL Round Bar [kg] 	Dimensions LxWxH [mm]	Weight [kg]	Art.
CE 440	200	50	150x85x150	10	65697
CE 1100	500	200	180x160x140	25	62666
CE2100	950	400	355x165x170	40	60643

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

Table of Contents

CE LIFTERS.....	1
LIFTERS - CE 440 / CE 1100 / CE 2100	2
1. FOREWORD.....	2
2. APPLICATION AND ADVANTAGES OF CE LIFTERS	3
3. GENERAL ASSEMBLY DRAWINGS AND FEATURES.....	4
3.1. CE 440	4
3.2. CE 1100	5
3.3. CE 2100	6
4. SAFETY INSTRUCTIONS.....	7
5. FACTORS AFFECTING HOLDING POWER	8
5.1. MATERIAL	8
5.2. CONTACT AREA	8
5.3. OVERHANG	8
5.4. LOAD THICKNESS	9
5.5. LOAD TEMPERATURE	9
5.6. AIR GAP	9
6. OPERATION	12
7. LIFTING.....	19
8. BATTERY CHARGER.....	20
9. EXCHANGING THE BATTERY MODULE CE 1100 /950.....	23
10. TROUBLESHOOTING.....	24



LIFTERS - CE 440 / CE 1100 / CE 2100

1. FOREWORD

You have purchased an Magswitch CE LIFTER battery-powered load lifting magnet. Thank you for choosing our product.

This operating manual contains all the information required for safe and optimum use of the lifting magnet. Read the operating manual carefully and follow the instructions. Keep this operating manual in a safe place close to the workplace.

On receipt, inspect the CE LIFTERS lifting magnet for possible damage and completeness. If the lifting magnet is damaged or incomplete, please contact your supplier immediately.

The complete delivery includes:

- Undamaged packaging
- CE LIFTERS load lifting magnet and battery charger.
- Operating manual including test certificate and CE Declaration.

Never use a damaged or incomplete CE lifting magnet!

The CE LIFTERS is guaranteed for a term of 12 months. The guarantee does not cover defects that can be completely or partially attributed to:

- Ignoring the operating and maintenance instructions.
- Improper use.
- Normal wear.
- Modifications or repairs not performed by Magswitch or an authorized agent.

In all correspondence regarding your CE lifting magnet always state the type and serial number indicated on the nameplate.



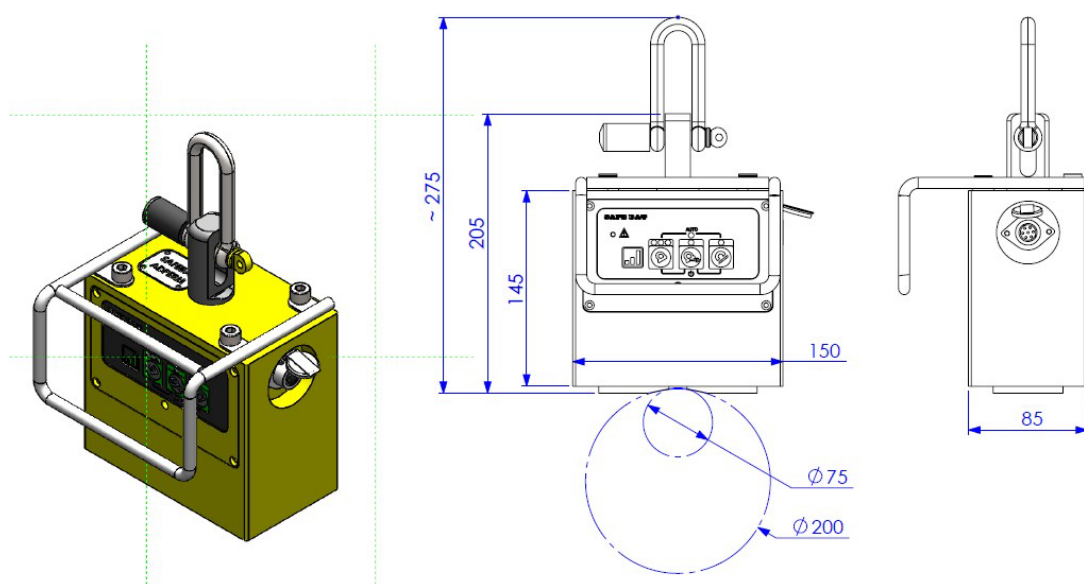
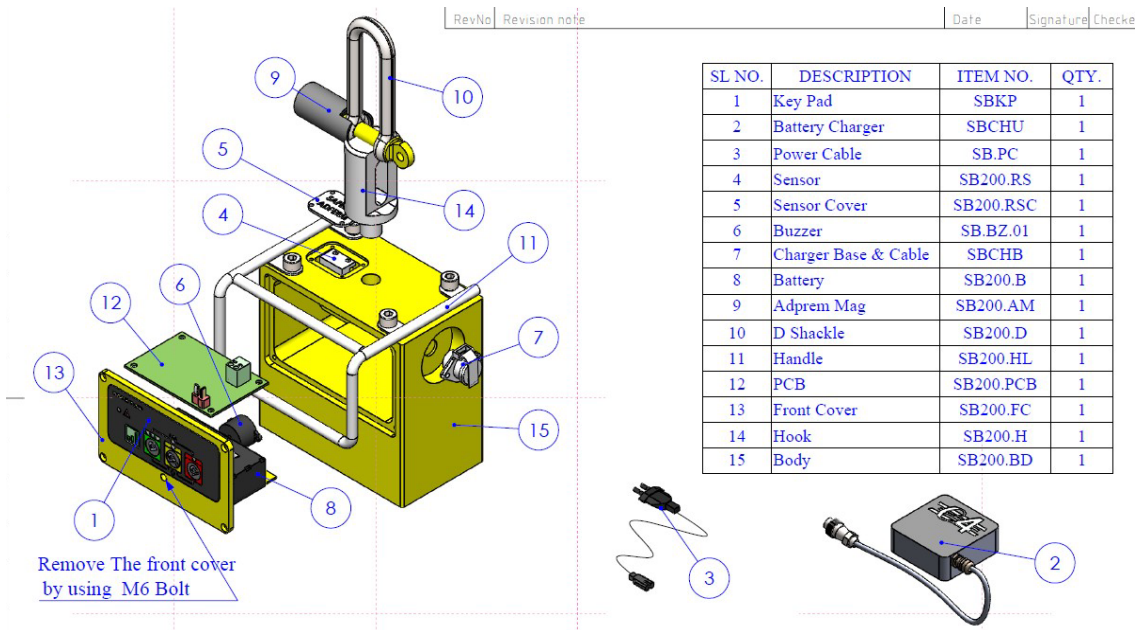
2. APPLICATION AND ADVANTAGES OF CE LIFTERS

- For iron material, both flat and round bar, to be handled by crane.
- Independent of mains power supply.
- Two magnets working in automatic mode can be used attached to a small-size beam.
- Usable in mechanical engineering, tool manufacturing, plant engineering, steel construction, ship building, steel mills, cutting operations, carriers, or warehouses.
- No battery power consumed during lifting. For magnetizing and demagnetizing, only a current pulse of less than one second is needed. Low power consumption.
- A built-in safety mechanism (ADPREM safety system) prevents demagnetizing and releasing of the load when the load is suspended. The electro-permanent technology maintains the full holding force even in case of power failure.
- Switching both manually by push-button control or automatically by raising and lowering the lifting magnet.
- The battery (lithium-polymer) is charged in approximately 3 hours using a mains charger.

3. GENERAL ASSEMBLY DRAWINGS AND FEATURES

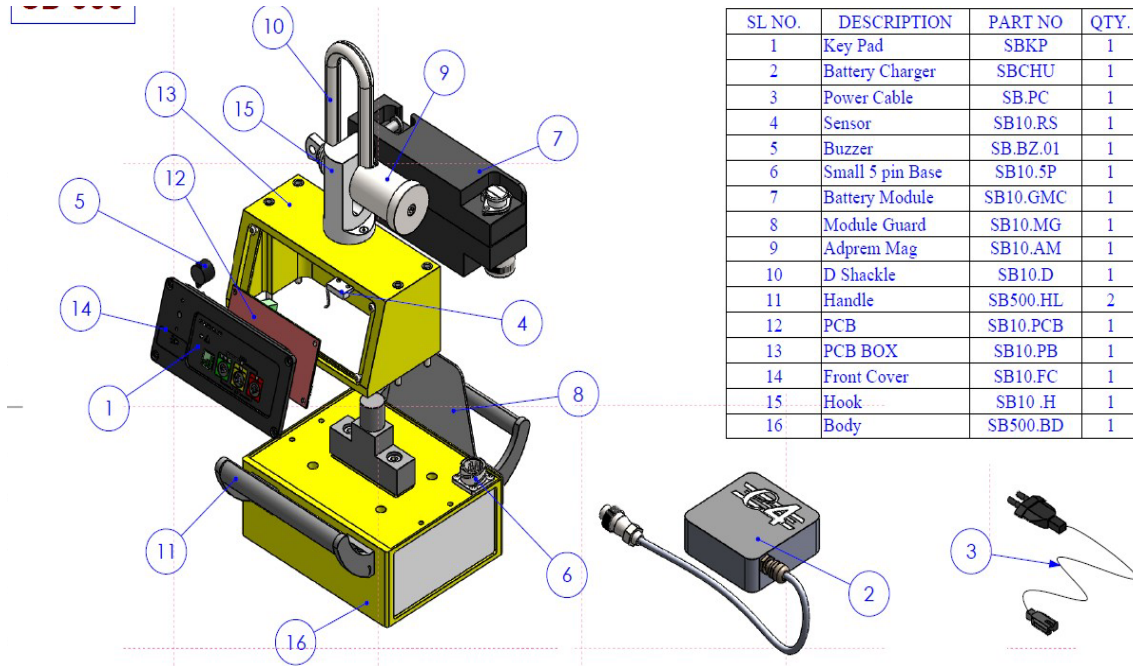
3.1.CE 440

The CE 440 can handle workloads up to 200 kg for flat material and up to 50 kg for round bar. Using a current pulse of less than one second, the Magswitch CE 440 can be switched manually, using push buttons, or in automatic mode. While lifting the load, no current is required; the workpiece remains safely held as by a permanent magnet. Up to 600 ON/OFF switching cycles are possible before recharging the internal battery using the supplied mains charger.

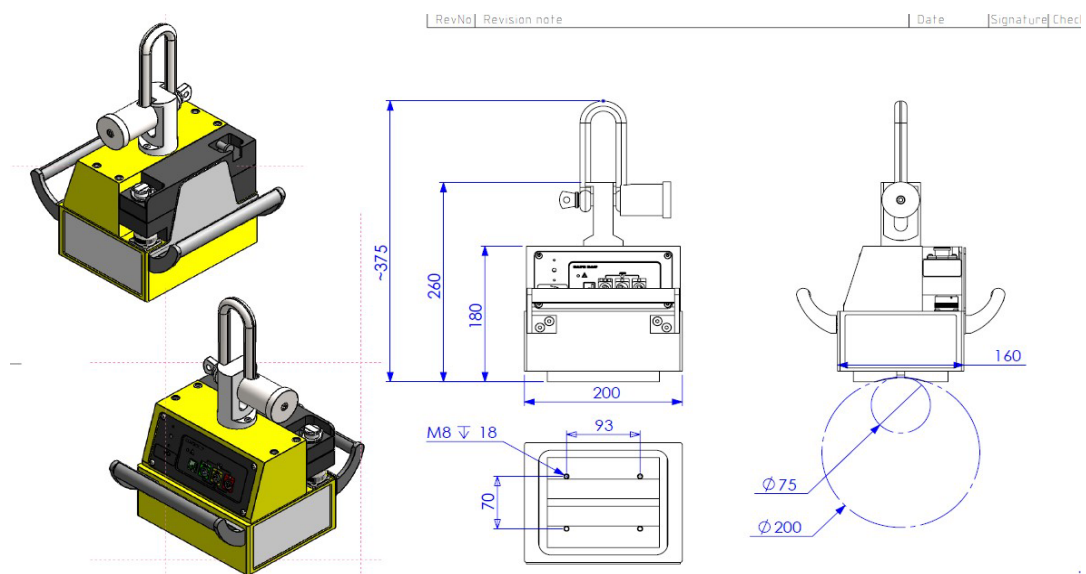


3.2.CE 1100

The CE 1100 is modified a little from the former version by the exchangeable and rechargeable black battery module. It is able to handle loads up to 500 kg for flat material and up to 200 kg for round bar. Using a current pulse of less than one second, the Magswitch CE 1100 can be switched manually, using push buttons, or in automatic mode. While lifting the load, no current is required; the workpiece remains safely held as by a permanent magnet. Up to 1,000 ON/OFF switching cycles are possible before recharging the external battery module using the supplied mains charger.



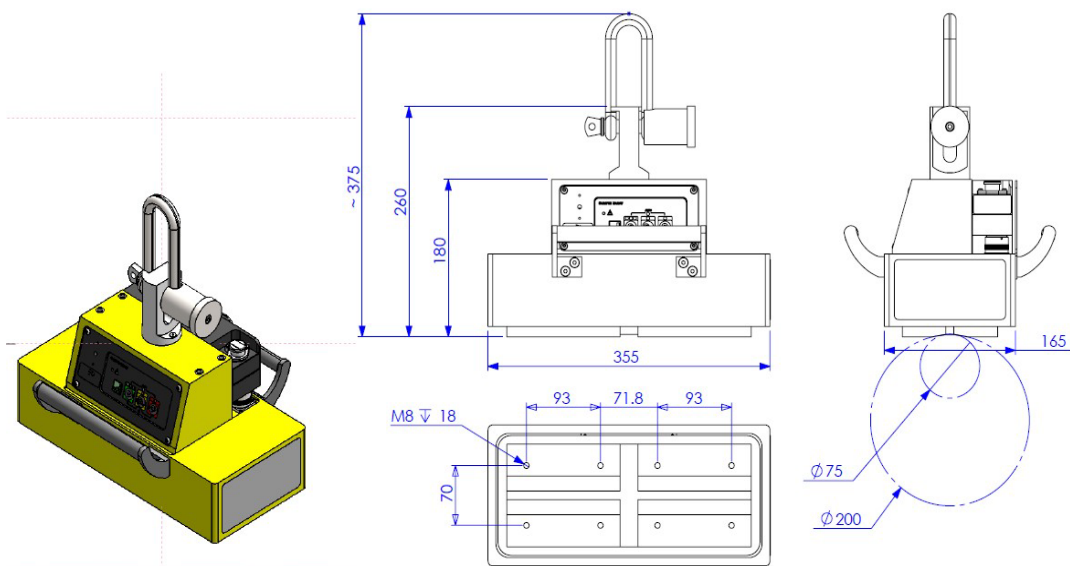
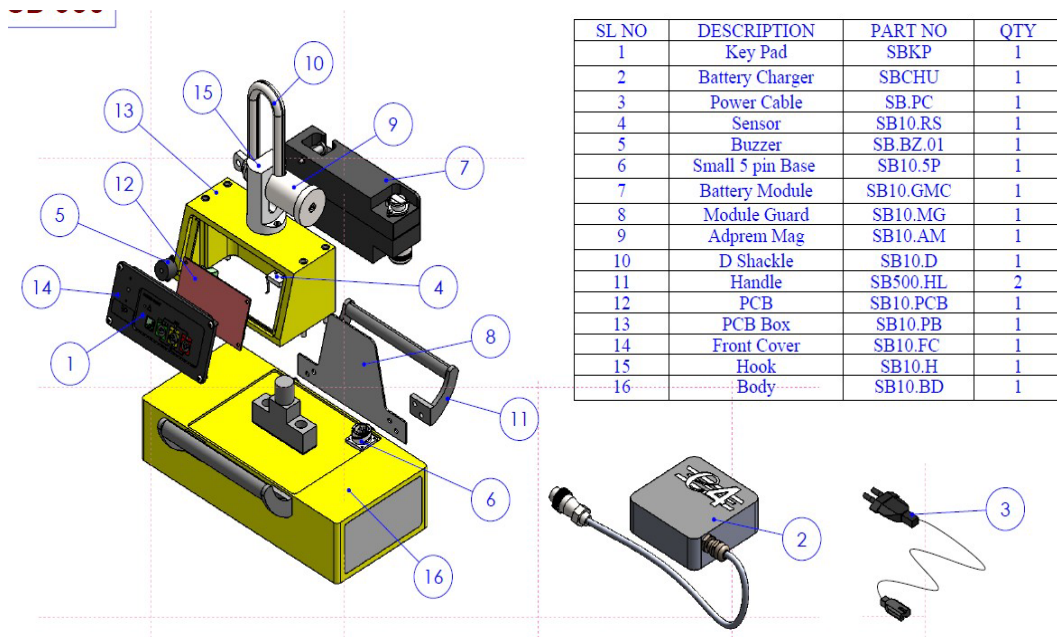
Option: Special pole shoes, to be fixed on the pole surface with 4 x M12 screws, are available on request.



3.3.CE 2100

The CE 2100 is modified a little from the former version by the exchangeable and rechargeable black battery module. It is able to handle loads up to 950 kg for flat material and up to 400 kg for round bar. Using a current pulse of less than one second, the Magswitch CE 2100 can be switched manually, using push buttons, or in automatic mode. While lifting the load, no current is required; the workpiece remains safely held as by a permanent magnet. Up to 500 ON/OFF switching cycles are possible before recharging the external battery module using the supplied mains charger.

Option: Special pole shoes, to be fixed on the pole surface with 4 x M12 screws, are available on request



4. SAFETY INSTRUCTIONS



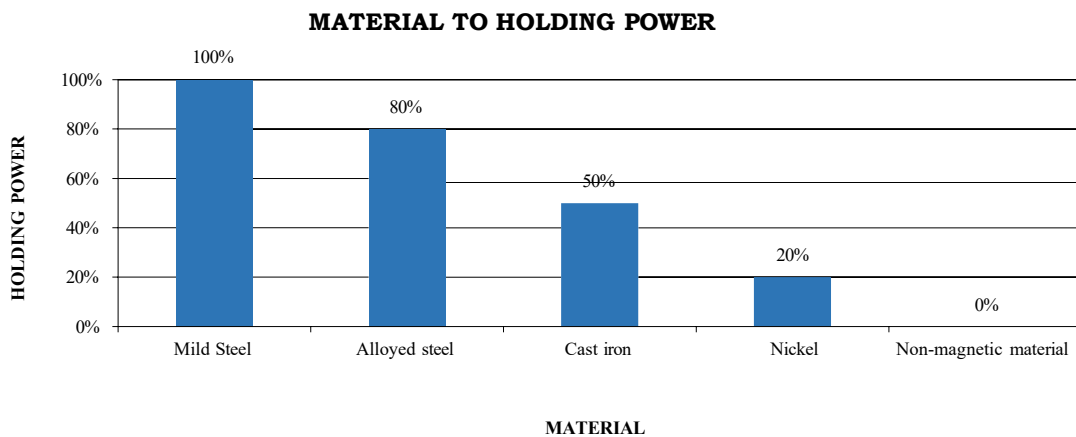
- Never use the CE LIFTERS lifting magnet before these instructions have been read and understood.
- Persons having a pacemaker or other medical device should never come closer than 10 cm to the CE lifting magnet.
- Never remove warning or instruction signs from the CE lifting magnet.
- Always wear safety goggles, gloves, protective boots and helmet.
- Never stay or move under the load.
- Never move loads over or close to people.
- Never use the CE lifting magnet for hoisting, supporting, or transporting people.
- Warn people nearby before beginning to lift the load.
- Whenever possible, make use of lifting hooks equipped with a safety lock.
- Ensure that the weight and dimensions of the load to be lifted do not exceed the maximum permitted values.
- Never use a damaged or poorly operating CE lifting magnet.
- Press the MAG-button only when the lifter has been placed on the load.
- Press the DEMAG-button only when the load has been placed on a stable surface.
- Never lift more than one load at a time with the CE lifting magnet.
- Never leave a hoisted load unattended.
- The maximum operating temperature must never exceed 80°C.

5. FACTORS AFFECTING HOLDING POWER

5.1. MATERIAL

The holding force depends on the type of material to be lifted. The variation of holding force with respect to material is shown in the following graph.

Mild steel offers the best conductivity for magnetic flux, whereas tool and alloyed steels, cast iron and stainless steel are characterized by lower magnetic conductivity. Generally, the holding force can be summed up as the function of carbon, Ni-Cr-content and hardness of the steel.

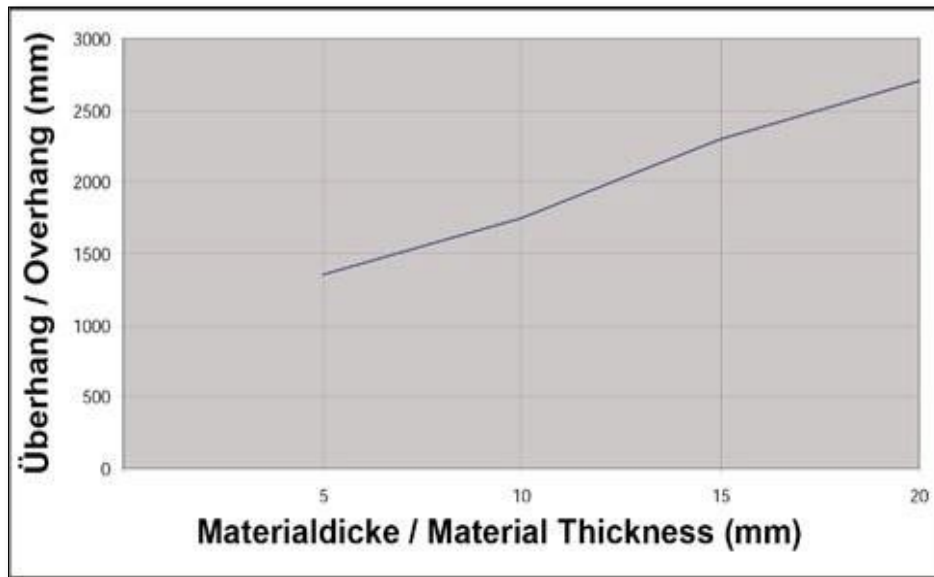


5.2. CONTACT AREA

The magnetic holding force depends on the contact area between load and lifting magnet. The larger the contact area, the higher the lifting capacity of the magnet. To achieve the maximum force, the poles of the lifting magnet must be fully covered by the load.

5.3. OVERHANG

The admissible overhang of the load depends on the thickness of the steel plate. In order to grip the load safely, make sure the overhang is within the range shown in the graph (see below). One of the main causes for sudden release of steel sheets is too large a bending due to too long an overhang length. These loads do not have sufficient mechanical strength.



5.4. LOAD THICKNESS

The magnetic flux flows from one pole of the magnet to the other through the load being lifted. If the thickness of the load is smaller than the width of the poles, the magnetic flux is restricted. Thus, the flux density at the contact area between the poles and the load is reduced which results in reduced holding force. Steel thickness of at least 20mm (CE 440), 30mm (CE 1100) or 40mm (CE2100) is required to absorb the entire flux and achieve the maximum holding force.

5.5. LOAD TEMPERATURE

The magnetic holding force also varies with temperature of the load to be lifted. Generally, the holding force decreases as the material temperature rises. With loads, whose temperature exceeds 80°C, the magnetic force steadily diminishes. Therefore, any load whose temperature has exceeded 80°C should not be hoisted with the lifting magnet.

(Notice: Contact with hot loads may cause failure of the lifting magnet. With longer contact, the magnets are damaged by the penetrating heat.)

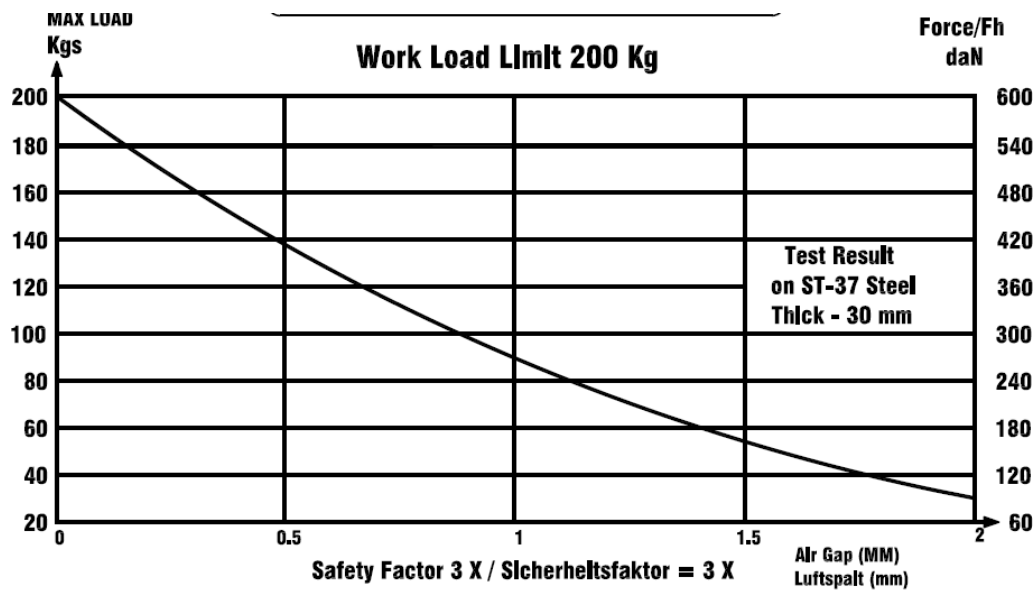
5.6. AIR GAP



The air gap is the average distance between the poles of the lifting magnet and load surface. Air gaps are caused by foreign bodies or improper contact between the magnet poles and the load.

The magnetic field cannot pass so easily through non-magnetic materials (air, dust, non-ferrous materials such as stainless steel, brass, aluminum, wood, foreign matter, concavities/convexities etc.) so the holding force is reduced. Thus, the magnets output the full power only when their poles are directly in contact with the surface of the load. The force - air gap curve (see graph below) shows how the holding force (F_h) of the lifting magnet diminishes as the air gap (mm) increases.

In order to avoid an air gap, remove the foreign matter from the load surface before positioning the lifting magnet.

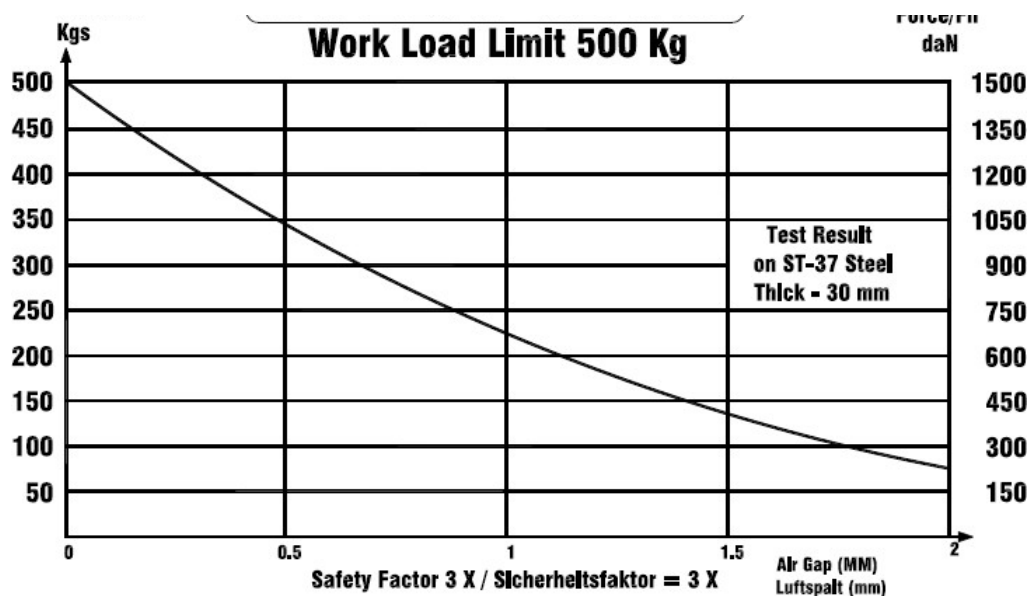
CE 440





LOAD TYPE	LIFTING (Kg)	THICKNESS DICKE	Job size Maximum(mm.)		
			Length / Länge	Width / Breite	Diameter / Durchm
	200	≥20	1500	750	—
	50	—	1250	—	150

CAUTION-ALWAYS LIFT LOAD HORIZONTALLY BALANCED LAST NUR WAAGRECHT AUSBALANZIERT HEBEN!

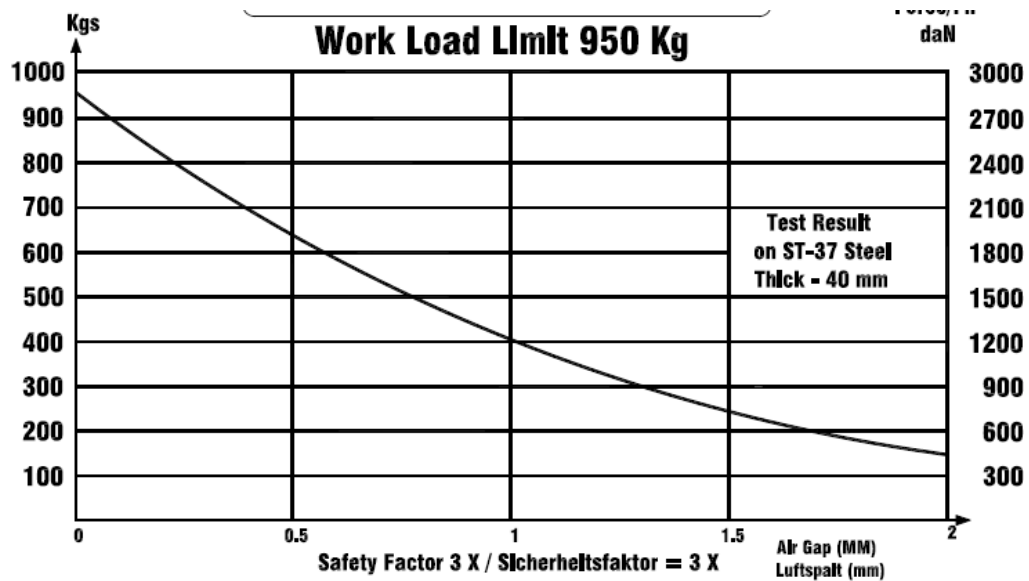
CE1100





LOAD TYPE	LIFTING (Kg)	THICKNESS DICKE	Job size Maximum(mm.)		
			Length / Länge	Width / Breite	Diameter / Durchm
	500	≥30	2500	1000	—
	200	—	2000	—	200

CAUTION-ALWAYS LIFT LOAD HORIZONTALLY BALANCED LAST NUR WAAGRECHT AUSBALANZIERT HEBEN!

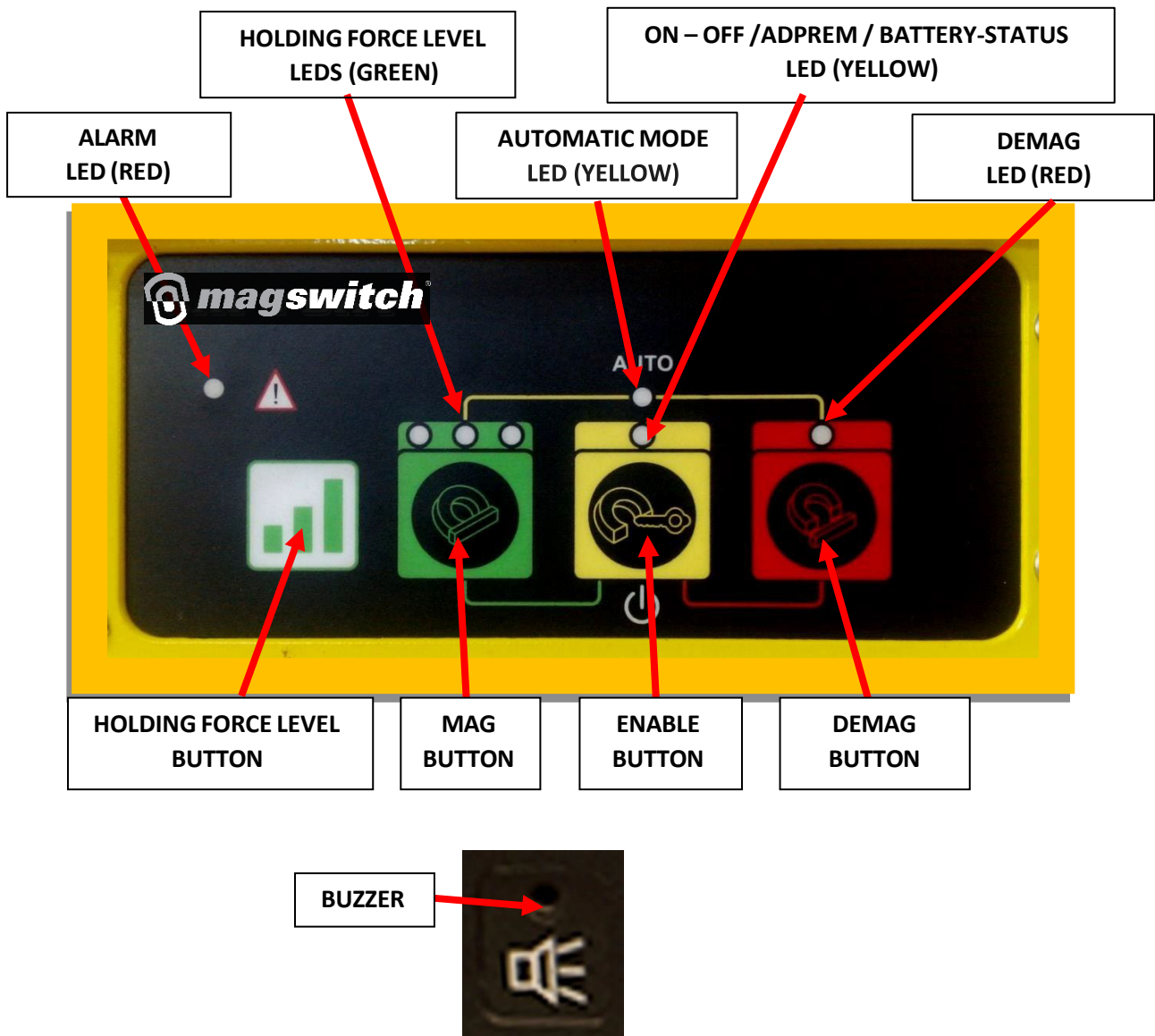
CE 2100



LOAD TYPE	LIFTING (Kg)	THICKNESS DICKE	Job size Maximum(mm.)		
			Length / Länge	Width / Breite	Diameter / Durchm
	950	≥40	2500	2000	—
	400	—	2500	—	200

CAUTION-ALWAYS LIFT LOAD HORIZONTALLY BALANCED LAST NUR WAAGRECHT AUSBALANZIERT HEBEN!

6. OPERATION



6.1. Power ON/OFF



To turn ON the lifting magnet, press the ENABLE button.
The BUZZER sounds briefly, and the status of the CE LIFTER is indicated.

To turn OFF, press and hold the ENABLE button until all the LEDs light and then release that button.

The CE LIFTERS automatically turns itself OFF after 5 minutes of inactivity.

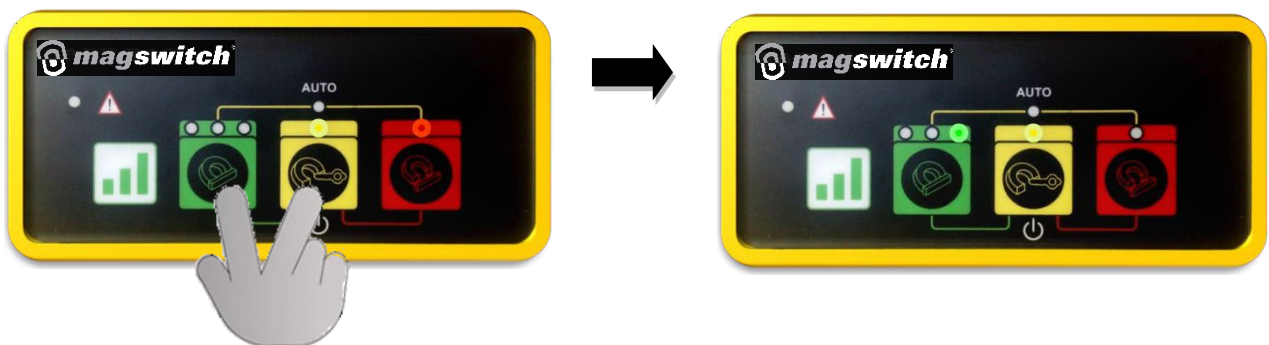
6.2. Before start-up

To prevent demagnetization of the load whilst it is suspended, the CE LIFTER is equipped with a safety device (ADPREM) attached to the D-shackle. Before magnetizing or demagnetizing, make sure that the lifting magnet has been completely lowered and the tension on the crane hook is fully relieved.



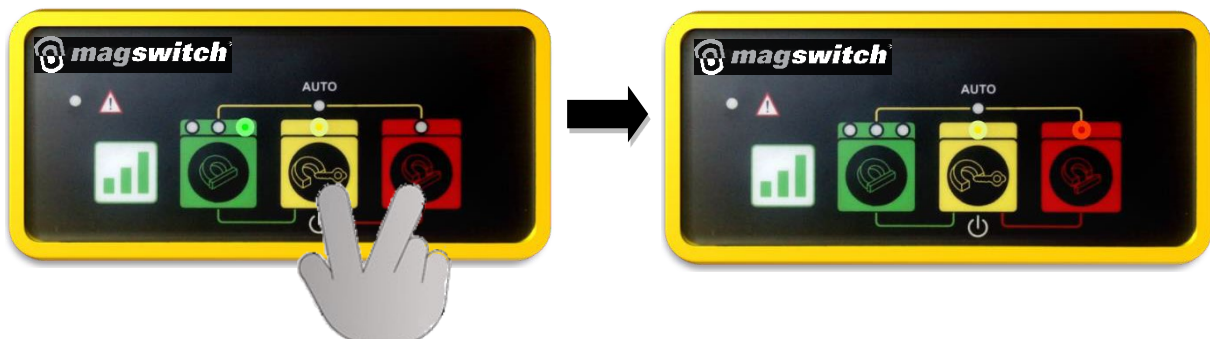
6.3. To Magnetize

The CE lifting magnet must be lowered. The yellow ADPREM / BATTERY-STATUS LED must light. For magnetizing, press the ENABLE and MAG buttons at the same time.



6.4. To Demagnetize

The CE lifting magnet must be lowered. The yellow ADPREM / BATTERY-STATUS LED must light. For demagnetizing, press the ENABLE and DEMAG buttons at the same time.



Note: Maximum 3 operations can be executed within 10 seconds.

6.5. Automatic mode

In automatic mode, the CE LIFTER automatically magnetizes / demagnetizes each time it is hoisted and then lowered.

Before using automatic mode make sure the ADPREM magnet is securely fastened.

CAUTION: Only use automatic mode in a restricted area free from personnel.

To activate the automatic mode, press the MAG and DEMAG buttons at the same time.

The yellow AUTOMATIC MODE LED lights up to show that the automatic mode is activated.



To deactivate the automatic mode, press the MAG and DEMAG buttons at the same time.

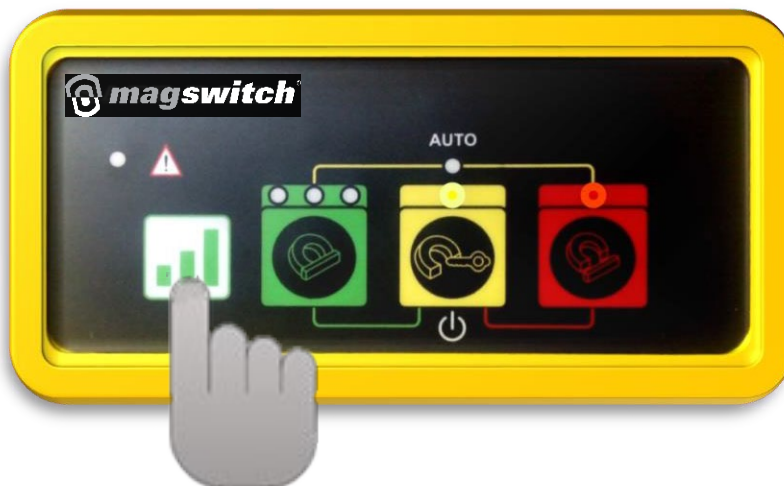
The yellow AUTOMATIC MODE LED goes off to show that the automatic mode is deactivated.

In automatic mode, the CE LIFTER turns itself automatically OFF after 15 minutes of inactivity.

6.6. Holding force levels

The CE LIFTER offers three holding force levels. By default, the level is always pre-set at the maximum holding force level 3.

The currently selected holding force level is indicated while pressing the associated button.



The three green LEDs above the MAG Button show the currently selected holding force level.

The holding force level can be changed only when the CE LIFTERS is demagnetized. Reduce the holding force in two cases: the sheet thickness is below 12mm or the lifting magnet hoists more than a single sheet. Safe lifting is only possible with one sheet hoisted at a time.

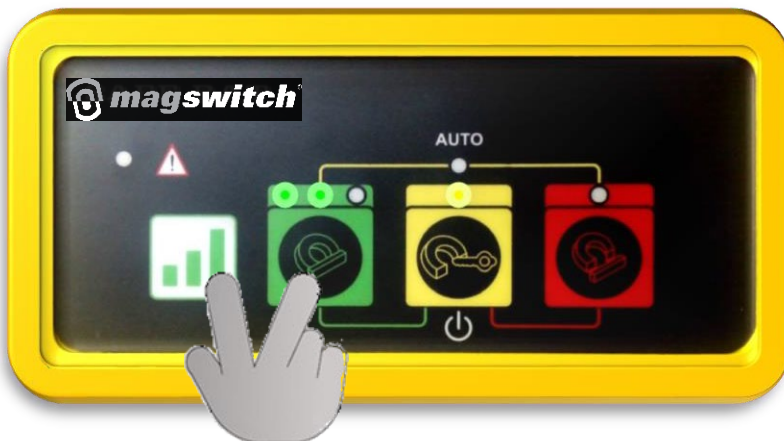


To change the holding force level, first press and hold the MAG button and then the HOLDING FORCE LEVEL button. Each time the HOLDING FORCE LEVEL button is pressed, the selected level changes as shown by the three green LEDs.

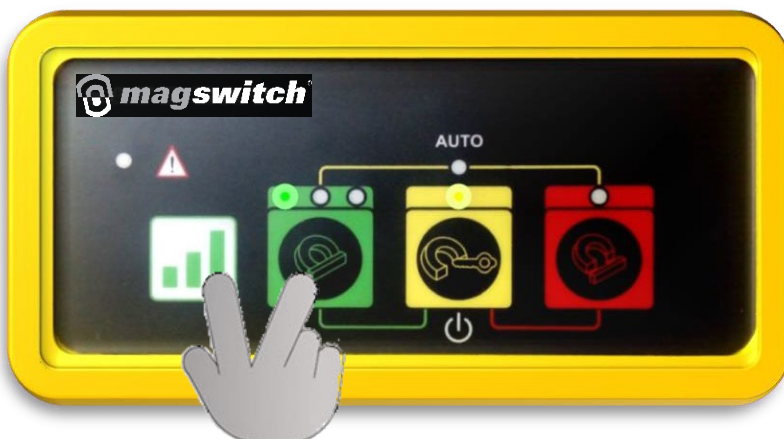
With level 3 all three green LEDs light.



With level 2 the left-hand and middle green LEDs light.



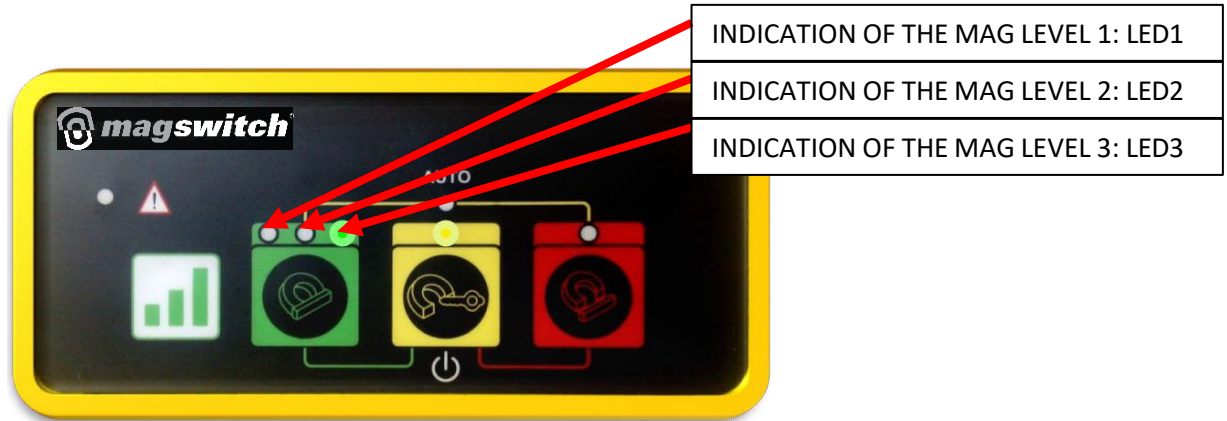
With level 1 the left-hand green LED lights.



Display of the holding force level after magnetizing

The CE LIFTER lifting magnet has been pre-set to magnetize at maximum holding force level 3 when switching ON.

- At maximum holding force level 3, the LED3 lights after magnetizing.
- At reduced holding force level 2, the LED2 flashes slowly after magnetizing.
- At reduced holding force level 1, the LED1 flashes quickly after magnetizing.




Example of the effect of the holding force level onto the holding force with 4mm sheet thickness

CE Lifters	Force on Steel Sheet of Thickness 4mm SWL (tear-off force) [kg]		
	Level 3	Level 2	Level 1
CE 440	50 (150)	33 (100)	20 (60)
CE 1100	100 (300)	67 (200)	47 (140)
CE 2100	167 (500)	107 (320)	73 (220)

Safe operation with reduced holding force level

In both normal and automatic mode, with level 1 or 2, the CE LIFTER lifting magnet automatically increases the magnetic force to the next higher level within 5 seconds after the load has been hoisted.

6.7. Indications given by the ADPREM / BATTERY-STATUS LED + BUZZER

	ADPREM / BATTERY-STATUS LED + BUZZER Indicates whether the CE LIFTERS is enabled for operation and the battery status.
OFF	LIFTING MAGNET HOISTED OPERATION DISABLED
ON	LIFTING MAGNET LOWERED BATTERY OK OPERATION ENABLED
SLOWLY FLASHING	LIFTING MAGNET LOWERED BATTERY LOW - CHARGE SOON! OPERATION ENABLED
FAST FLASHING + BUZZER	LIFTING MAGNET LOWERED BATTERY EMPTY- CHARGE IMMEDIATELY! MAGNETIZATION DISABLED
OFF + BUZZER	LIFTING MAGNET HOISTED BATTERY EMPTY- CHARGE IMMEDIATELY! OPERATION DISABLED

6.7.1. The CE LIFTERS is supplied with a 14.8 V Li-Po battery. When the battery voltage drops below a certain level, the yellow ADPREM / BATTERY-STATUS LED flashes slowly (when the lifter is lowered). The CE LIFTERS continues to operate but should be charged as soon as possible.

6.7.2. As soon as the battery voltage drops below a minimum level, the BUZZER sounds intermittently and the yellow ADPREM / BATTERY-STATUS LED flashes quickly (when the lifter is lowered). The battery must be charged immediately. In such condition, the CE LIFTERS can still be demagnetized but not magnetized.

6.7.3. When the battery voltage falls below its working condition, the CE LIFTERS turns itself OFF automatically and cannot be turned back ON until the battery has been completely charged.

6.8. ALARM LED + BUZZER

The red ALARM LED flashes if the current fails to reach the required level or comes on when no current is



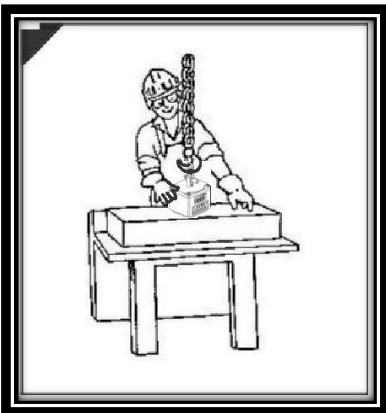
detected. The BUZZER also sounds to indicate such an alarm. See Section 11 TROUBLESHOOTING.

7. LIFTING



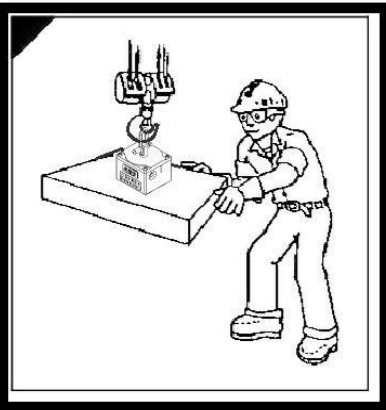
Inspect the condition of the lifting magnet each time before use.

Clean the magnetic poles as well as the contact surface area of the load.
Remove burrs.



Position the lifting magnet on the load prior to starting any operation.

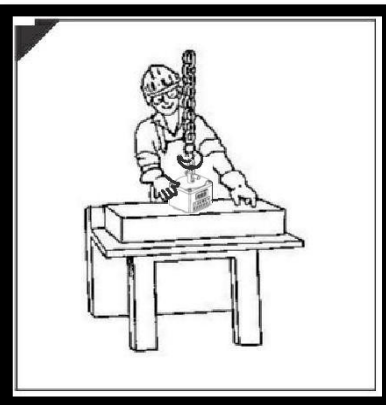
Press the MAG-button to magnetize.



Lift the load a short distance.

Inspect its balance.

Lift (or lower the load another time to correct its position).



Lower the Load.

Demagnetize.

The next lifting operation can be initiated now.

8. BATTERY CHARGER

Only use the charger supplied by Magswitch!

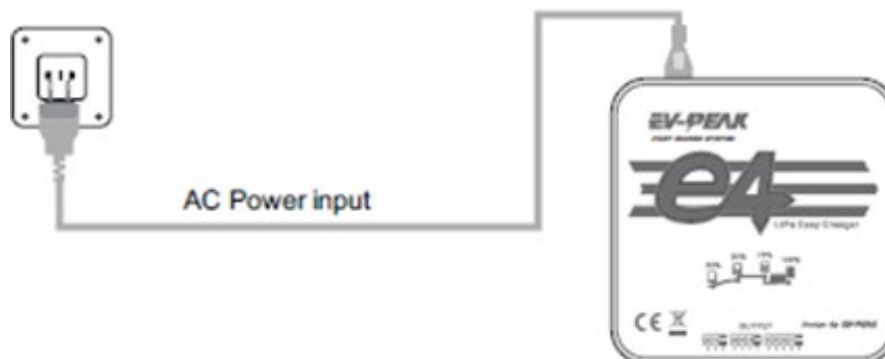
Always check the charging plug for proper orientation before connecting the CE LIFTERS!



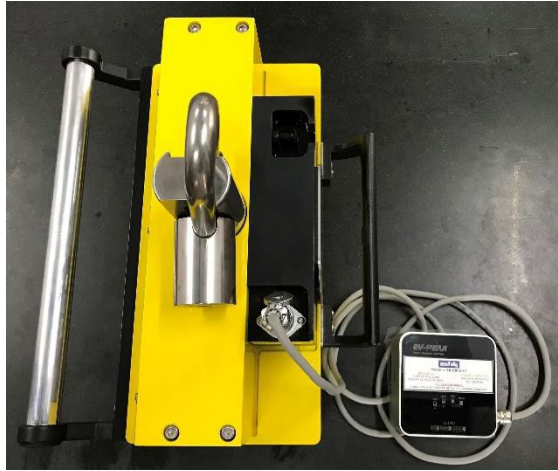
- Whenever the charger is connected with the lifter (CE 440) or the external battery module whilst it is still connected to the lifter (CE 1100/950), the CE LIFTERS powers down automatically. Therefore, the lifter cannot be used whilst charging.
- For CE 1100/950 an additional battery module may be purchased. The depleted battery module can then be replaced with a fully charged one. This allows the lifter to continue to be used whilst the depleted battery module is charged elsewhere.
- It takes approximately 3 hours to fully charge the CE LIFTERS battery.

8.1. Charging instructions

- a) Plug the charger in to the AC mains socket.



- b) After the charger self-check routine has finished (LEDs1/3 and LEDs2/4 will flash alternately), carefully plug the charger in to the CE LIFTERS charging point, making sure the connector is correctly orientated.



CE1100/950 exchangeable Battery Module or at
CE440 see page 4, SL-No.7

- c) Once the battery has been detected, the LEDs indicate the current battery level and charging begins.
- d) Once the battery has been fully charged (all four LEDs light), first disconnect the charger from the AC mains socket and then from the CE LIFTERS.

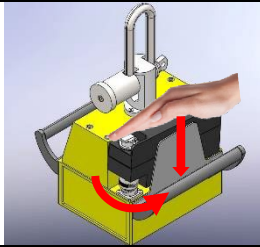
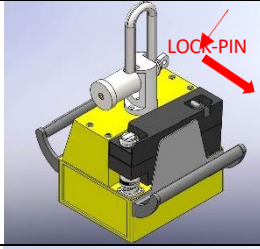
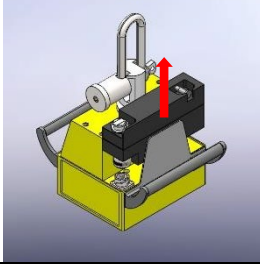
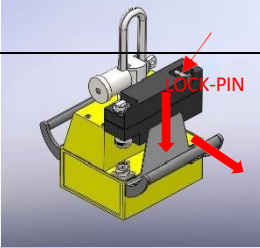
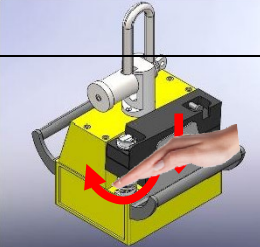
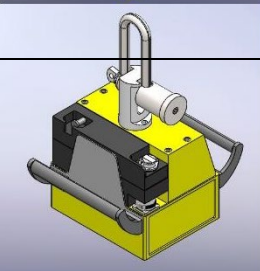
In case of fault, the four LEDs flash simultaneously. Disconnect the charger from the AC mains socket and then from the CE LIFTERS. Reconnect the charger as before. If charging is still not working correctly, then contact Magswitch.



8.2. Charger features and safety notes

- AC input voltage 100-240V, no transformer needed, worldwide safe operation.
- Small size, high power density.
- Convenient and fast to use, plug and play.
- Metal design provides for good heat dissipation.
- LED display visualizes the charging power from 25%-100%.
- Short circuit, over current and over temperature protection make the charger safe and reliable.
- Do not place the charger on an unstable cart, stand or table. If the charger falls, it could be damaged!
- Do not disassemble the charger, take it to a qualified service technician when service or repair is required. Improper assembly increases the risk of electric shock or fire.
- Never push any object into the air-vents of the charger since dangerous voltage points can be touched or parts short-circuited. Ignoring this instruction may lead to electric shock or fire.
- Unplug the charger from the mains socket when it is out of use for a prolonged period, left unattended or during thunderstorm. In this way, the charger is protected from lightning and power surges.
- Unplug the charger from the mains socket before maintenance or cleaning. Do not apply liquid or aerosol cleaners. Use damp cloth for cleaning only and then wipe dry immediately.
- If the charger does not operate properly, in particular with any unusual condition or escaping smell, unplug it immediately from the mains socket and contact a qualified service technician.

9. EXCHANGING THE BATTERY MODULE CE 1100 /950

To Remove the Battery Module		
1. Press the top face of the module down and rotate the bayonet connector anti-clockwise to unlock it.		
2. Pull the lock-pin out in the direction of the arrow.		
3. Pull the battery module upwards to remove it.		
To Fit the Battery Module		
1. Pull out the lock-pin and slide the battery module down to engage the connector.		
2. Press the top face of the module down and push in the lock-pin. Rotate the bayonet connector clockwise to lock it.		
3. The mounting of the battery module is complete.		

10. TROUBLESHOOTING

Problem	Cause	Remedy
CE LIFTERS cannot be enabled (ADPREM / BATTERY-STATUS LED does not light).	ADPREM has not been activated (see 6.2).	Check the ADPREM is not damaged or loose. Make sure that the shackle has been fully lowered so that the ADPREM is located closely to the top side of the lifting magnet.
When trying to power up, the BUZZER sounds and ADPREM / BATTERY-STATUS LED lights, but then CE LIFTERS turns off.	Battery level is too low (<14.2V)	Charge the battery as described in 'Charging Instructions'. If the problem persists, then contact Magswitch for a new charger and/or battery.
CE LIFTERS will not power up at all.	Battery may be damaged or have a bad cell.	Contact Magswitch for a new battery.
ALARM LED flashes. BUZZER sounds intermittently.	Current did not reach the level required for proper switching. Battery is too weak.	Charge the battery as described in 'Charging Instructions' and try again. If the problem persists, then contact Magswitch for a new charger and/or battery.
ALARM LED and BUZZER come on continuously.	No current was detected due to a component or wiring failure.	Contact Magswitch for a new PCB.