Operation Instructions for FXE Lifting Magnets

FLAIG
Magnetsysteme
St. Georgnerstr. 73 • 78739 Hardt
Tel.: +49 7422 940010 • Fax +49 7422 9400125
info@flaig-te.de • www.flaig-te.de

Operation Instructions for FXE Lifting Magnets

NOTE: Please read the operating and maintenance instructions prior to first use carefully. For questions or doubts you should contact your local dealer.
This manual is part of the lifting magnets and have to be available to the user at any time.

Caution:
Put the magnet on a tasks for which it is specifically adapted, in case of any doubts contact your dealer.
Do not change the original configuration of the device.
Please also note the regulations of the professional associations for handling slings.

1. SCOPE OF APPLICATION

FXE Lifting magnets are designed to lift flat steel parts, round materials may only be transported with special pole shoes!

2. TECHNICAL DATA:

Model	Dim. (mm)			Max. Load capacity (kg)	Weight (kg)	Voltage*	Fuse
	L	W	H				
FXE-300/50	164	164	420	300	23	400 V	16 A
FXE-500/50	234	164	420	500	31	400 V	16 A
FXE-750/50	298	164	250	750	27	400 V	16 A
FXE-1100/50	420	164	270	1100	39	400 V	16 A
FXE-1600/50	620	164	270	1600	56	400 V	16 A
FXE-L400/50+	294	95	450	400	23	400 V	16 A
FXE-L600/50+	420	95	450	600	31	400 V	16 A
FXE-L1000/50+	680	95	450	1000	44	400 V	16 A
FXE-1000/80	228	228	295	1000	39	400 V	25 A
FXE-2500/80	506	228	295	2500	77	400 V	25 A
FXE-4000/80	783	228	295	4000	132	400 V	25 A
FXE-1600/100	296	296	125	1600	82	400 V	25 A
FXE-2400/100	415	296	335	2400	118	400 V	25 A
FXE-3200/100	536	296	335	3200	78	400 V	25 A
FXE-4800/100	778	296	400	4800	202	400 V	35 A
FXE-7200/100	778	415	400	7200	389	400 V	35 A
*Possibly 230V							

3. INTENDED USE

The Lifting Magnet FXE is controlled via 4 built pushbuttons, they are from left to right:

PICK-UP with red LED • FULL-MAG with green LED • SAFE with orange LED • DE-MAG with white LED

3.1 Connect the lifting magnets at 400V mains voltage. The white LED above the button DE-MAG flashes to indicate that the magnet is in an undefined state.

3.2 Lifting in PICK-UP mode:

To check whether the workpiece can be transported with sufficient safety, or to lift a single sheet metal from a stack. Place the magnet on the workpiece and press the PICK-UP button, the orange Cycyle LED will flash briefly above the SAFE key. The red LED above the PICK-UP button then lights up to indicate that the
magnet is activated with partial power. **In this state, the workpiece may only be lifted slightly but must not be transported under any circumstances!**

3.3 Transport in FULL-MAG operation:

After checking the safety by means of the PICK-UP operation or directly from the DE-MAG switching state, the maximum magnetization can be triggered with this key. After pressing, the orange cycle LED above the SAFE key lights up briefly and then the green status LED above the FULL-MAG key turns on to indicate that the maximum magnetization has occurred. Carry out transports only if the green LED lights up and the alarm LED (SAFE) does not flash!

3.4 Releasing the workpiece by DE-MAG:

To release the workpiece, the SAFE and DE-MAG keys must be pressed simultaneously. The orange cycle LED above the SAFE key lights up briefly and then the white status LED above the DE-MAG key lights up.

Operation Instructions for FXE Lifting Magnets

LED status displays

The magnet is partially magnetized; ready for full magnetization.

The magnet is fully magnetized; ready for demagnetization.

The magnet is demagnetized; ready for magnetization.

The magnet is magnetized: ready for demagnetization.

Additional LED status indicators:
3.3 If there is insufficient magnetization the orange LED flashes above the SAFE button as an alarm signal. The cause may be a weak supply network, insufficient cable cross-sections, or a too high power internal resistance at the connection point.

Caution:
- Never activate the magnet before it is seated on the load - the achievable holding forces were up to 10x lower than when activating on the load!
- Perform command DEMAG only when the Load is laying secured!
- Disconnect the magnet only when its demagnetized!

Operation Instructions for FXE Lifting Magnets

4. FACTORS AFFECTING THE LIFTING FORCE OF THE LIFTING MAGNETS

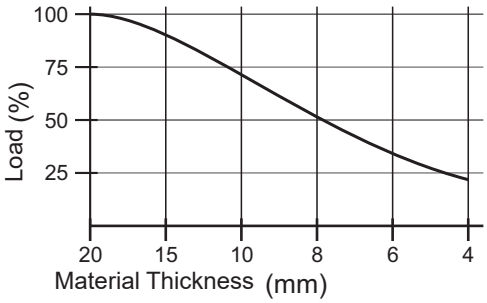
On the underside of the lifting magnets are the two magnetic poles, which transmit the magnetic force in the activated state to the load. The maximum possible forces and thus the Lifting capacity depend on the factors described in 4.1-4.5. Note this anytime and check BEFORE any application, whether the data of the lifting magnets and the load allows a safe transportation.

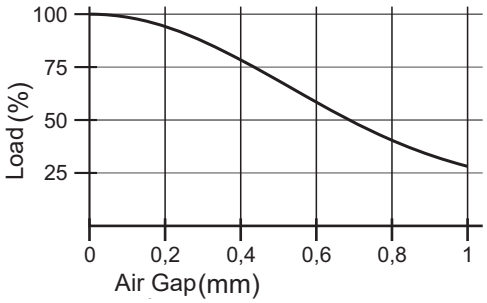
4.1 THE CONTACT SURFACE

The contact area between Lifting magnet and the load to be lifted should be clean and free of irregularities in any case. If a distance (air gap) is made between the lifting magnets and the load to be lifted, this reduces the lifting capacity. Rust, paint, dirt, paper, or a roughly machined surface can thus have an air gap result.

Example: FXE 400/50 is the pole size 50, FXE 500/80 is the pole size 80, etc.

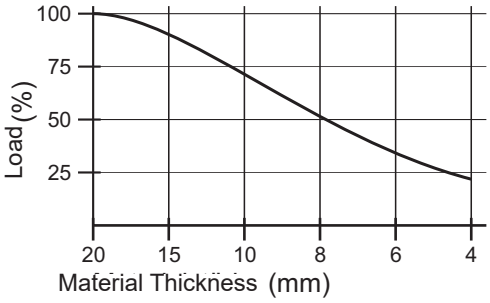
Pole Structure 50

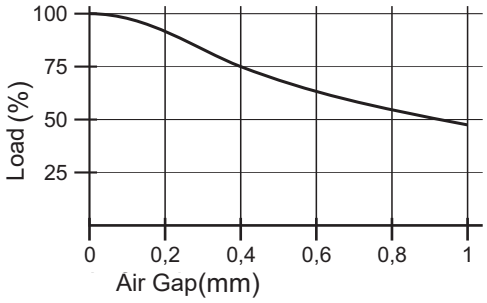




The nominal values of the FXE Lifting magnets with pole structure type 50 are achieved up to an Air gap of 0.3 mm.
With air gap 0, the pole structure 50 reaches a holding force of 3.8 kN.

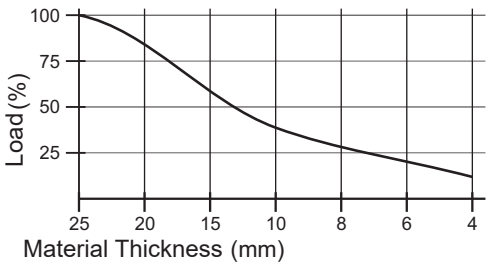
Pole Structure 50+

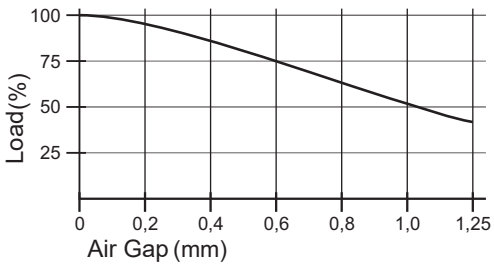




Pole structure 50+ has a reinforced Magnetic system with the same Pole size as the pole structure 50. With air gap 0, the pole structure 50+ reaches a holding force of 3.8 kN.

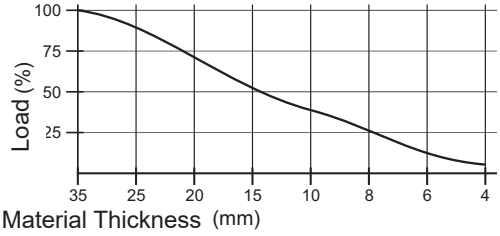
Pole Structure 80

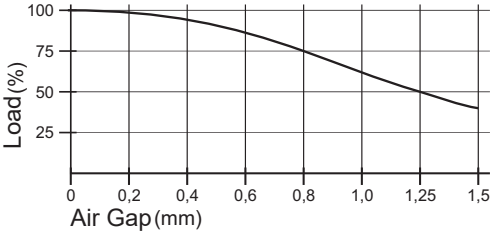




The nominal values of the FXE Lifting magnets with pole structure 80 are achieved up to an air gap of 0,4mm. With air gap 0, the pole structure 80 reaches a holding force of 9 kN.

Pole Structure 100





The nominal values of the FXE Lifting magnets with pole structure 100 are achieved up to an air gap of 0,6mm. With air gap 0, the pole structure 100 reaches a holding force of 14.5 kN.

Operation Instructions for FXE Lifting Magnets

4.2 THE MATERIAL THICKNESS

The magnetic flux of the lifting magnets requires a minimum material thickness. If the workpiece does not accomplish a minimum material thickness, this will reduce the lifting force. Basically higherv Lifting capacity requires increasing the thickness.

FXE-300/50

Max. Load capacity at sheet and 4-square Tubes*		
Material- / Wall thickn.	max. Load (kg)	max. Dimensions
from 4 mm	70	1800x1500 mm
from 6 mm	140	2000x1500 mm
from 8 mm	200	2000x1500 mm
from 10 mm	280	2000x1500 mm
from 15 mm	300	2000x1500 mm

FXE-500/50

Max. Load capacity at sheet and 4-square Tubes*		
Material- / Wall thickn.	max. Load (kg)	max. Dimensions
from 4 mm	100	1800x1500 mm
from 6 mm	200	2000x1500 mm
from 8 mm	300	2000x1500 mm
from 10 mm	400	2000x1500 mm
from 15 mm	500	2000x1500 mm

FXE-750/50

Max. Load capacity at sheet and 4-square Tubes*		
Material- / Wall thickn.	max. Load (kg)	max. Dimensions
from 4 mm	150	1800x1500 mm
from 6 mm	250	2000x1500 mm
from 8 mm	400	2000x1500 mm
from 10 mm	600	2000x1500 mm
from 15 mm	750	3000x1500 mm

FXE-1100/50

Max. Load capacity at sheet and 4-square Tubes*		
Material- / Wall thickn.	max. Load (kg)	max. Dimensions
from 4 mm	200	2000x1500 mm
from 6 mm	370	3000x1500 mm
from 8 mm	600	3000x1500 mm
from 10 mm	900	3000x1500 mm
from 15 mm	1100	3000x1500 mm

FXE-1600/50

Max. Load capacity at sheet and 4-square Tubes*		
Material- / Wall thickn.	max. Load (kg)	max. Dimensions
from 4 mm	300	3000x1500 mm
from 6 mm	500	3000x1500 mm
from 8 mm	800	3000x1500 mm
from 10 mm	1400	3000x1500 mm
from 15 mm	1600	3000x2000 mm

FXE-1000/80

Max. Load capacity at sheet and 4-square Tubes*		
Material- / Wall thickn.	max. Load (kg)	max. Dimensions
from 8 mm	200	2000x1500 mm
from 10 mm	300	2000x1500 mm
from 15 mm	600	2000x1500 mm
from 25 mm	1000	2000x1500 mm

FXE-2500/80

Max. Load capacity at sheet and 4-square Tubes*		
Material- / Wall thickn.	max. Load (kg)	max. Dimensions
from 8 mm	500	2000x1500 mm
from 10 mm	750	3000x1500 mm
from 15 mm	1500	3000x1500 mm
from 25 mm	2500	3000x1500 mm

FXE-4000/80

Max. Load capacity at sheet and 4-square Tubes*		
Material- / Wall thickn.	max. Load (kg)	max. Dimensions
from 8 mm	800	3000 x 1500 mm
from 10 mm	1200	3000 x 1500 mm
from 15 mm	2400	3000 x 1500 mm
from 25 mm	4000	4000 x 1500 mm

FXE-1600/100

Max. Load capacity at sheet and 4-square Tubes*		
Material- / Wall thickn.	max. Load (kg)	max. Dimensions
from 10 mm	400	2000x1500 mm
from 20 mm	1000	2000x1500 mm
from 35 mm	1600	3000x2000 mm

FXE-2400/100

Max. Load capacity at sheet and 4-square Tubes*		
Material- / Wall thickn.	max. Load (kg)	max. Dimensions
from 10 mm	600	2000x1500 mm
from 20 mm	1500	3000x2000 mm
from 35 mm	2400	3000x2000 mm

FXE-3200/100

Max. Load capacity at sheet and 4-square Tubes*		
Material- / Wall thickn.	max. Load (kg)	max. Dimensions
from 10 mm	800	3000x2000 mm
from 20 mm	2200	3000x2000 mm
from 35 mm	3200	4000x2000 mm

FXE-4800/100

Max. Load capacity at sheet and 4-square Tubes*		
Material- / Wall thickn.	max. Load (kg)	max. Dimensions
from 10 mm	1200	3000 x 2000 mm
from 20 mm	3000	4000 x 2500 mm
from 35 mm	4800	4000 x 3000 mm

FXE-7200/100

Max. Load capacity at sheet and 4-square Tubes*		
Material- / Wall thickn.	max. Load (kg)	max. Dimensions
from 10 mm	1800	3000x1500 mm
from 20 mm	3300	4000x2000 mm
from 35 mm	7200	4000x2500 mm

FXE-L400/50+

Max. Load capacity at sheet and 4-square Tubes*		
Material- / Wall thickn.	max. Load (kg)	max. Dimensions
from 4 mm	70	1800x1000 mm
from 6 mm	140	2000x1000 mm
from 8 mm	200	2000x1000 mm
from 10 mm	250	2500x1000 mm
from 20 mm	400	3000x1000 mm

Operation Instructions for FXE Lifting Magnets

FXE-L600/50+

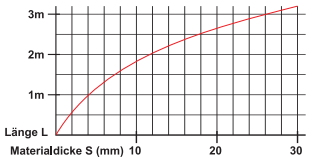
Max. Load capacity at sheet and 4-square Tubes*		
Material- / Wall thickn.	max. Load (kg)	max. Dimensions
from 4 mm	100	2000x1000 mm
from 6 mm	200	2500x1000 mm
from 8 mm	300	2500x1000 mm
from 10 mm	350	3000x1000 mm
from 20 mm	600	4000x1000 mm

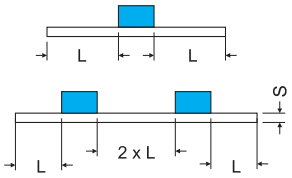
FXE-L1000/50+

Max. Load capacity at sheet and 4-square Tubes*		
Material- / Wall thickn.	max. Load (kg)	max. Dimensions
from 4 mm	150	2500x1500 mm
from 6 mm	300	3000x1500 mm
from 8 mm	400	3000x1500 mm
from 10 mm	500	4000x1500 mm
from 20 mm	1000	5000x1500 mm

4.3.THE WORKPIECE DIMENSIONS/INTRINSIC STABILITY

At great length and width of the workpiece it bends through and formes an air gap between the workpiece and the lifting magnets (primarily at low thicknesses). This reduces the lifting force of the lifting magnets. Not intrinsically stable workpieces also vibrate more than massive workpieces and the resulting, the dynamic forces act in addition to the contact surface.





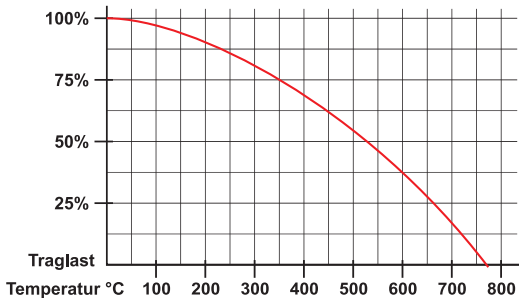
4.4 THE COMPOSITION OF THE LOAD TO BE LIFTED

Steel with low carbon content is a good magnetic conductor e.g. C-40 or St -37. Steel with a high carbon content or with other materials alloyed steel loses its magnetic properties, so that the power of the lifting magnets is reduced. Hardness and other methods which affect the steel structure also reduce the lifting power. The harder a steel, the lower its response to magnetic fields and it tends to residual magnetism.
The nominal power of our Lifting magnets applies to steel with low carbon content, such as e.g. C-40 or St-37.

Material	Lifting capacity in %
mild steel 0,1 - 0,3 % C ST37/52	**100**
mild steel 0,4 - 0,5 % C	**90**
alloyed steel 2312/2379...	**80 - 90**
cast iron GGG	**70 - 80**
cast iron GG	**45 - 60**
alloyed steel hardened at 55-60 HRc	**40 - 50**
stainless steel	**0**
Brass, aluminum, copper	**0**

4.5 THE TEMPERATURE OF THE LOAD TO BE LIFTED

The higher the temperature, the faster the molecules of the steel swing, which causes a lower magnetic conductivity. Our figures are for a workpiece temperature up to max. 80°C.



CAUTION: You have to combine all the factors which reduce the lifting power and observe one to another.

5. INSTRUCTIONS FOR COMMISSIONING AND OPERATION

To use the lifting magnets correctly , the device is to be placed on a clean, flat and smooth as possible steel surface of the load. The max. potential loads are shown in Table 1. For rough surfaces or thin steel parts is to reduce the lifting force correspondingly Chart 1 taken into account, as well as the other reduction factors in paragraph 4.

Notes on commissioning

Assignment:
Lifting magnets may be used only by persons who are familiar with these duties and when there is a commission. When handling loads the boundaries for the manual lifting and carrying of loads by a person have to be observed:

Persons:	**Frequent Lifting and carrying under average Working conditions**	**Occasional Lifting and carrying under favorable Working conditions**
Men	18 to 25 kg	40 to 50 kg
Women	8 to 10 kg	13 to 15 kg
pregnant Women	5 kg	10 kg

Personal Safety
Please note that safety clothing (helmet, gloves, safety shoes) must be worn when handling lifting magnets in order to minimise any risks.

Operation
Lifting magnets are applied, they are not charged on their carrying capacity addition and that the load is secured against falling. The following further points should be observed in handling lifting magnets:

- Loads are running loose items may not be transported.
- Initially raise only a few centimeters and check whether the load securely holds.
- Loads have to be raised and depose that accidental falling, falling apart, slipping or Unrolling of the load is avoided.
- With lifting magnets dangerous goods shall not be lifted.
- Lifting magnets are applied in a way, that people are not endangered.
- A load slippage in lifting operation must be avoided.
- No lift loads while persons resident in the work area
- never Embark under suspended loads
- Lifting Magnet only switch on suitable load
- Do not overload Hoist and slings, also calculate the weight of the lifting magnets.
- Do not poke suspended loads or put them in vibration

6. RISKS / DEFECTS / DAMAGES

Lifting magnets are applied so that damage which can lead to impairment, is avoided .
Lifting magnets are observed during use for visible defects.
Obvious defects are, for example, deformation, cracks, breaks, incomplete labeling drawings. Lifting magnets with deficiencies which may affect the safety, must be withdrawn further use (replacement state).

Note in particular:
- No lifting of uneven and porous workpieces.
- Avoid burrs, sharp corners and edges.
- lift surfaces must be clean, dry, free from oil and grease and any loose surfaces coatings etc.
- An unintentional detachment from the crane hook must be avoided.
- Knocks, blows and falls are to be avoided in any case.
- Apply the Lifting magnet just in a dry environment.
- Oil the moving parts from time to time and protect it at the magnetic poles Between longer intervals use corrosion protection.

7. REPAIR AND TESTING

Repair

Repair work on lifting magnets may be carried out by persons who have the necessary knowledge and skills (experts).

Testing

Examination before the first start

Lifting magnets may only be put into operation if any defects have been fixed and checked by a specialist.

Regular inspections

Lifting magnets must be checked from an expert at intervals not exceeding one year.

Extraordinary inspections

After damage or special events that may affect the viability, and are subjected to repair, an extraordinary inspection by specialist is neccessary

Extent

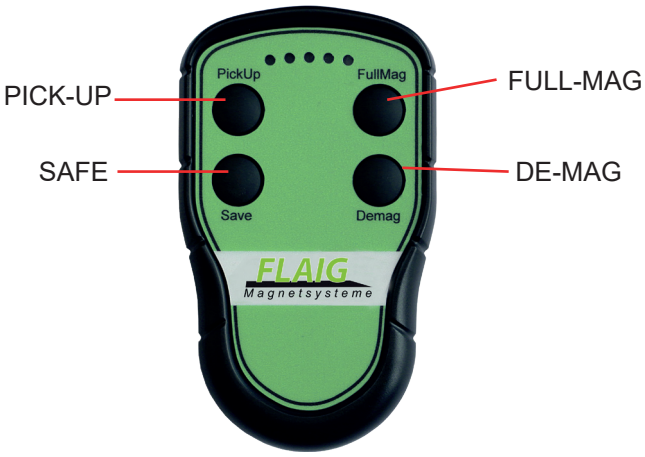
The inspection before the initial commissioning and regular tests are essentially visual and functional tests. You have to extend to examination of the condition of the components and devices on the intended assembly and for completeness and effectiveness of safety devices.
The extent of the exceptional test depends on the nature and extent of the pollution, the incident or repair. The tests must be documented.

8. STORAGE AND DISPOSAL

Lifting magnets have to be stored in a way they do not tilt, fall or can slide. Lifting magnets should be stored protected from the weather and corrosive substances. For longer storage, it is advisable to lubricate the device. At the end of the use of lifting magnets or at end of life, the device must be disposed of properly and environmentally friendly, take note of the relevant provisions of the relevant authorities.

Operation Instructions for FXE Lifting Magnets

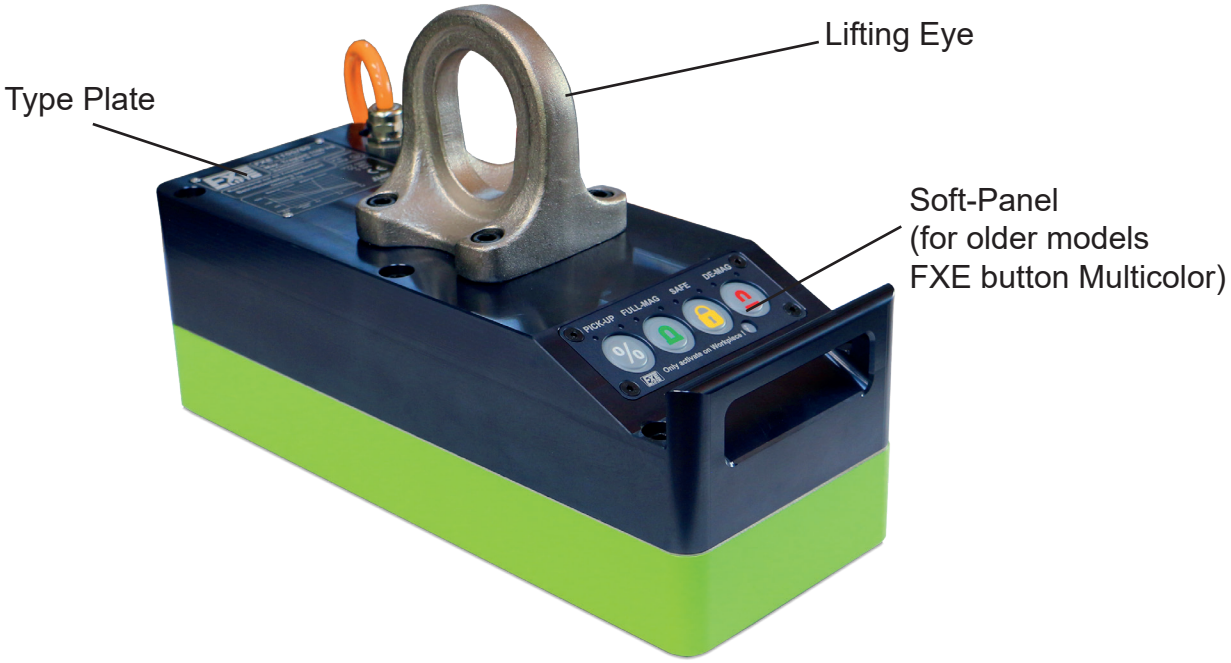
9. RADIO REMOTE CONTROL:
Please note when using the remote control:
First press the red button for ON/OFF; the Green Radio LED lights
- For switching aim for the magnet.
- Function and operation of each button see section 3 of this manual!
- Operate the magnet only by one person!
- Max. Reach 8m
- When the red Battery-LED lights change the battery

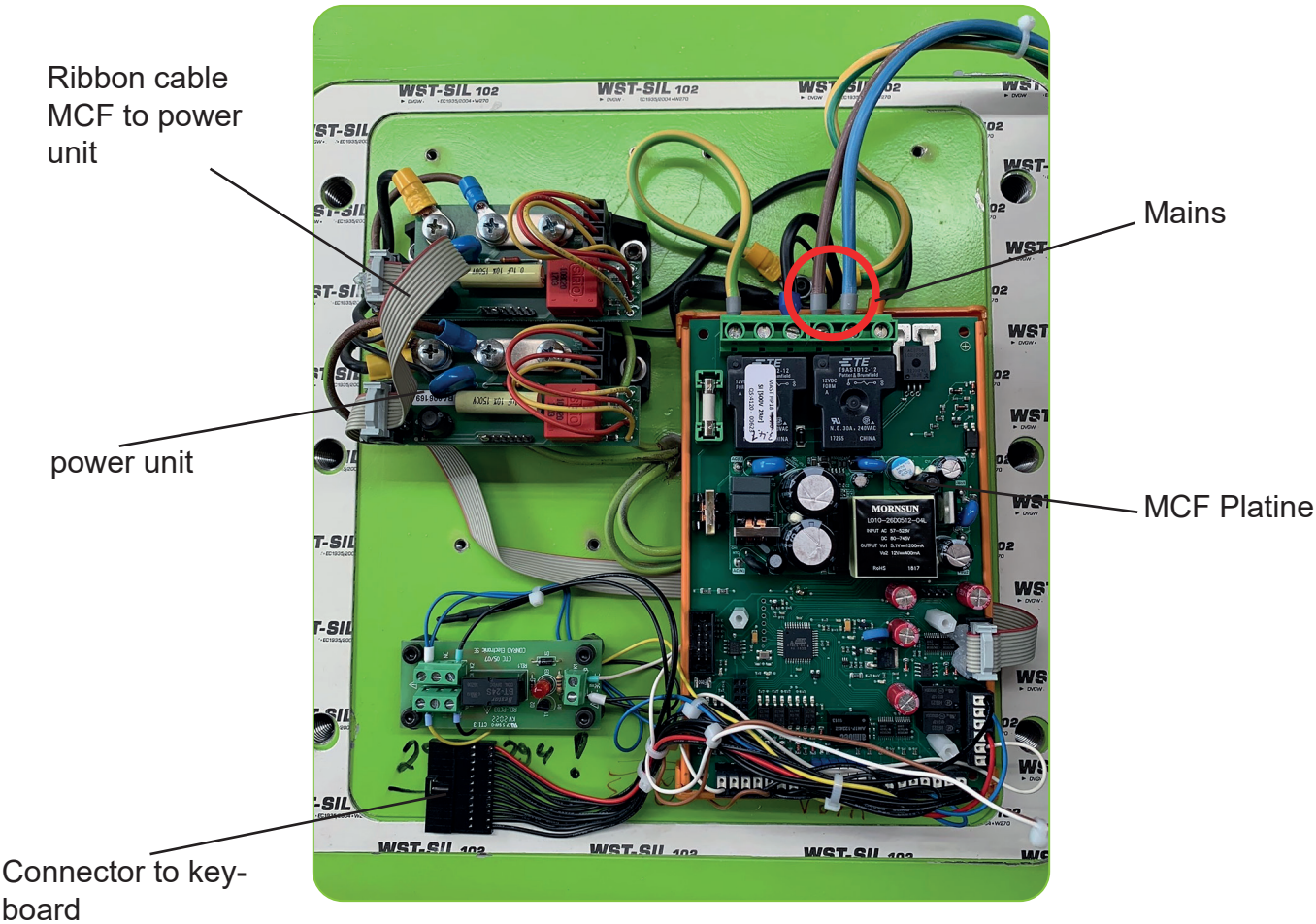


10. LIFTING SENSOR:
With integrated Lifting Sensor "Mangentize" and "Demagnetize" on floating Load and Lifting Magnet is not possible!

11. Spare Parts

Below you will find a list of the common spare parts for our FXE electro-permanent lifting magnets. If you need a spare part, please contact your dealer.





EC declaration of conformity

For load handling equipment to confirm compliance with the Machinery Directive 2006/42/EC, Annex 2A, Directive 2014/30/EU, Directive 2014/35/EU.

Explained herewith:

Flaig Magnetsysteme GmbH & Co. KG
Feurenmoos 15
D-78739 Hardt
Germany

That the separately placed load handling equipment with the following safety function is placed on the market:
Electromagnetic permanent magnet for transporting flat ferromagnetic workpieces by crane.

Model	Max. Load on Flat material	From Material thickness	Max. Towing Load
FXE-300/50	300 kg	15 mm	0
FXE-500/50	500 kg	15 mm	0
FXE-750/50	750 kg	15 mm	0
FXE-1100/50	1100 kg	15 mm	0
FXE-1250/50-S	1250 kg	15 mm	0
FXE-1600/50	1600 kg	15 mm	0
FXE-L 400/50+	400 kg	20 mm	0
FXE-L 600/50+	600 kg	20 mm	0
FXE-L 1000/50+	1000 kg	20 mm	0
FXE-1000/80	1000 kg	25 mm	0
FXE-1500/80	1500 kg	25 mm	0
FXE-2500/80	2500 kg	25 mm	0
FXE-4000/80	4000 kg	25 mm	0
FXE-1600/100	1600 kg	35 mm	0
FXE-2400/100	2400 kg	35 mm	0
FXE-3200/100	3200 kg	35 mm	0
FXE-4800/100	4800 kg	35 mm	0
FXE-7200/100	7200 kg	35 mm	0

S-No. : 0119 E_ _ _ _ 001 bis 1299 E_ _ _ _ 099

Comply with the provisions of Machinery Directive 2006/42/EC and the national laws implementing them.
Applied harmonized standard: EN ISO 12100:2010, EN 13155:2022

Hardt/Germany 01.01.2019

Horst Flaig (Documentation) **Horst Flaig (CEO)**

FLAIG
Magnetsysteme

SICHERHEITS-HINWEISE

HANDLING INSTRUCTIONS / CONSIGNES D´UTILISATION

Es besteht Verletzungsgefahr bei unsachgemäßer Behandlung von Magneten. Daher sollten Sie im Umgang mit Magneten folgendes unbedingt beachten:

Magnets can represent risks of injury in case of inproper handling. We therefore recommend to respect the following instructions when handling with magnets:

Les aimants peuvent représenter un risque de blessure en cas d´utilisation inadequate. C´est pourquoi nous vous conseillons de respecter les instructions suivantes concernant l´utilisation des aimants:

Die starken, anziehenden Kräfte der Magnete sind eine mögliche Gefahrenquelle - die Haut kann gequetscht (eingeklemmt) werden. Wir empfehlen deshalb mit geeigneten Schutzmaßnahmen zu arbeiten und zu vermeiden, dass Finger bzw. Haut zuwischen die Magnete geraten! Bitte beachten Sie, dass sich Magnete selbst aus großen Abständen anziehen können - es besteht auch hier Verletzungsgefahr!

The strong adhesive forces of magnets are representing a possible source of danger - skin could be squeezed. We suggest therefore to work with usefull protection measures and to avoid, that fingers or skin are placed among the magnets!
Please pay attention, that magnets can be adhesive even over gib distances - here as well are existing dangers of injury!

Les grandes forces d´attraction magnétique représentent une source de risques potentiel - la peau pourrait être coincée. Nous recommandons donc de travailler avec des mesures de protection appropriées et d´eviter que les doigts ou la peau ne soient placés entre les aimants!
Attention, les aimants peuvent aussi s´attirer sur des grandes distances - dans ce cas aussi il existe des risques de blessure!

Magnete können beim Zusammenprallen in scharfkantige Teile splittern. Jeglicher Zusammenprall sollte daher vermieden werden!

Magnets can splitter into sharp pieces when crashing. Therefore any chrash should be avoided!

Les aimants frittés éclatent en débris coupants en cas de choc. C´est la raison pour laquelle les chocs doivent être évités!

Magnete dürfen nicht in explosionsgefährdeter Umgebung eingebaut werden, weil sie Funken auslösen und Explosionsgefahr besteht!

Magnets are not allowed to be installed in explosive areas, as they can set off sparks which could cause explosions!

Les aimants ne doivent pas être montés dans un environnement explosif, car ils peuvent provoquer des étincelles qui pouraient déclencher une explosion!

Starke Magnetfelder können elektrische bzw. elektronische Geräte beeinflussen oder beschädigen. Dies gilt auch für Herzschrittmacher. Personen mit Herzschrittmacher müssen einen Sicherheitsabstand von mindestens 1 Meter einhalten!

Strong magnetic fields can influence or destroy electronic equipment. Persons with pacemakers must keep a safety distance of at least 1 meter!

Les champs magnétiques peuvent influer ou endommager les appareils électriques ou électroniques. Cela s´applique aussi pour les stimulateurs cardiaques. Les personnes portant un stimulateur cardiaque doivent respecter une distance de sécurité d'au moins 1 mètre !

Nachteilige Auswirkungen von Magnetfeldern auf den menschlichen Körper sind uns nicht bekannt.

Negative effects of magnetic fields to the human body are unknown to us.

Des effets défavorables de champs magnétiques sur le corps humain nous ne sont pas connus.