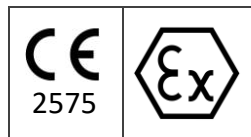


Type  
 EXD130\_XXX\_0891  
 EXD160\_XXX\_0891  
 EXD180\_XXX\_0891



## USE AND MAINTENANCE MANUAL

### ABOUT THIS DOCUMENT

This document provides the necessary information on installation, use and maintenance for the holding electromagnets EXD series. This document is intended for qualified, trained, and informed persons who are fully capable of understanding them and with the technical knowledge in relation to the risk of explosion (and related classified hazardous areas). Always attach this document to the documentation of the application in which the holding electromagnet is installed. This document must be available for consultation at any time and for the whole service life of the holding magnet.

**ELFRI accepts no responsibility whatsoever for damage and/or injury to persons, animals or property caused by failure to observe the prescriptions contained in this document.**

The electromagnets are certified for use in hazardous areas zone 1, 2 (gas, mist, vapour) and zone 21, 22 (dust). It is designed for use in potentially explosive areas of category 2, equipment group II

- Foreseeable applications are: holding, lifting and handling of ferrous pieces and parts of machines.

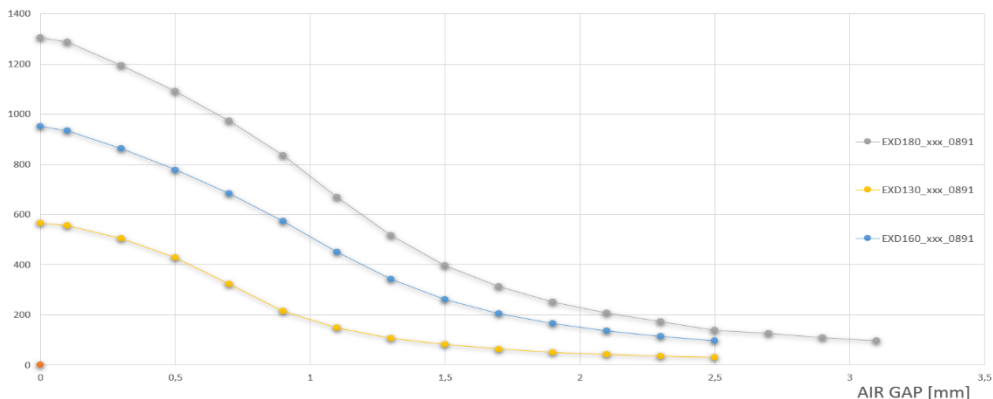
The operating principle is based on the creation of an electromagnetic field through the application of electricity to the inner enamelled round copper wire (air coil). The component that is magnetized is the magnetic core (i.e. the central metal and outer ring surfaces of the holding electromagnet). When powered, the electromagnet retention force is made active and a suitable object/surface can be attracted. On the other hand, when the supply voltage is cut off, the electromagnet loses its retention force.

### INTENDED USE

In order to guarantee the foreseen retention force (see technical data below) and the proper industrial/safety application, the object/surface to be attracted shall fall within the following characteristics/values:

Material: ferrous	Surface ≥ magnetic core surface (see technical data below)	Thickness ≥ 20 mm	Air gap: see table below
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HOLDING FORCE [daN]



Any object/surface is excluded from ELFRI supply.

**ATTENTION!** Any use or value different from the ones written above cannot guarantee sufficient safety and reliability and are therefore strictly forbidden.

The type code of product is:

**EXD yyy\_XXX\_0891**

PRODUCT SERIES \_\_\_\_\_ ELFRI TECHNICAL SPECIFICATION  
 PRODUCT MODEL \_\_\_\_\_ ADMITTED PRODUCT VARIANTS

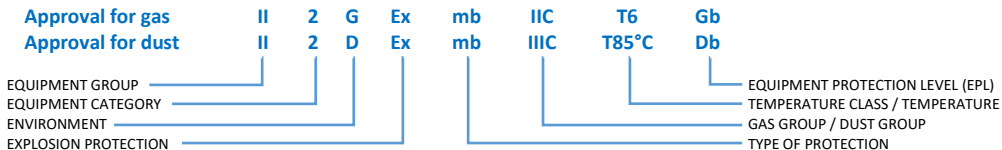
SEE TECHNICAL DATA BELOW

yyy = replaced values as per technical data as table below

xxx = values replaced by the ELFRI technical department, limited to acceptable ATEX variants

The holding electromagnet is explosion-proof EU-type approved in compliance with ATEX Directive 2014/34/EU.

It is designed, manufactured and tested for use in hazardous areas of category 2 [zone 1, 2 (gas, mist, vapour) and zone 21, 22 (dust)], equipment group II, with potentially explosive atmospheres, according to the Ex Marking affixed on it:



**ATTENTION!** Any use in areas different from the ones written above cannot guarantee sufficient safety and reliability and is therefore strictly forbidden.



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Rev. 00

Dated 31.05.2023

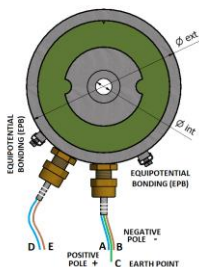
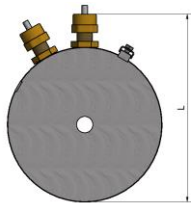
## HOLDING ELECTROMAGNET

Type

EXD130\_XXX\_0891

EXD160\_XXX\_0891

EXD180\_XXX\_0891

  
2575


### TECHNICAL DATA

		EXD130_XXX_0891	EXD160_XXX_0891	EXD180_XXX_0891
Retention force		540 daN	990 daN	1300 daN
Supply voltage *		48 V <sub>DC</sub> apply to terminals A and B		
Ripple max. *		20 %		
Absorbed current		0.65 A	1.22 A	1.56 A
Power consumption		31 W	59 W	75 W
Duty cycle *		40 %		
Switch ON * / Switch OFF		6 s / 9 s		<b>⚠ WARNING ⚠</b>
Cycles per hour		240		
Degree of protection EN 60529		IP65		
Materials		Housing: S235JR or S355JR Encapsulation (compound): epoxy potting resin		<b>⚠ WARNING ⚠</b> <b>KEEP AWAY FROM UV RAYS</b>
Dimensions	Øext x H x L	130 x 60 x 155 mm	160 x 60 x 185 mm	180 x 60 x 205 mm
	Øint	17 mm		
Weight		4.6 kg	7.5 kg	10.0 kg
Ambient temperature *	Normal	-20°C +40°C		
	Storage	-20°C +60°C		
* <b>ATTENTION!</b> Failure to comply with the above values can irreparably damage the holding electromagnet and negatively affect the retention force; therefore a sufficient safety and reliability cannot be guaranteed. <b>Designed for a specific duty cycle, as above indicated.</b>				
Electrical connection	High temperature cable: two wires (A and B) + PE wire for the internal air coil 1 mm <sup>2</sup>			
	High temperature cable: two wires (D and E) for thermal protection circuit 1 mm <sup>2</sup>			
	EPB for external equipotential bonding (minimum 4 mm <sup>2</sup> single wire). Screws torque 5.5 Nm			
Thermal protection	The holding electromagnet is provided with two self-resetting thermal protectors (cabled in series) and one thermal fuse. Maximum switching value for the temperature monitors: 5A, 250Vac/48Vdc. Refer to the wiring diagram on the next page for further details.			

### SAFETY PRESCRIPTIONS

Carefully respect all the national and international laws, standards and regulations in force where the electromagnet is intended to be installed and used. Explosion-proof applications do not depend solely on the electromagnet but also on the electrical system in which is installed. The electrical system shall respect all the mandatory legislative and regulatory references as well. Installing and using the holding electromagnet with evident damages, defects and wear (cracks, exposure of encapsulated parts, dents, swelling, separation of adhering parts, detachment of parts, softening, damaged cables and glands) is dangerous and absolutely forbidden. The same concept is valid in case the holding magnet is dropped. Promptly contact ELFRI for the necessary support.

The following is deemed improper use and therefore forbidden:

- mechanical and/or electrical modification or any other kind of tampering to the holding electromagnet;
  - using the holding electromagnet in fields of application other than as described in INTENDED USE and TECHNICAL DATA on the previous page.
- Pay attention to the following important prescriptions:
- The equipment shall be protected against direct sunlight or ultraviolet lights.
  - Designed for a specific duty cycle, as indicated in the item description and on technical data box.
  - Reduce the impact velocity not more than 1 m/s and reduce the maximum potential impact energy not more than 500 J.
  - The user shall provide the required strain relief for both supply cable.

Any modification/tampering or inadequate installation may entail injuries and even death, property damage and economic loss.

### INSTALLATION

**ATTENTION!** Installing the holding electromagnet is not sufficient to guarantee sufficient safety and reliability. Before installing the holding magnet, perform a risk assessment dedicated to the hazardous areas with potentially explosive atmospheres. ELFRI exclusively guarantees the safe functioning of the holding electromagnet to which this document refers and not the safety of the hazardous areas.

Installation shall be carried out by qualified and trained personnel who have read and understood this document.

Electrical connections shall be carried out in compliance with the TECHNICAL DATA written on the previous page.

Technical standards EN/IEC 60079-14 and EN/IEC 60079-17 shall be used as reference for proper and safe installation, inspection and maintenance of the electrical system.

Do not stress the holding electromagnet and its electric cables with bending and twisting. Do not exceed the tightening torque specified in the mounting procedure. Do not drill or varnish the holding electromagnet.

The equipment is furnished with the supply already connected, through a suitable cable gland. The connection of the free end of the cable shall be carried out in safe zone or suitably protected, using one of the types of protection foreseen by the standard EN60079-0.

Vibrations that may affect the proper functioning of the holding electromagnet must be avoided.

Make sure that the whole electrical system is compliant with the EMC Directive (electromagnetic compatibility).

### Mounting

Fix the holding electromagnet by a M16 screw (material 8.8) in correspondence of the central hole shown in the figure above. Make sure to tighten the screw to the tightening torque according to the technical standard or suggested by the screw manufacturer (approximate value 170 ± 210 Nm).

Fix the holding electromagnet keeping its magnetic surface parallel to the surface to be held.

Connect the D-E terminals to the appropriate safety circuit to avoid damage at the holding electromagnet (see wiring diagram).

Connect the power line to the A-B terminals of the holding electromagnet (see wiring diagram). Use electric wires with insulation and section according to official regulations. Consider to place a flyback diode (minimum 3 A, minimum 1000 V).



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Rev. 00

Dated 31.05.2023

## HOLDING ELECTROMAGNET

Type

EXD130\_XXX\_0891

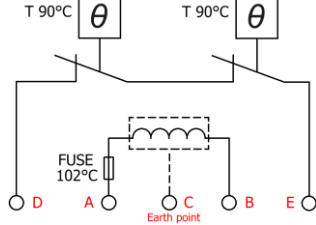
EXD160\_XXX\_0891

EXD180\_XXX\_0891



When installing the electromagnets, the encapsulation surface must be protected against mechanical damage and light exposure. Therefore, the armature plate must be installed directly in front of the holding surface of the electromagnet. The space between the armature plate and the magnet must be protected by a folding bellows.

### Wiring diagram



### Electrical connection

A stabilised power supply unit is recommended in order to avoid excessive residual ripple (see TECHNICAL DATA on page 2).

Do not pull electrical cables before, during and after installation.

Electrical cables must be installed in a fixed position, protected against mechanical and thermal damage.

Wire as indicated on the wiring diagram.

Connect the electromagnet to a suitable dimensioned and verified equipotential system.

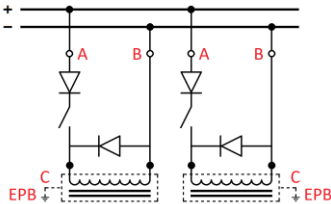
The supply voltage is 48V DC. No warranty claims relating to use with a higher voltage will be recognized. Wiring must always be made in absence of voltage supply (upstream main switch opened).

The same applies when unwiring and unmounting the holding electromagnet.

An overcurrent protection must be provided upstream each holding electromagnet installed (use FF type "very quick acting" max. 2xIB) or a suitable motor protection switch with short-circuit and thermal instantaneous tripping (adjusted to rated current; see TECHNICAL DATA on pages 2).

The rated fuse voltage or motor protection switch must be equal to or greater than the specified nominal magnet voltage. The breaking capacity of the fuse link must be equal to or greater than the maximum short-circuit current at the place of installation (usually 1500 A).

### Parallel connection of electromagnets



In order to avoid voltage spikes in the electric system, a flyback diode (minimum 1000 V, 3 A) must be provided upstream each holding electromagnet installed.

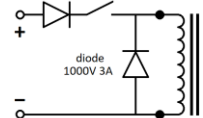
A non-resettable thermal fuse is integrated in the coil, with a cut-off temperature of 102°C.

This fuse is protected by 2 bimetallic thermostats with a breaking temperature of 90°C.

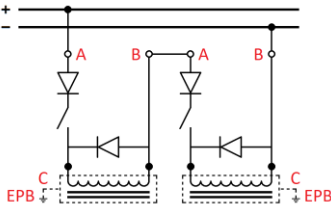
The bimetallic thermostats have a dry N.C. contact. (max 250Vac/48Vdc 5A). Upon reaching the preset operating temperature, the contacts opens causing them to disengage from the rest position.

As temperature decreases, contacts return to the rest position.

### Flyback diode



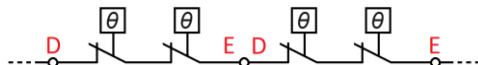
### Series connection of electromagnets



If the installation includes more than one electromagnet, connected in series or in parallel, always connect all the respective bimetallic thermostats in series (cables D and E).

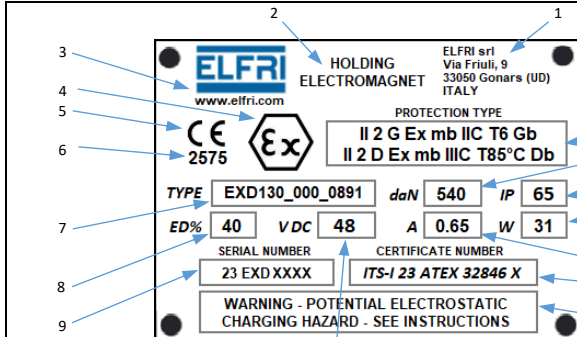
Connect the N.C. bimetallic thermostats (D and E) to a safety system so that when the contacts open, this system automatically cuts off the power supply to the electromagnet (A and B). Scrupulously follow the general safety rules for emergency management.

### Series connection of bimetallic thermostats



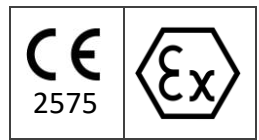
### PLATE DESCRIPTION

NR	DESCRIPTION
1	Manufacturer address
2	Product type
3	Manufacturer logo & website address
4	ATEX certified
5	CE compliant
6	Notified body number
7	Manufacturer product code
8	Duty cycle (ED %)
9	Product Serial Number
10	Rated voltage [V]
11	ATEX certificate number
12	Rated current [A]
13	Absorbed power [W]
14	IP – Ingress Protection Code



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 Via Friuli, 9 33050 Gonars (UD) Tel. (+39) 0432.931425 mail <a href="mailto:elfri@elfri.com">elfri@elfri.com</a> www.elfri.com	Rev. 00
	Dated 31.05.2023
<b>HOLDING ELECTROMAGNET</b>	

Type  
EXD130\_XXX\_0891  
EXD160\_XXX\_0891  
EXD180\_XXX\_0891



10	15	Magnetic holding force [daN]
	16	ATEX marking
	17	Warning

**USE AND FUNCTIONAL TEST** Make sure that the object/surface to be attracted is always smooth and clean.  
Once the electromagnet is energised, check that the object is attracted and consequently couples perfectly, leaving no free space between it and the core.  
De-energise the holding electromagnet and check that it can be separated from the object/surface within two seconds.

**MAINTENANCE** The electromagnets do not require particular maintenance, but an inspection is recommended every 6 months or at shorter intervals depending on the intensity of use. The inspection includes the visual and functional check, verification of the integrity of the electromagnet and the electric power cables, as well as the tightening of all the screws.

If the device is exposed to heavy charge-separating processes, dangerous electrostatic charges can occur. Charge-separating processes are, for example, direct exposure to pneumatic transport media.

- Avoid heavy charge-separating processes at the installation site and during cleaning.
- Clean only with water or damp cloths.
- Avoid unintentional and dry rubbing.
- Do not clean with compressed air, high-pressure or steam jets.
- Earth the device housing.

**ATTENTION!** When cleaning the electromagnet, avoid generating electrostatic currents.  
Disconnect the electrical power and clean the surfaces with a damp rag. Allow wetted parts to dry completely before restoring power.  
**ATTENTION!** Do not disassemble or try to repair the holding electromagnet. In case of malfunction or failure it is mandatory to replace it.

**With de-energised holding electromagnet (upstream main switch opened):**

- visually check the absence of damages, defects and wear (cracks, exposure of encapsulated parts, dents, swelling, separation of adhering parts, detachment of parts, softening, damaged cables and glands);
- check the proper fixing of the holding electromagnet as well as that of the object/surface intended to be coupled.
- check the correct tightening of:
  - 25 Nm torque for cable glands;
  - 5.5 Nm torque for screws of equipotential bondings;
  - 170 ÷ 210 Nm torque for M16 screw used to fix the electromagnet.

The above values are indicative.

Make sure to tighten the screw to the tightening torque according to the technical standard or suggested by the screw manufacturer.

**With energised holding electromagnet (upstream main switch opened):**

- check that the holding electromagnet properly withholds the object/surface intended to be couples (refer to USE AND FUNCTIONAL TEST).

**DISPOSAL**

At the end of service life, the holding magnet must be properly disposed according to the laws in force in the country in which the disposal takes place.

In general:

- it is forbidden to dispose of it in a household waste container;
- it is forbidden to dispose of it as unsorted waste.



**SUPPORT**

For all that is not mentioned and in case of any doubt, always contact our technical department [tecnico@elfri.com](mailto:tecnico@elfri.com).  
This document together with the EU Declaration of Conformity and the EU-type certification is made available by ELFRI on [www.elfri.com](http://www.elfri.com)

**CERTIFICATIONS**

ATEX Directive 2014/34/EU

EU-type approval ITS-I 23 ATEX 32846 X - Notified body 2575

