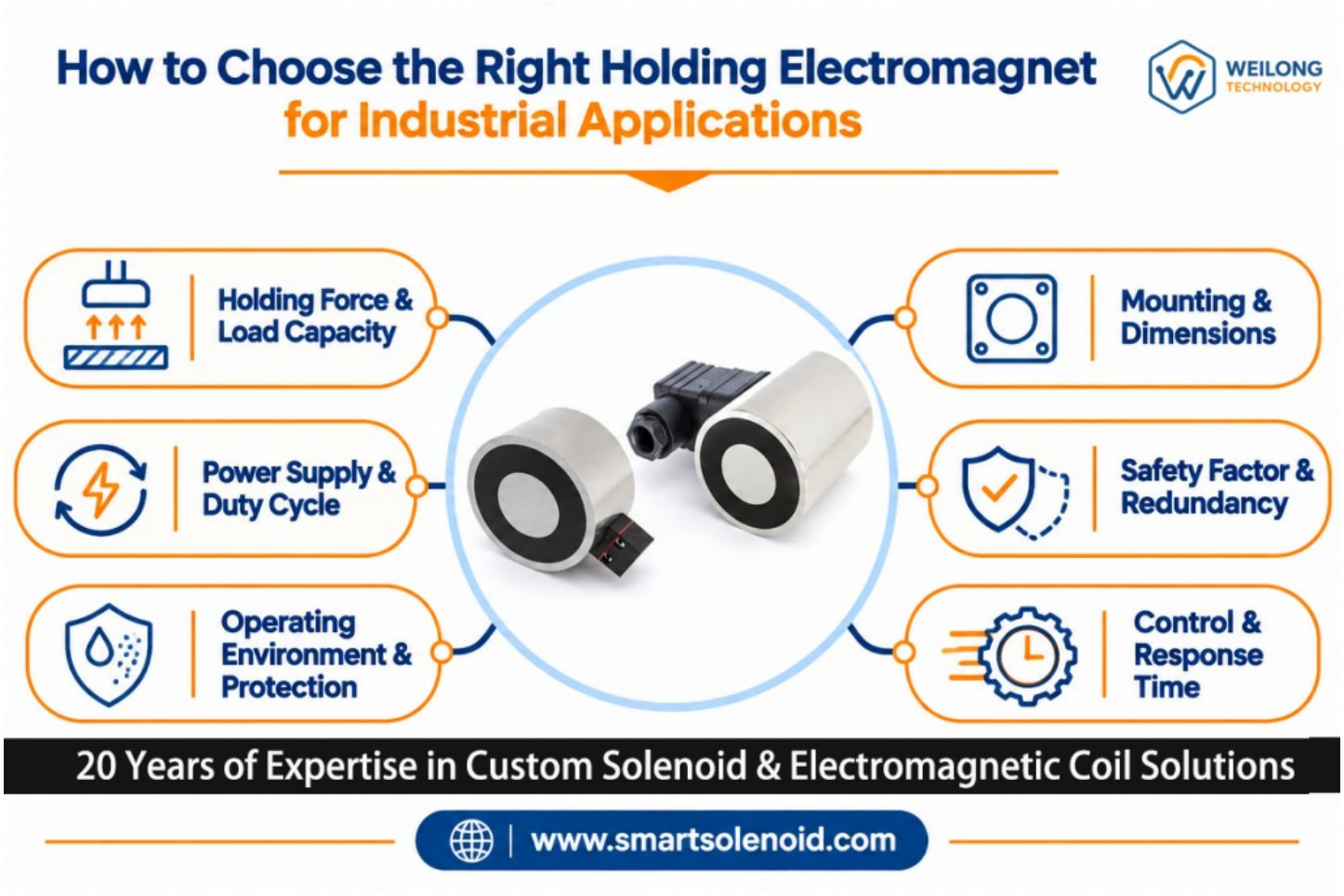
How to Choose the Right Holding Electromagnet for Industrial Applications



Dongguan, Guangdong Nov 9, 2026 (Issuewire.com) -

- Introduction

Efficient positioning, clamping and handling of material are essential for productivity and safe operation in manufacturing and industrial automation today. In automated assembly lines, robotic handling systems and elsewhere, electromagnetic technology plays an ever increasing role in the control and security of metal parts.

A Holding Electromagnet is an electromagnetic device to create magnetic attraction and hold ferromagnetic materials like iron and steel. Unlike mechanical clamps that work using movement and mechanical contacts, a holding electromagnet uses a magnetic field created with electric current to hold the workpiece.

The on/off property of holding force makes it suitable for applications requiring frequent gripping, releasing, positioning and automated handling of parts.

So how do you select the correct Holding Electromagnet for your industrial application?

The guide deals with the principle of working, differences between holding magnets and permanent magnets, benefits, applications, selection criteria of suppliers and the future trends in the industry for the benefit of buyers and engineers to make informed decisions.

- What is the holding electromagnet?

A Holding Electromagnet is an electromagnetic device that uses magnetic attraction to hold ferromagnetic objects in a stationary position.

It consists of a copper coil, a magnetic core, a steel case and an electrical connection. An electric current passing through the coil creates magnetic fields and pulls an appropriate steel or iron object to the working surface of the magnet.

Depending on the design, the magnet can sustain its holding force while being energized and releases the workpiece when electricity is turned off.

Some special designs use permanent magnets for holding, so they do not need to be continuously powered.

Various shapes and sizes of Holding Electromagnets are available in the market with varying force ratings and voltage configurations according to their industrial applications.

Typical product configurations include:

Circular holding electromagnets

Flat Type holding Electromagnets.

Electromagnets of Square Holding.

Magnet Coil (Compact DC Holding Magnet)

Custom Industrial Holding Electromagnets

Electro Permanent Holding Magnets.

- How Does Holding Electromagnet Work?

When choosing a Holding Electromagnet, it is important to know its working principle.

The Holding Electromagnet works according to the principle of electromagnetic induction. Electric current flowing through the coil generates magnetic field and magnetizes the magnetic core inside.

This creates a magnetic field that attracts ferromagnetic materials to the working surface.

The standard operation procedure includes 4 steps.

- 1: Activating electricity

Once connected to the power supply, current flows through the copper coil and generates a magnetic

field around the internal magnetic core.

3.2: Magnetic Pull

An attracting force is generated between the Holding Electromagnet and the ferromagnetic workpiece because of the magnetic field.

The workpiece is drawn against the magnetic face and held there.

- 3: Holding Operation

The device generates magnetic holding force as long as the electromagnetic field is sustained.

The actual holding force depends on many factors including coil design, magnetic circuit design, contact area, air gap, material properties and electrical input.

- 4: Release Operation

When a conventional power-on holding electromagnet is disconnected from the electricity source, the magnetic field disappears and releases the workpiece.

In some cases, there might be some residual magnetism. In case of immediate separation, mechanical ejectors or other release mechanisms might be necessary.

- What is the Difference Between Holding Electromagnet and Permanent Magnet

When selecting a magnetic holding device, one of the most important issues is the difference between a Holding Electromagnet and a Permanent Magnet.

Both can attract and hold ferromagnetic materials, but they differ in the working principle and power requirements.

4.1 Electromagnet Holder

The common Holding Electromagnet generates a magnetic field due to the flow of electricity through a coil.

The main benefit of the electromagnetic holding magnet is the ability to control magnetic field. Its magnetic attraction can usually be switched on and off electrically.

The Permanent Magnet generates a magnetic field using its magnetic material without need for continuous electricity power.

4.2 Electro Permanent Magnet (EPM)

The electro-permanent magnet combines both permanent magnetic materials and electromagnetic switching.

A controlled electrical pulse switches the magnetic state. Then the device can hold or release the workpiece, without the need for continuous electricity when holding it.

4.3 Key Differences (for picture)

4.4 Which one should buyers choose?

Buy a standard Holding Electromagnet if the fast release and frequent electrical control are required.

If magnetic attraction without electricity is necessary, choose a Permanent Magnet.

Consider an Electro-Permanent Magnet in the case of controlled gripping and holding force during the power interruption.

Other factors that should be taken into account while making the selection include the load, safety requirements, the operation environment and the release mechanism.

- Advantages and Disadvantages of a Holding Magnet

It is important for buyers to know the following features and drawbacks before purchasing a Holding Electromagnet.

5.1 Benefits

5.1.1Easy Electrical Control

A Holding Electromagnet can be integrated with switches, relays, PLC systems and automated controllers to control operations of gripping and releasing.

5.1.2. Quick Response

Electromagnetic activation can be controlled electrically. This makes it suitable for production equipment requiring frequent positioning and material handling.

5..13. Compact Size

Electromagnetic devices can generate compact structures and save installation space comparing with mechanical holding devices.

5..14. Strong Magnetic Holding Force

Electromagnets can generate, if correctly designed, a strong magnetic holding force in comparison with their size. The performance depends on the magnetic circuit, contact conditions and the workpiece material.

5..15. Mechanical simplicity

In some cases, mechanical clamping structures might not be required because of magnetic attraction.

5.1.6. Flexibility of Customization

5.2 Drawbacks

5.2.1. Power Consumption: Continuous

A conventional holding electromagnet usually requires electricity when it is energized. It might lead to higher energy consumption for applications requiring continuous holding.

5.2.2. Temperature Rise of Coil

Continuous operation will heat up the coil. Engineers have to consider rated voltage, current, insulation, duty cycle and operating temperature.

5.2.3. Holding Force depending on the Contact Conditions

An air gap between the magnet and workpiece can significantly decrease the holding force. The paint, rust, dust, uneven surfaces and absence of contact surface can affect the performance.

5.2.4. Possibility of Power Failure

A conventional power-on Holding Electromagnet can lose its load if electricity is disconnected.

Suspended loads and safety critical equipment should be mechanically retained, have backup power or fail-safe magnetic design.

5.2.5. Limitations of Materials

The holding electromagnets can attract ferromagnetic materials only. Regular aluminum, copper or nonmagnetic stainless steel will not be held with their magnetic attraction.

- Holding Electromagnets Typical Applications

In many industries, electromagnets are used as holding magnets where the magnetic force has to be controlled .

6.1 Automation Industry

Holding Electromagnets can hold metal parts for automated assembly, positioning, inspection and production processes.

They can be controlled electrically and can be integrated with PLC and other automation systems.

6.2Robotic Handling Systems

Robotic arms can grip and release appropriate steel parts using electromagnetic holding devices.

It helps in handling of workpieces in automated manufacturing environments.

6.3 Material Handling Equipment

Some systems use Holding Electromagnets for positioning, holding and moving ferromagnetic materials.

Special heavy-duty lifting magnets should be designed and rated for the application with appropriate

safety systems in place. A compact holding electromagnet should not be automatically considered as a lifting magnet.

6.4 Packaging Machinery

In automated packaging and assembly lines, electromagnetic holding devices are used to hold metal parts or components.

6.5 Industrial Locks Systems

Electromagnetic door locks, access-control systems, equipment locks and others use Holding Electromagnets.

6.6 Machine Tools & Fixtures

Electromagnets are used for holding ferromagnetic work pieces for machining, testing, inspection and assembly.

6.7 Manufacturing of Automobiles

Automotive manufacturing equipment can use electromagnetic holding devices for component positioning, automated handling and fixture applications.

Design depends on the workpiece material, holding force, cycle frequency and the operation environment.

- How to Avoid Mistakes When Selecting a Holding Electromagnet Supplier

Choosing a supplier is an important step in the buying process.

A competitive quotation is not always a guarantee of reliable performance of the product. Buyers should pay attention to technical abilities, quality control, customization support and manufacturing experience.

Here are six mistakes to avoid:

Mistake 1: Choosing a Supplier by Price Only

A cheap Holding Electromagnet can have inconsistent material, low magnetic force and insufficient thermal performance.

Take into account the total cost of ownership - product replacement, maintenance, energy consumption and equipment downtime.

Mistake 2: Ignoring Real Holding Force Requirements

Do not base your choice of product only on the advertized maximum holding force.

Performance depends on the material of the workpiece, flatness of the surface, contact surface, air gap, thickness and load direction.

"Request test conditions and force readings from the manufacturer.

Error 3: Power failure conditions ignored

A conventional Holding Electromagnet releases its workpiece when power is lost.

In case of safety critical applications the buyer should discuss backup power, mechanical retention and fail safe design with the manufacturer.

Mistake 4: Not Paying Attention to Coil Temperature and Duty Cycle

Continuous operation can lead to overheating of the coil if the product is not rated for the required duty cycle.

Check the continuous or intermittent duty rating of the product.

Mistake #5: Not considering customization features

The standard products may not always meet all the requirements of the equipment manufacturer.

Choose a supplier that discusses customization features such as custom sizes, mounting options, voltage, magnetic power and coil specifications.

- Tips for Choosing the Right Holding Electromagnet Supplier

8.1 When evaluating a Holding Electromagnet manufacturer, purchasing managers should consider the following criteria.

(for pics)

8.2 Technical Information Buyers Should Prepare

To help suppliers recommend an appropriate product, prepare the following information before requesting a quotation:

Required holding force in N or kgf.

Workpiece material and thickness.

Contact surface dimensions and flatness.

Operating voltage and current.

Required holding and release time.

Continuous or intermittent duty cycle.

Operating temperature.

Installation and mounting dimensions.

Environmental conditions, including dust and moisture.

Power failure and safety requirements.

- Why should you choose Weilongas your Holding Electromagnet partner?

Here are the reasons why Weilong is a right choice of your Holding Electromagnet partner.

9.1. Electromagnetic Technology Experience

Well-designed magnetic circuits, coils, cores and mechanical structure are needed in designing the Holding Electromagnet.

Experience with electromagnetics offered by Weilong is the basis of the discussion on custom Holding Electromagnet applications.

9.2. OEM/ODM Custom Services

The magnetic force of installation and magnetic circuits of various equipment manufacturers will be different.

Weilong can offer you custom development services when you can discuss the following issues related to the electromagnetic component.

9.3. Manufacturing Capabilities In-House

The company profile reveals that the company has in-house manufacturing capabilities: metal stamping, CNC machining, plastic injection molding, coil winding and assembling.

An in-house manufacturing allows for better coordination of manufacture of important parts and components of electromagnetic products.

9.4. Factory Testing and Quality Control

Company publications tell us that Weilong has an in-house testing lab that can conduct electromagnetic force measurements, response-time tests, temperature-rising tests and product endurance tests.

All these testing capabilities can help in developing custom electromagnetic components.

9.5. Support to OEM Equipment Manufacturers

OEM customers need to communicate with the supplier and coordinate their engineering activities during the development process.

Weilong can communicate about technical specifications and samples, and develop custom magnetic products accordingly.

9.6. Bigger electromagnetic product line

The company produces holding electromagnets, push-pull solenoids, tubular solenoids, latching

solenoids, solenoid valves and inductor coils besides the holding electromagnets.

Contact Weilong to discuss your technical requirements, drawings, samples and OEM/ODM opportunities.

Website: https://www.smartsolenoid.com

- Conclusion

Choosing the correct Holding Electromagnets requires careful analysis of its magnetic properties, electrical specifications, operational conditions and suppliers capabilities.

While ordering, the customer needs to take into account such parameters as magnetic force, type of the workpiece material, surface contact, air gap, voltage, duty cycle, coil heating and power failure operation.

Besides, engineers have to decide whether the conventional Holding Electromagnet, permanent or electro-permanent magnet will be needed for their application.

- FAQs: Guide to purchasing Holding Electromagnets

FAQ 1: What is a Holding Electromagnet used for?

Holding Electromagnet attracts and secures ferromagnetic workpieces such as steel and iron . This electromagnet is called holding. Typical applications are industrial automation, robotic handling, machine fixtures, electromagnetic locks, positioning equipment and automated assembly systems.

Main feature of it is electrical control of magnetic attraction.

FAQ 2: How do I choose the correct holding force?

Firstly, you need to know weight of workpieces, its material, area of its contact surface, surface conditions and orientation of the load.

Ask the manufacturer for the information on holding force test and check the conditions of it.

For critical safety applications, it is necessary to calculate loads caused by acceleration, vibration and to set a necessary safety margin. Don't substitute a certified safety workload by nominal holding force rating.

FAQ 3: Is Holding Electromagnet always supplied with electricity?

Usually, Holding Electromagnets need continuous electrical power to maintain their magnetic fields.

But electro-permanent holding electromagnets will maintain their magnetic force after turning on without further continuous power.

It should be chosen depending on needs for energy consumption, power failure conditions and releasing of the load.

FAQ 4: Is Holding Electromagnet customizable?

Certainly. Holding Electromagnets can be customized to match specific needs of application.

Typical options for customization of Holding Electromagnets are voltage, magnetic force, dimensions, installation method, coils configuration, housing material and duty cycle.

FAQ 5: Why do I need to choose Weilong as my Holding Electromagnet supplier?

Weilong Intelligent Technology Co., Ltd. is the professional electromagnetics manufacturer that develops OEM/ODM electromagnets products.

Manufacturing capacities of it include development, prototyping, tooling, coiling, machining, assembly and testing in laboratory in-house.

Technical specification, feasibility, samples and manufacturing requirement will be discussed.

Website: https://www.smartsolenoid.com



Comparison	Holding Electromagnet	Permanent Magnet	Electro-Permanent Magnet
Power requirement	Usually continuous	None	Switching pulse
Magnetic control	Electrical on/off	Generally not electrically switched	Electrical pulse
Holding without power	Usually no	Yes	Yes
Release mechanism	Remove power	Mechanical separation or magnetic circuit arrangement	Controlled switching pulse
Automation integration	Easy	Requires additional mechanisms for controlled release	Suitable for advanced automated systems
Energy consumption	Depends on energized duty cycle	None	Low during static holding

Supplier evaluation	What buyers should check
Manufacturing experience	Experience in electromagnets and electromagnetic components
Engineering capability	Magnetic circuit design and product development
Holding force	Verified force specifications and test conditions
Customization	Voltage, dimensions, mounting, and coil design
Material quality	Magnetic core, housing, coil, and insulation materials
Quality management	Documented manufacturing and inspection processes
Testing facilities	Force, electrical, thermal, and endurance testing
OEM/ODM support	Design review, prototyping, and mass production
Delivery capability	Production capacity and lead-time management
Technical support	Engineering communication and after-sales service

Media Contact

Weilong Intelligent Technology Co., Ltd.

*********@gmail.com

+86 136 4298 0378

Building 1, No. 2 Jingxiang Road, Dongcheng District, Dongguan City, Guangdong Province, China [?]Zip code[?]523128[?]

http://www.smartsolenoid.com/

Source : Weilong Intelligent Technology Co., Ltd.

See on IssueWire