SHENZHEN MAGNET LABORATORIES CO.,LTD.

Innovate magnetic energy development technology and
contribute to the global intelligent manufacturing.

CONTENTS

Part 1 Company Brief

Company Overview | R&D Innovation | Honors and Qualifications |
Partners | Application Fields | Core Advantages | Main Business

Company Overview

In **1979**, Mr. Sasaki established Magnet lab Corporation in Tokyo, Japan

In **1995** , provide integrated magnetizing equipment for Japan FANUC robot

In **2003** Shenzhen Magnet Laboratiries Co., Ltd. was established

In **2014** The overall magnetizing equipment has been successfully introduced into new energy vehicle fields such as BYD.

In **2021** M&A of Tokyo Ferrite(HK) and Magnet Business (Shenzhen)

In **2022** Completed series A round funding of tens million RMB; Won the first prize of scientific and technological progress from China Electrotechnical Society.

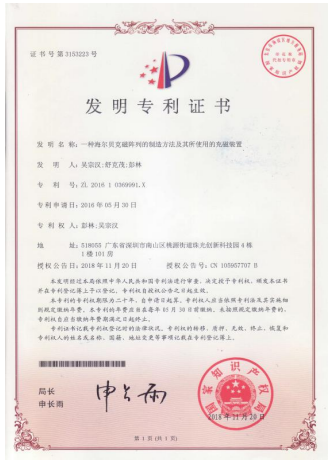
In **2023** Received the title of national level specialized, refined, and innovative "Little Giant" enterprise.

- **Development Experience and Historical Accumulation: Over 40 Years**
- **Wholly-owned Subsidiaries and Branches: 9**
- **Intellectual Property: Over 100**
- **Total Number of Group Employees: Nearly 800**
- **Floor Area: 100,000 m² (Including Equipment and Product Areas)**
- **Equipment Delivery Capacity: Over 300 Sets**

R&D Innovation


发明专利证书


发明专利证书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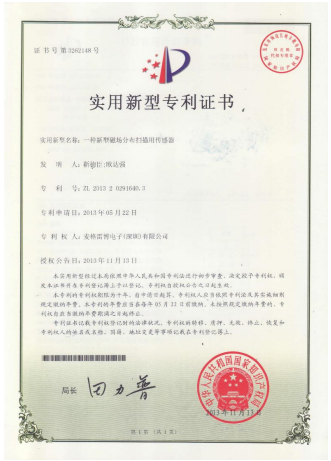
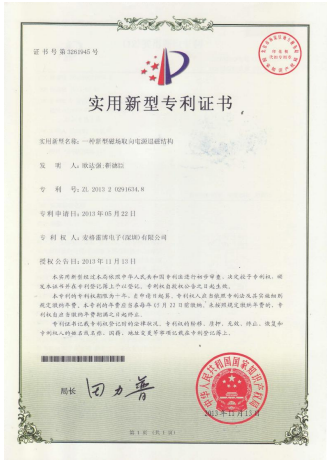

实用新型专利证书


实用新型专利证书


实用新型专利证书


实用新型专利证书


实用新型专利证书

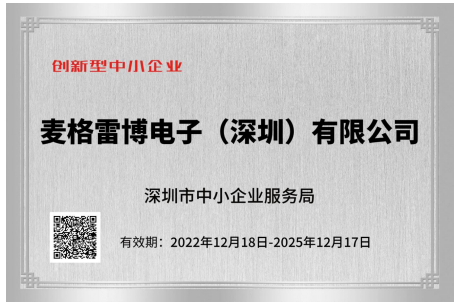
(Partial Patent Display)

Qualifications and Honors

National High-tech Enterprise

National "Little giants" company typically specialize in niche sectors, command high market shares and boast strong innovative capacity.

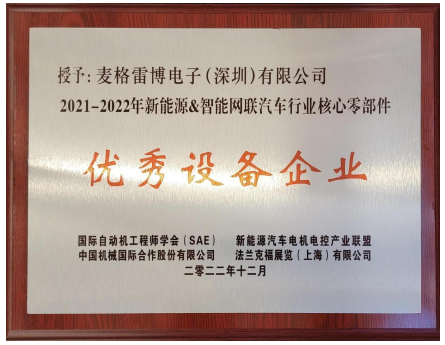
Specialized and sophisticated enterprises that produce new and unique products



Innovative SME

ISO9001Certificate of Quality Management System

First Prize of Scientific and Technological Progress from China Electrotechnical Society



New Energy & Intelligent Networked Excellent Equipment Enterprise of Key Components in Automobile Industry

D-U-N-S REGISTERED Company

CE Certification

(Partial Honorary Qualifications)

Partners

Global Partners

比亚迪汽车 | TESLA | 吉利汽车 GEELY AUTO | 长安汽车 CHANGAN | 中国一汽 FAW GROUP

长城汽车 | NISSAN | 东风汽车 DONGFENG MOTOR | Ford | NIO | ZEEKR

红旗 | LEAPMOTOR 零跑汽车 | AITO | SERES | 中国中车 CRRC | gm | 弗迪动力 | HYCET 蜂巢易创

TSINGSHAN 青山工业 | VREMT | 智新科技 INTELLIGENT POWER | HUAWEI | BorgWarner | SCHAEFFLER | UAES 联合汽车电子有限公司

vitesco TECHNOLOGIES | INOVANCE | 华域汽车 | 上海电驱动 EDRIVE | TUOPU 拓普 | 信质 | WOLONG 卧龙 | 方正电机 FOUNDER MOTOR

JEE 巨一科技股份有限公司 JEE TECHNOLOGY CO., LTD. | 合普动力 HEPU POWER | HONGTRON | Physis 菲仕智慧动力 | Enpower 英搏尔 | 大洋电机 BROAD-OCEAN | Welling 威靈電機 | ENGGA

LEGO | GLB | FANUC | ESTUN | HCFA 禾川股份 | XINJE | 富士电机 | GSK 广数控

ABB | 中国中车 CRRC | BOSCH | Nidec | JOHNSON ELECTRIC | ShinanoKenshi | HMC | IGARASHI

TDK | DMEGC 横店东磁 | 宁波韵升 | AT&M 安泰科技 | Shin-Etsu | 金力永磁 JLMAG 用稀土创造美好生活 | ZONGSHEN | E-ZONE 益中智能电气

Fisher&Paykel 斐雪派克 | Garrett ADVANCING MOTION | Foster Live the Quality | Panasonic | Canon | TOSHIBA | HITACHI | Pioneer

(The above rankings are in no particular order)

Application Area

New energy vehicles

Energy&Electricity

Automation

Magnetic material

Electroacoustic field

Traction&Construction Machinery

Rail Transit

Enterprise R&D&research institutions

Core Competitiveness

- Core magnetic energy technology from Japan
- Leading China's Magnetic Industry
- Technology-driven type company

Leading Technology

Efficient Solution

- The first large scale post assembly magnetization solution in China
- Successfully applied in new energy vehicle
- Comprehensive covers traditional Industrial

- Magnetizing coil life cycle: More than 500,000 times
- Leading standards across the industry
- Encoder solution: a magnetic ring with 400+poles

Industry Leader

Excellent Platform

- Japanese front-end magnetic technology & products
- Talents of advanced magnetic field

Main Business

Magnenting equipment for production line

- Design and integration of precision, small and medium power online integrated magnetization system;
- High precision molding of all kinds of permanent magnet materials

Magnetic field measurement for production line

- High-end precision instruments and meters;
- Programmable intelligent instrumentation
- On - line/off-line meter magnetic detection equipment

Magnet ring for magnetic encoder

- High precision magnetic encoder magnet ring
- Absolute/incremental encoder magnet ring

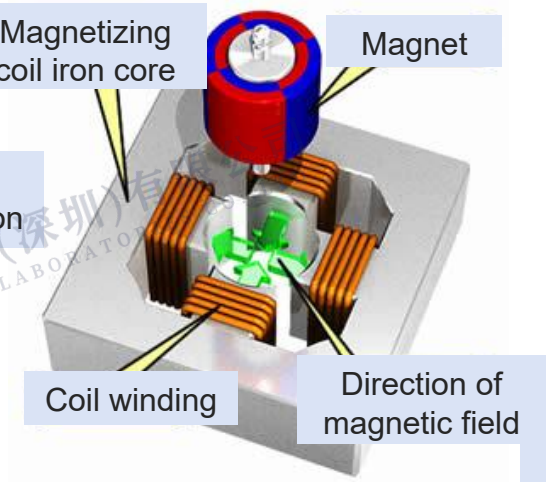
Magnetic material

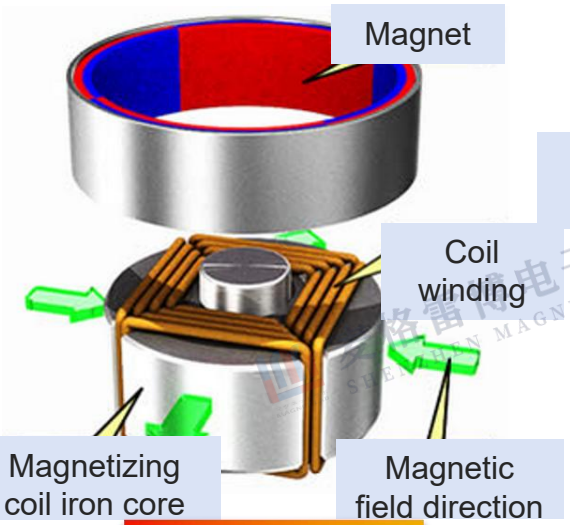
- Sintered permanent magnet ferrite;
- Injection molding magnetic strip, ring; Various magnetic devices

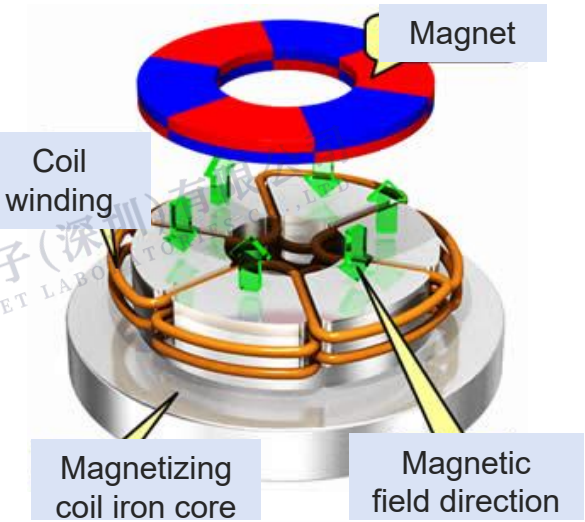
Part 2 Product Introduction

Magnetizing Coil | Post-assembly Magnetization | Surface Magnetic Detector | Instrumentation | Magnetic Encoder | Magnetizing Power Supply

The Type of Magnetization Coil

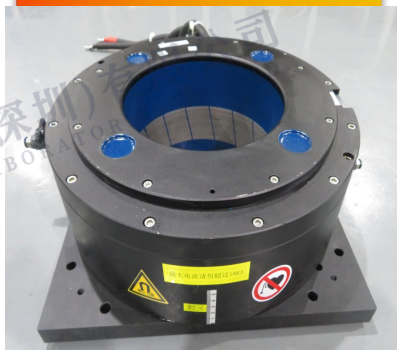






Solenoid coil

External Magnetizing Coil



Internal Magnetizing Coil

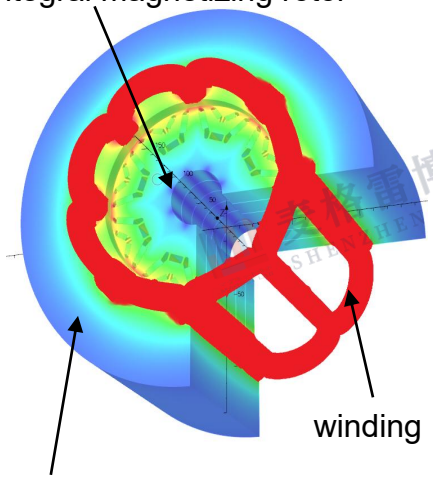
Planar Magnetizing Coil

Principle of Integral Magnetization

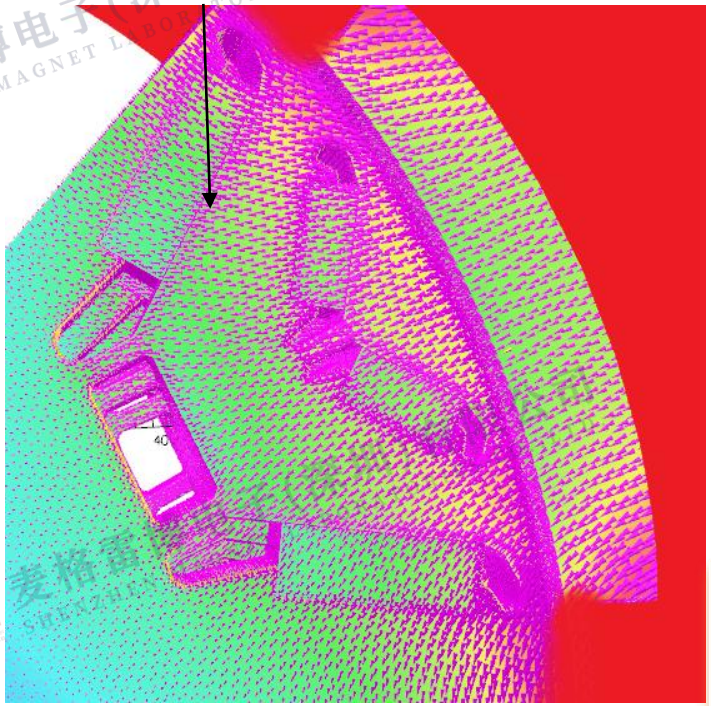
Integral magnetizing(post assembly magnetization): un-magnetized components are magnetized after rotor is fully assembled

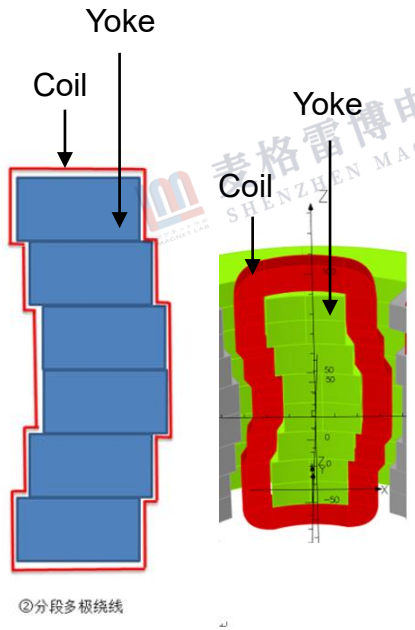
Information input of Rotor to be magnetized → Confirm the magnetic circuit direction → Design and assemble coil → Sizing the magnetizing power supply → Permanent magnetization (electromagnetic principle)

Integral magnetizing rotor

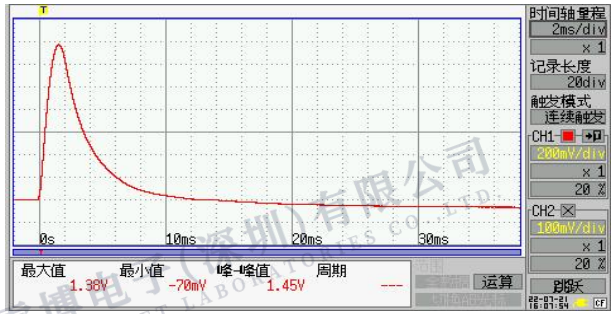


Vector diagram of magnetic line of force when rotor is magnetized





The magnetizing power source is fully charged and discharges through the magnetizing coil. The peak value of the discharge pulse current can reach tens of thousands of amperes. This current pulse generates a strong magnetic field in the coil, which permanently magnetizes the rotor magnet placed in the coil.

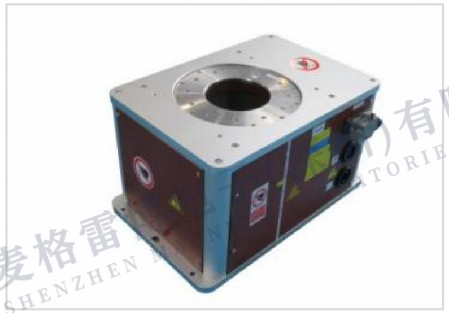


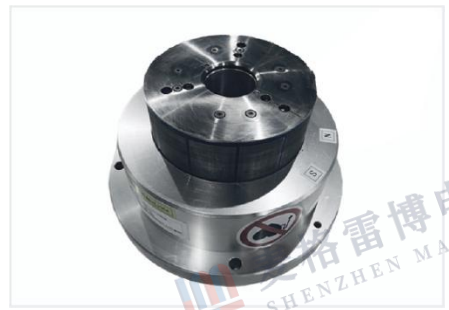
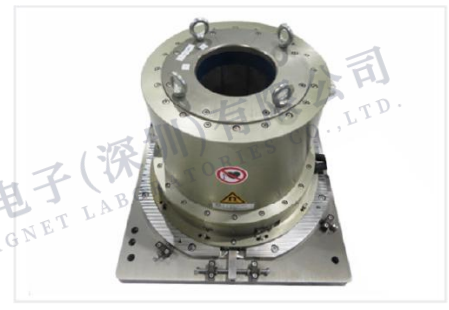
Pulse current waveform

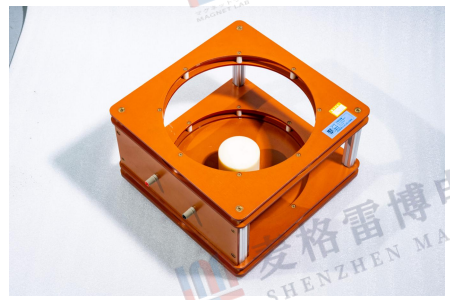
If the rotor is stagger in sections, the coil yoke shall correspond one by one according to the rotor stagger.

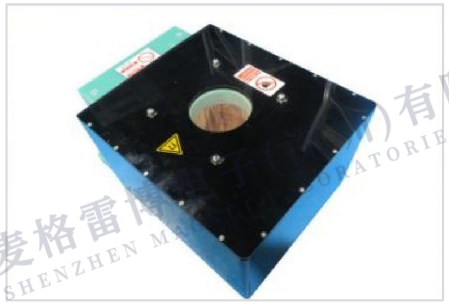
Post-assembly Magnetization Coil

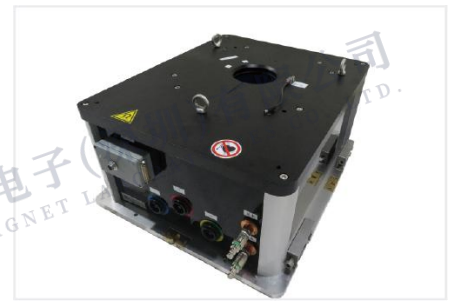
- Planar multipole magnetization
- Torsional multipole magnetization
- Sticker type external magnetization
- Embedded internal magnetization
- Large size magnetization





Magnetization Simulation

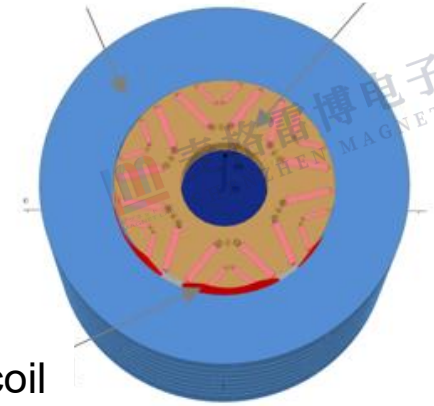
Accurately predict the saturation effect of magnetization, reduce the development cycle, and improve product quality.

The main steps of rotor magnetization transient simulation:

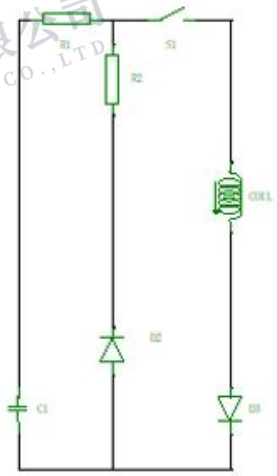
Set parameters for 3D model → Transient circuit → Model symmetric mesh subdivision → Simulation calculation

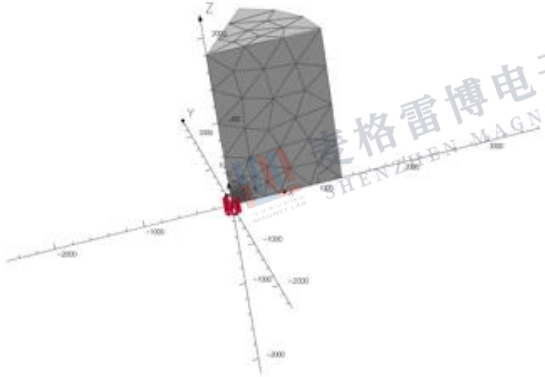
Magnetic yoke

Magnetized rotor



coil

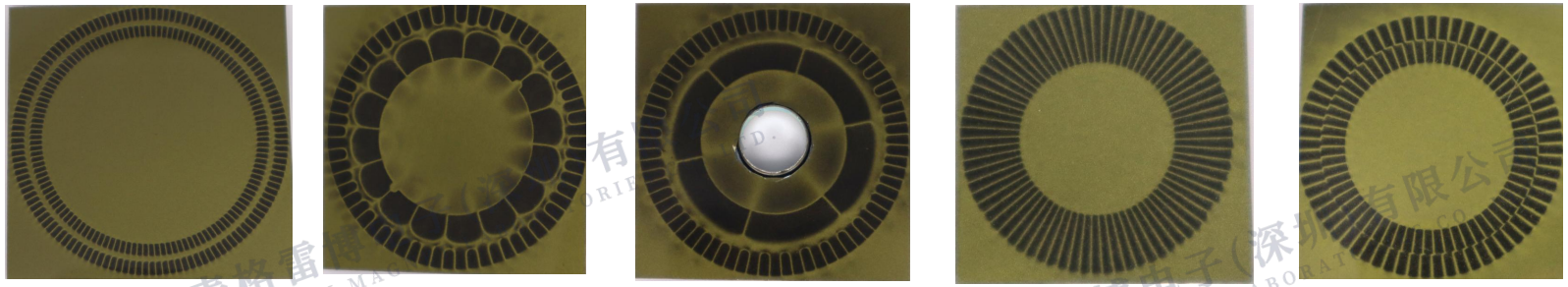




UNITS	
Length	mm
Magn Flux Density	T
Magnetic Field	A/m
Magn Vector Pot	Wb/m
Current Density	A/mm^2
Electric Field	V/m
Electric Pot	volt
Conductivity	S/mm
Power	W
Force	N
Energy	J

Magnetic Encoder – High Resolution Magnet Ring

- ★ 400 plus pole magnetization
- ★ Minimum pole spacing 0.1mm
- ★ Peak value deviation ±1%
- ★ Phase angle deviation between poles ±1%
- ★ Axial/radial/plane magnetization

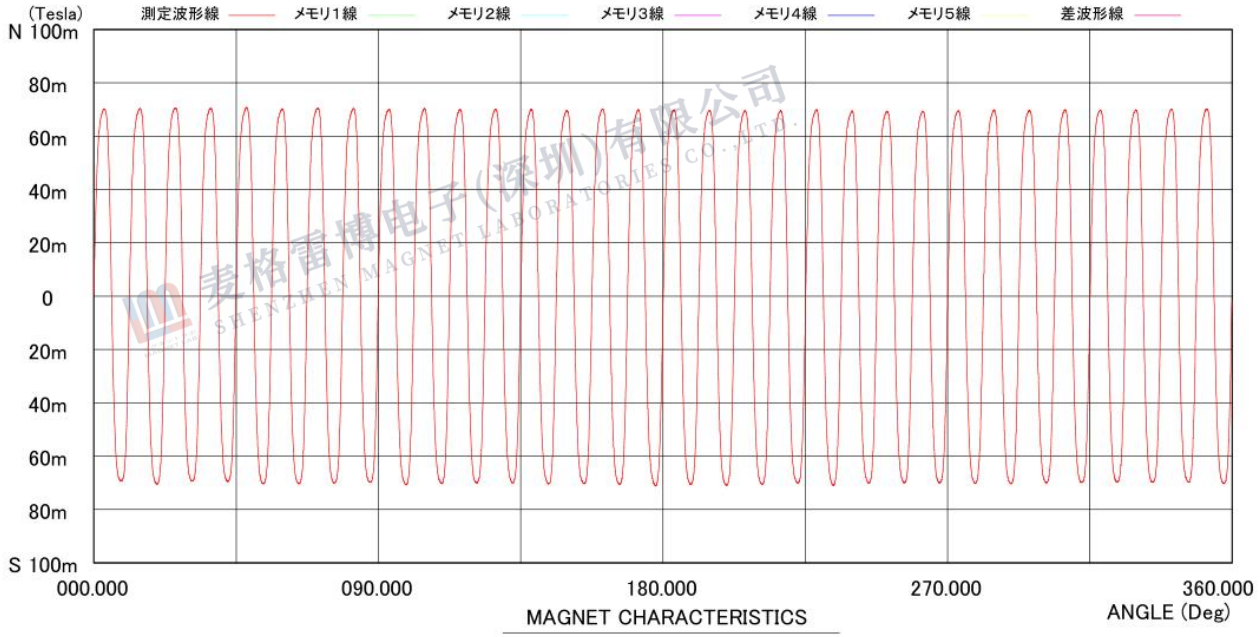


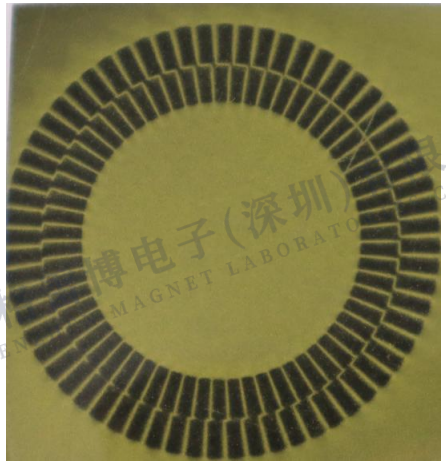
Magnetic Encoder – High Resolution Magnet Ring

DMT MAGNET ANALYZER MODEL MF-301R

No. :	DATE : '2021/05/06	PEAK (Tesla)/(Deg)		INT (Deg)
POLES : 64	MAGNET:	MAX	0070.7m / 177.5520	005.6580
MAGNET CONDITION : 12# 64		MIN	0069.6m / 008.4240	005.5940
		AVG	0070.1m	005.6250

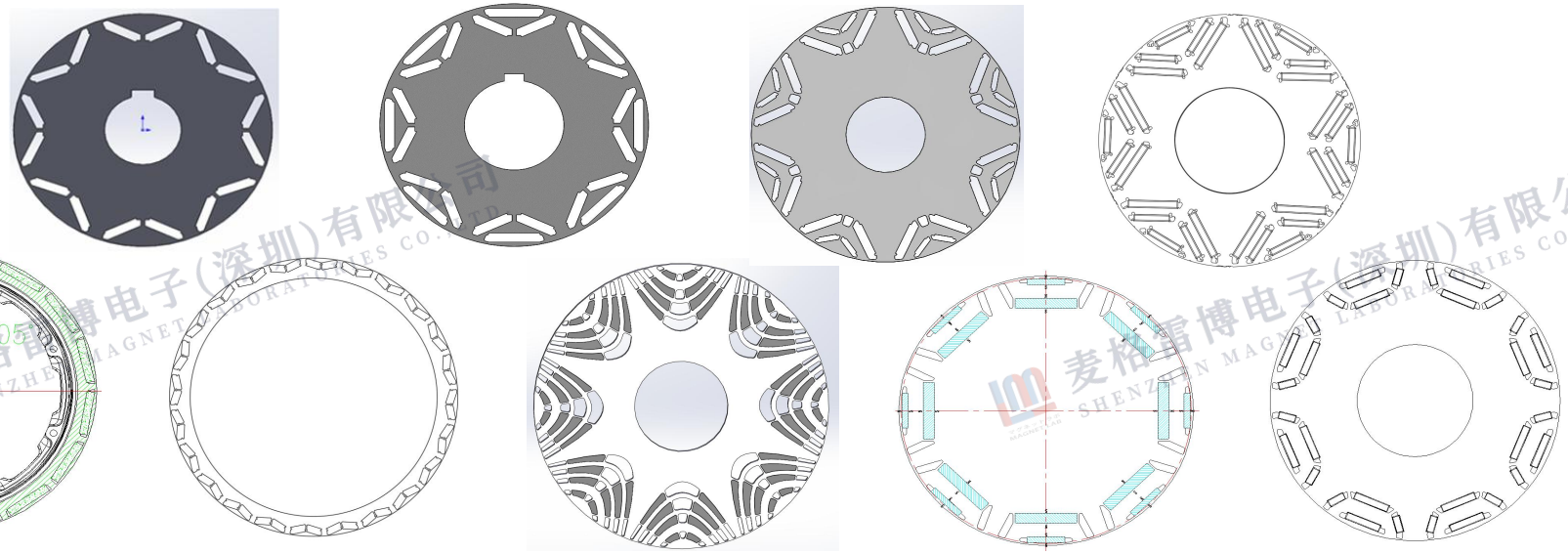
TOTAL 003312.0mTesla TOTAL AVG 0051.8mTesla

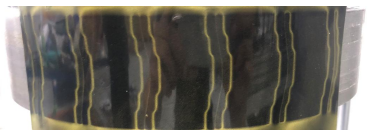


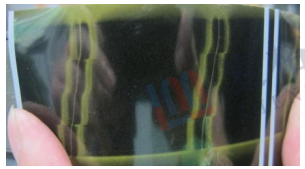


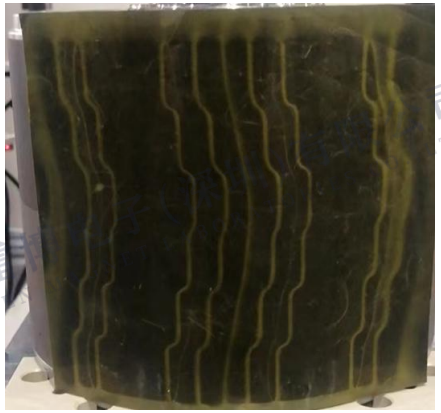
↑Dual code channel

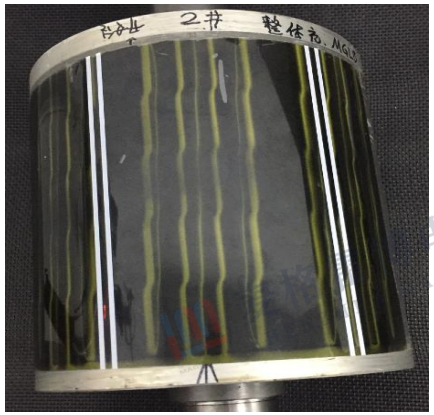
Cases of Magnet Steel—Internal Rotor





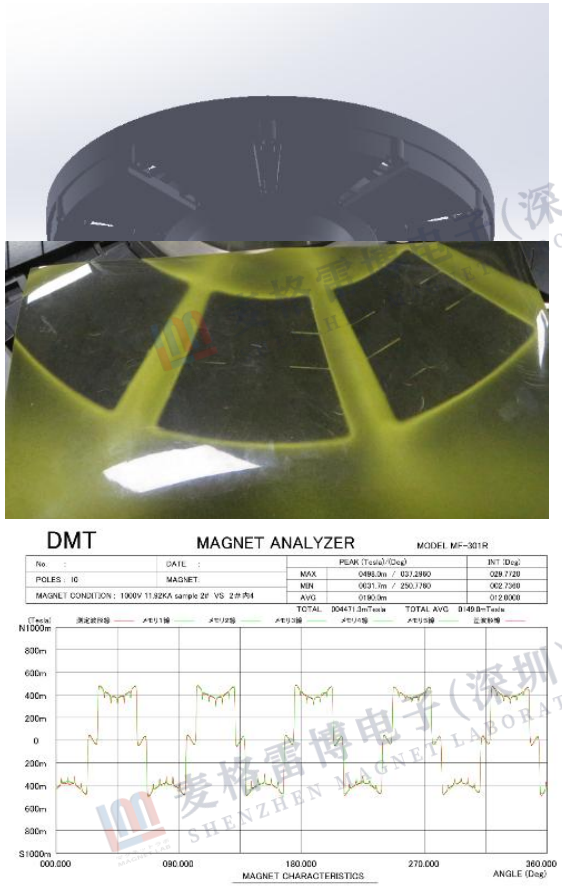




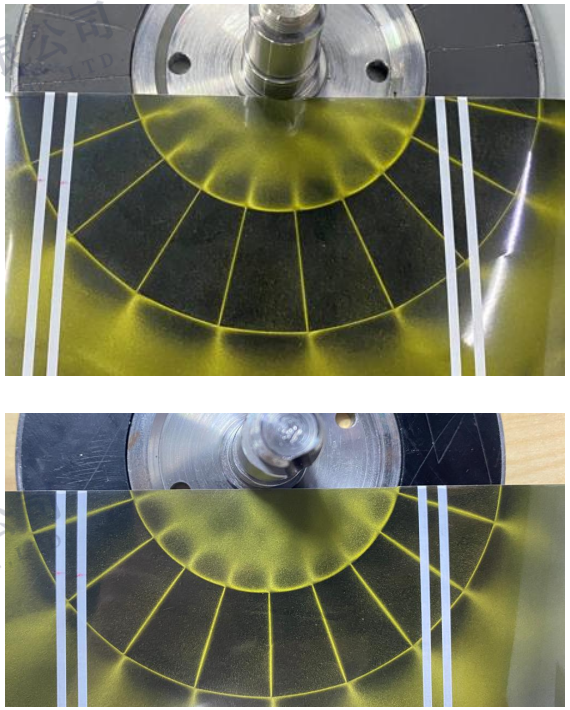


- ✓ V shape
- ✓ V+ — shape
- ✓ Double V shape
- ✓ Double V+—shape
- ✓ Multi V shape
- ✓ Double — shape
- ✓ U+—shape
- ✓ staggered uni-pole
- ✓ V-shaped staggered pole
- ✓ AB shape symmetric staggered pole
- ✓ Asymmetric staggered pole

Cases of Magnet Steel—Disk motor



Disc motor with magnet yoke on the back
Single sided magnetization



Disc motor of Integrated magnetic sheet
Single sided magnetization

Disc motor with exposed double-sided magnets
Double sided magnetization

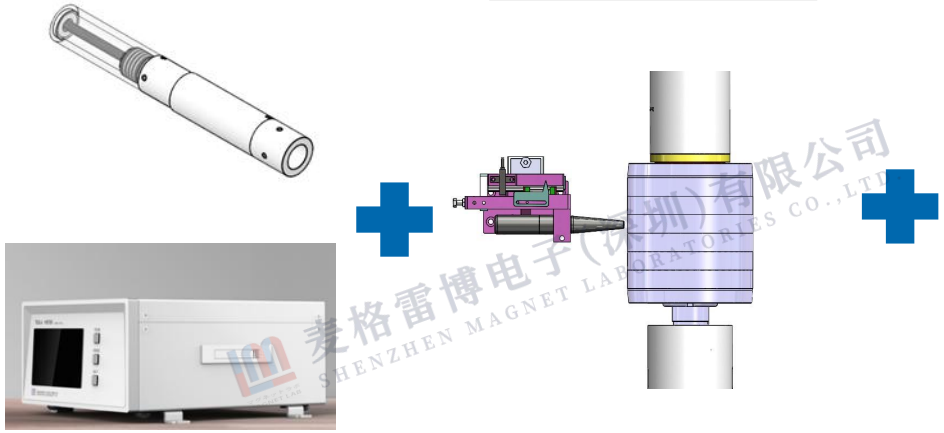
Principle of Surface Magnetic Field Detection

Detection probe + Gauss meter

The rotors are scanned layer by layer

Industrial computer + software analysis

Magnetic Measurement result

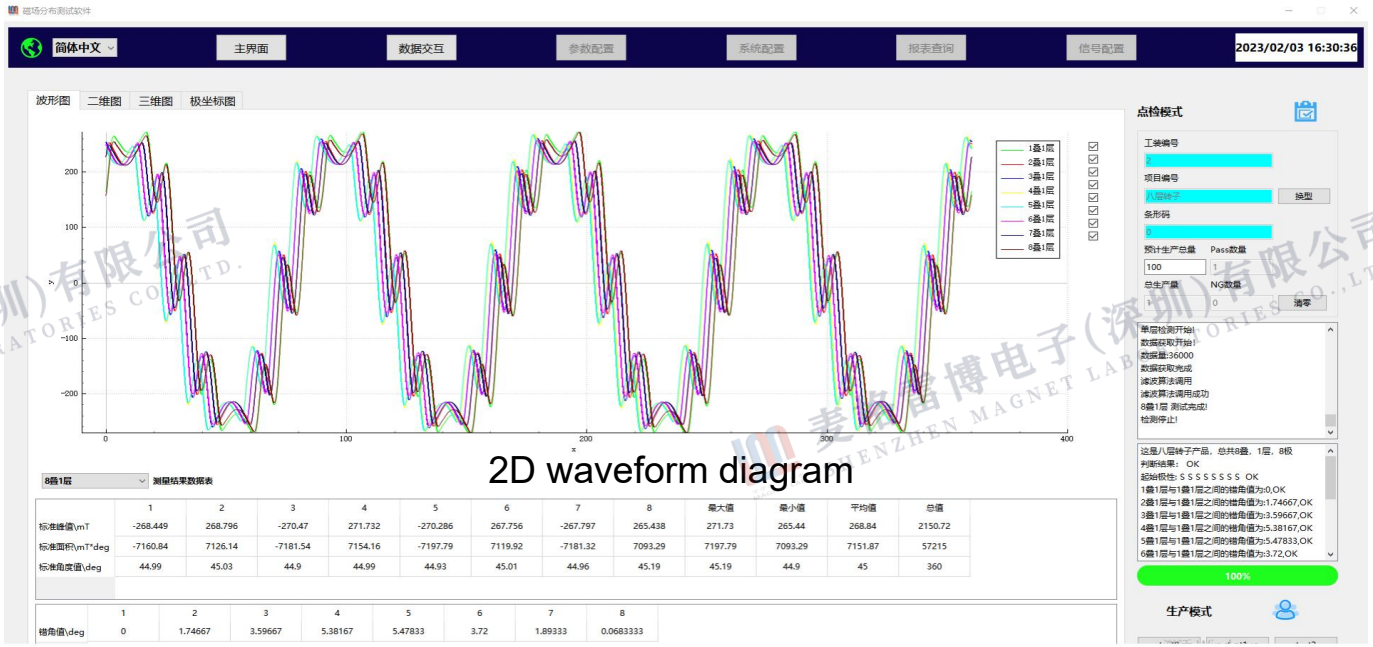


Surface magnetic detection principle introduction

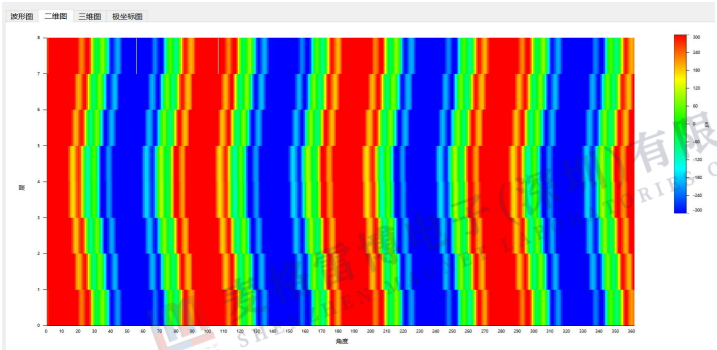
The probe of the Tesla meter is moved to the specified position through the multi-axis module, and the measured rotor is driven by the motor to carry out uniform circular motion. The rotor surface magnetic field measured by the probe of the Tesla meter is digitally processed by the Tesla meter and sent to the computer. The magnetic detection data and the rotation Angle correspond to 36,000 points /360° by the special magnetic detection software of the computer. After scanning the magnetic distribution of the whole circle at the specified height of the rotor, the Tesla meter probe is moved to the designated position of the next layer for repeated measurement and completion. The data is processed by the surface magnetic distribution software and the upper and lower limits set by the specified parameters (magnetic pole peak value, magnetic pole area, magnetic pole Angle) are compared. The measurement report is generated and the detection result output OK or NG signal is judged. The detection is displayed as 2D waveform and one-dimensional Hall probe is used.

Magnetic Detection Parameters

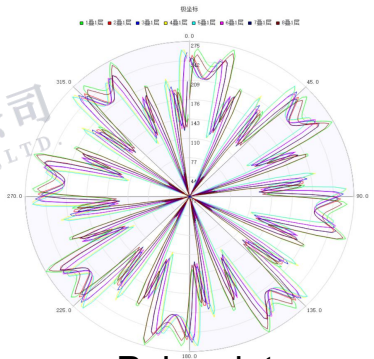
- Peak value
- Area
- Magnetic pole angle
- Magnetic field misalignment angle
- FFT analysis



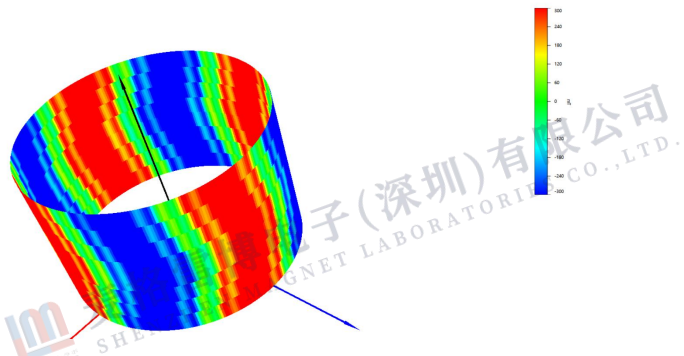
2D waveform diagram



2D planar cloud map



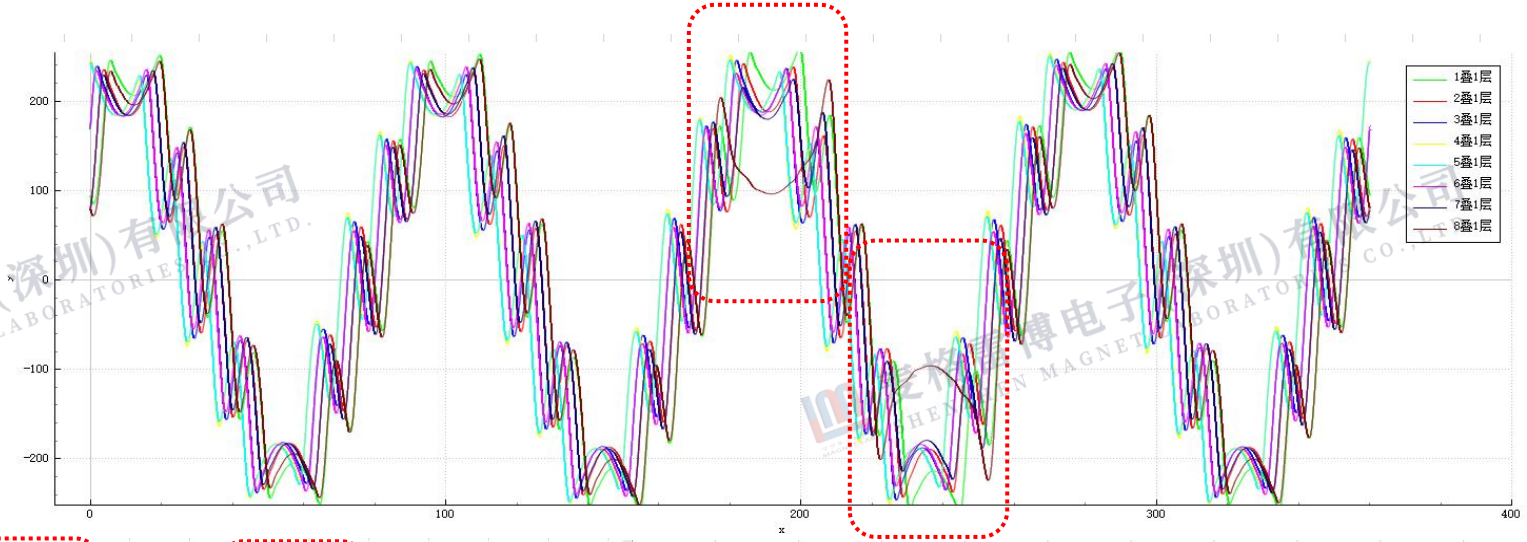
Polar plot

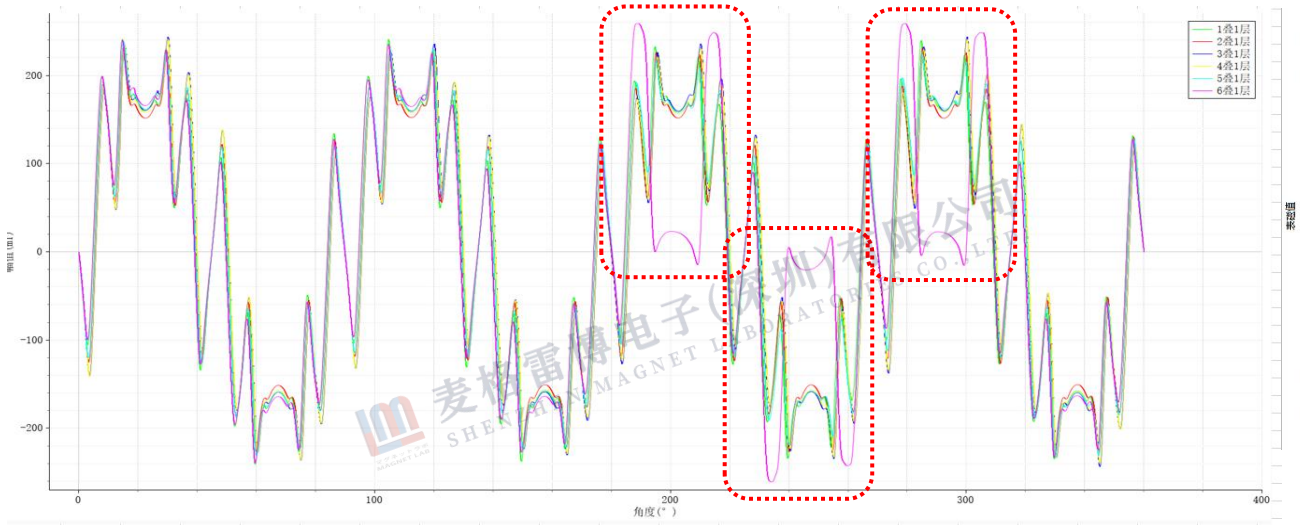


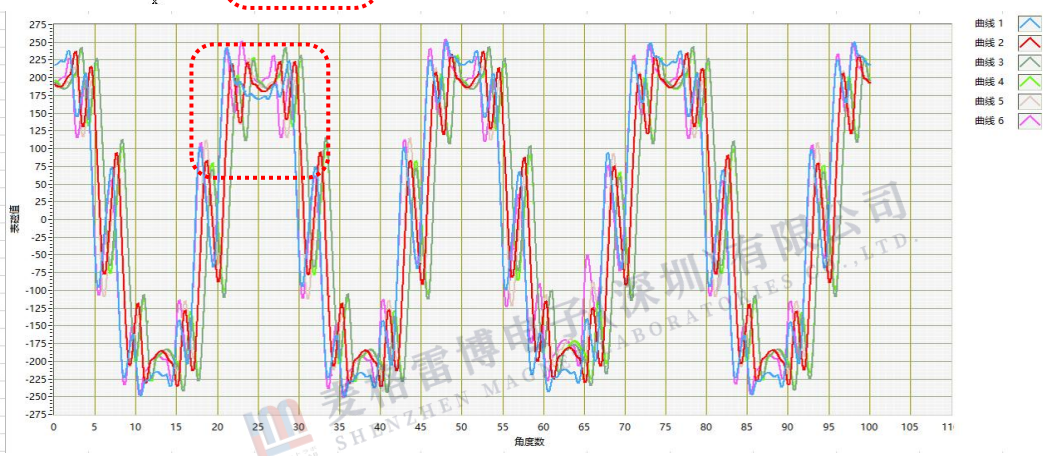
3D cloud map

Case of Missing Magnet Steel Insertion

- Magnet steel leakage insertion
- Magnet steel reverse insertion
- Magnetization unsaturation
- Stacking direction incorrect/reversed

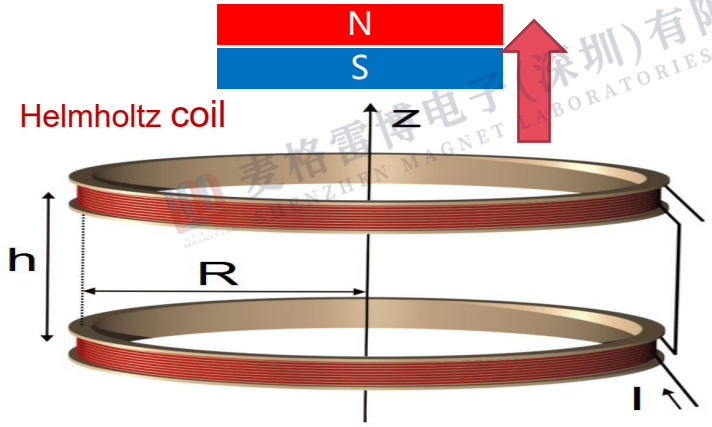






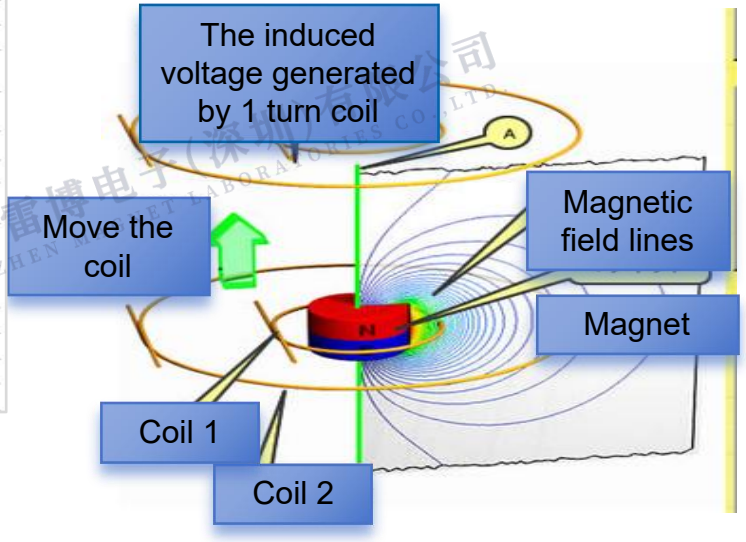
Magnetic Measuring Instrument - Flux Meter

Subject

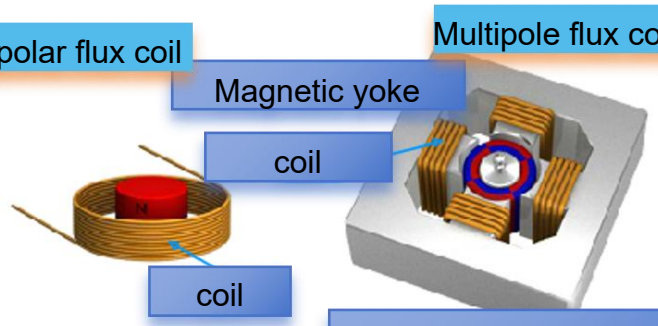


项目 | Items	技术参数 | Technical Parameters
量程 | Measuring range	0~1Wb
量程档位 | Range gear	1mWb(可选) | (optional) 10mWb 100mWb 1000mWb
分辨率 | Resolution ratio	0.1uWb 1uWb 10uWb 100μWb
精度 | Precision	±0.4%
零点漂移 | zero drift	< ±1μWb/min
输入阻抗 | Input impedance	> 200kΩ
显示位数 | Display digit	4（5位数显示需要定制） | 4(5-digit display needs to be customized)
显示内容 | Display content	磁通量、上下限、量程、峰谷差值、磁矩、线圈系数 Magnetic flux, upper and lower limits, measuring range, peak-valley difference, magnetic moment, coil coefficient
显示更新速率 | Display update rate	5次/秒 | 5times/second
采样率 | Sampling rate	正常和峰值模式为100 次/秒，峰峰值模式为1000 次/秒，采样位数24 位。 Normal and peak modes are 100 times/sec, peak-to-peak mode is 1000 times/sec, and the number of sampling bits is 24bits.
重复性 | Repeatability	0.05%
输入接口 | Input interface	4mm橡胶插座 | 4mm rubber socket
通讯接口RS-232 CommunicationinterfaceRS-232	波特率可调；串口接口: DB-9 (默认115200) Baud rate is adjustable; Serial interface: DB-9 (default 115200)
通讯接口RS-485 CommunicationinterfaceRS-485	波特率可调(默认115200)Baud rate adjustable (default 115200)
USB接口 | USB interface	有 | Available
继电器数目 | Number of relays	3个 | three
继电器方式 | Relay mode	常开，对应HIGH/GO/LOW 输出 | Normally open, Corresponding to HIGH/GO/LOW output
继电器触发负载 Relay triggered load	30VDC at 2A
继电器动作 | Relay action	与高低报警输出一致,能手动操作 Consistent with the high and low alarm output, it can be operated manually
供电电源 | Power supply	AC：100V~230V、50/60Hz；FUSE：1A
环境温度 | Ambient temperature	0~40℃
尺寸 | Size	长宽高约：304x263x136mm
重量 | Weight	约5kg | About 5kg

Principle of flux detection：Put a magnet inside a flux coil, move the magnet away from the flux coil, and when the magnetic field inside the coil changes, the coil will generate an induced voltage. This is the principle of electromagnetic induction, which is often used in generators. The use of flux meters to check magnetic flux is also based on the principle of electromagnetic induction.

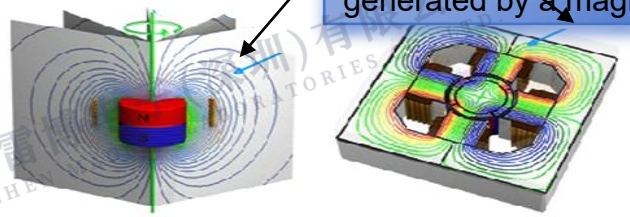


Instructions for Flux Detection

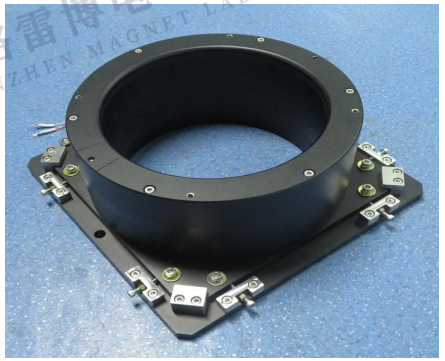


The magnet is placed inside the coil

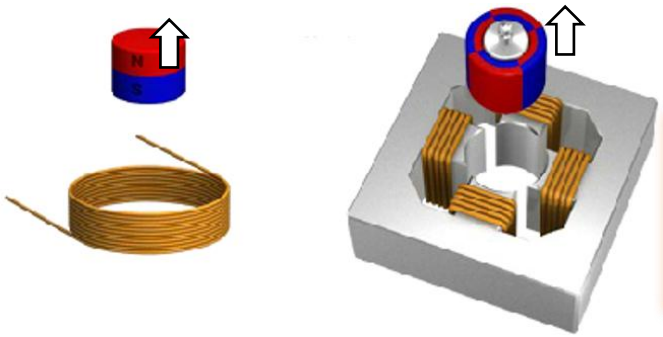
Unipolar flux coil (Helmholtz coil)



The magnet is placed inside the coil A cross-section of the magnetic field lines after that



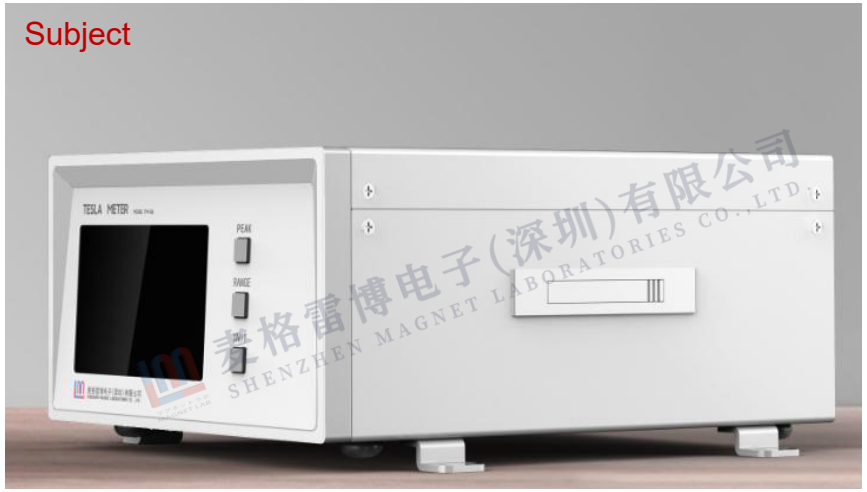
Multipole flux coil



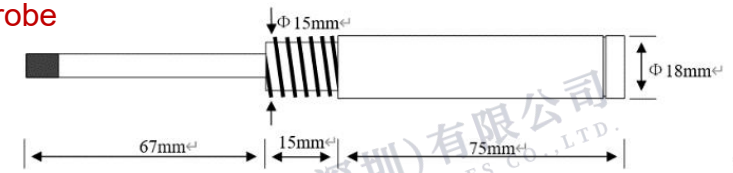
The magnet is removed from the flux coil, which generates an induced electromotive force and displays the flux through the flux meter

Surface Magnetic Measuring Instruments—Tesla Meter

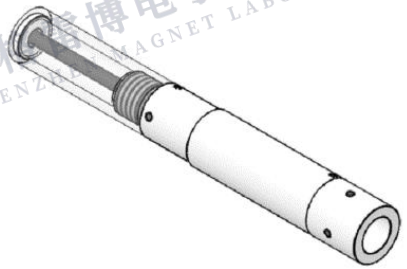
Subject



Flat probe



Cylindrical probe



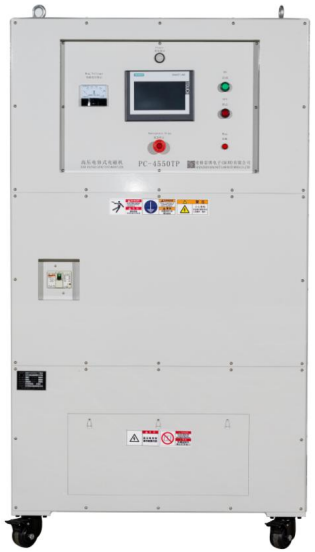
项目 | Items	技术参数 | Technical Parameters		
量程 | Measuring range	0~10T		
量程档位 | Range gear	0.1T	1T	10T
显示范围 | Indication range	N99.99mT~S99.99mT	N999.9mT~S999.9mT	N9.999T~S9.999T
分辨率 | Resolution ratio	0.1mT	0.1mT	1mT
精度 | Precision	±（读数0.5%+满量程0.05%）（校正0~2T范围） (reading 0.5%+ full scale 0.05%) (calibration range of 0~2T)		
温漂 | Temperature drift	优于-0.06% | Better than -0.06%		
显示位数 | Display digit	4位（5位数显示需要定制） | Four digit(5-digit display needs to be customized)		
显示内容 | Display content	当前值、N峰值、S峰值、上下限显示、极性Current value, N peak value, Speak value, upper and lower limit display, polarity		
显示单位 | Display unit	高斯（Gs）、千高斯（KGs）、特斯拉（T）、毫特斯拉（mT）		
显示更新速率 | Display update rate	5次/秒 | 5times/second		
模拟量输出 | Analog output	满量程±10V | Full scale±10V		
硬件输出精度1%@满量程 Hardwareoutputaccuracy1%@full scale	DAC修正输出精度0.5%满量程（需定制） DACcorrectstheoutputaccuracyto0.5% full scale (customization required)		
校准方式 | Calibration mode	分极性多点校准 | Polarization multi point calibration		
外部触发速率 | External trigger rate	最高10k/s | Maximum 10k/s		
通讯接口速率 | Communication interface rate	最高10ksps | Maximum 10ksps		
通讯接口 | communication interface	USB/RS-232/RS-485可选，标配RS-485 USB/RS-232/RS-485 is optional and comes standard withRS-485		
测试功能 | Test function	正常测试/峰值测量/脉冲峰值测试 | Normal test/peak measurement/pulse peak test		
脉冲要求 | Pulse requirement	脉冲宽度＞20uS，脉冲幅度＞5%量程 | Pulse width ＞ ＞20uS, pulse amplitude ＞ 5% range. 精度±5%，但不作保证 | The accuracy is 5%, but it is not guaranteed		
继电器数目 | Number of relays	3个 | three		
继电器方式 | Relay mode	常开，对应HIGH/GO/LOW 输出 | Normally open, corresponding to HIGH/GO/LOW output 继电器触发负载 Relay triggered load 30VDC at 2A		
继电器动作 | Relay action	与高低报警输出一致 | Consistent with high and low alarm output		
供电电源 | Power supply	AC：100V~230V、50/60Hz；FUSE：1A		
环境温度 | Ambient temperature	0~40℃		
尺寸 | Size	长宽高约：304x229x136mm | Length,width and height:304x229x136mm		
重量 | Weight	约5kg | About 5kg		

Magnetizing Power Supply

- ★ Adjustable magnetizing voltage and current
- ★ Modular design, easy to expand
- ★ Supports an outer diameter of 500mm and a height of 1000mm
- ★ Overall size, customized design
- ★ Capacitor charge and discharge life cycle ≥ twenty million times
- ★ 7 "LCD touch screen operation
- ★ Measurable discharging peak current
- ★ Ethernet TCP/IP, serial ports RS-232 and 485
- ★ Multiple protection/alarm output to protect system security

Orientation Power Supply

Transformer type field oriented power supply



Switching power supply type field oriented power supply

Capacitive field oriented power supply

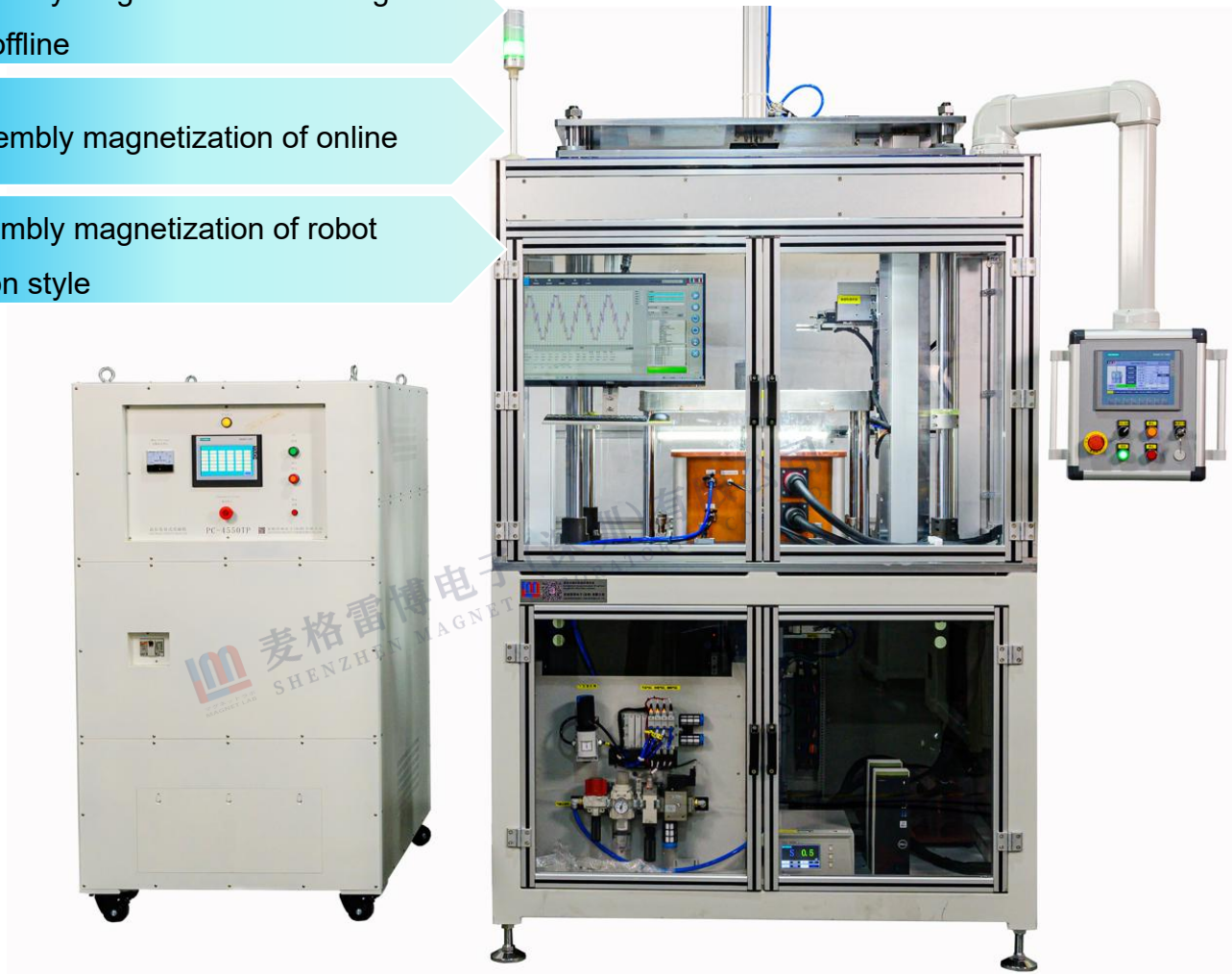
- ★ It is used for demagnetization in the process of making magnets and for the production of anisotropic magnetic materials
- ★ Transformer type, DC type, pulse type
- ★ Low energy consumption, high efficiency, fast performance
- ★ Can be used in automatic production line

Part 3 Application Cases

Magnetization & Surface Magnetic Detection Equipment |
Post-assembly Magnetization&Magnetic Detector Equipment

Magnetization & Surface Magnetic Detection Equipment

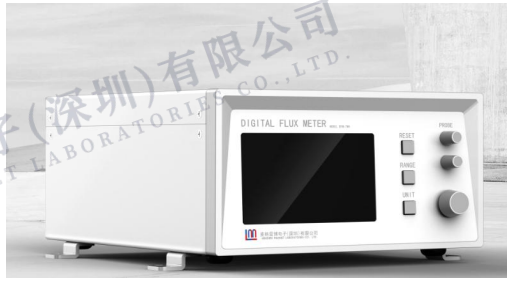
- Post-assembly magnetization of a single machine offline
- Post-assembly magnetization of online
- Post-assembly magnetization of robot workstation style



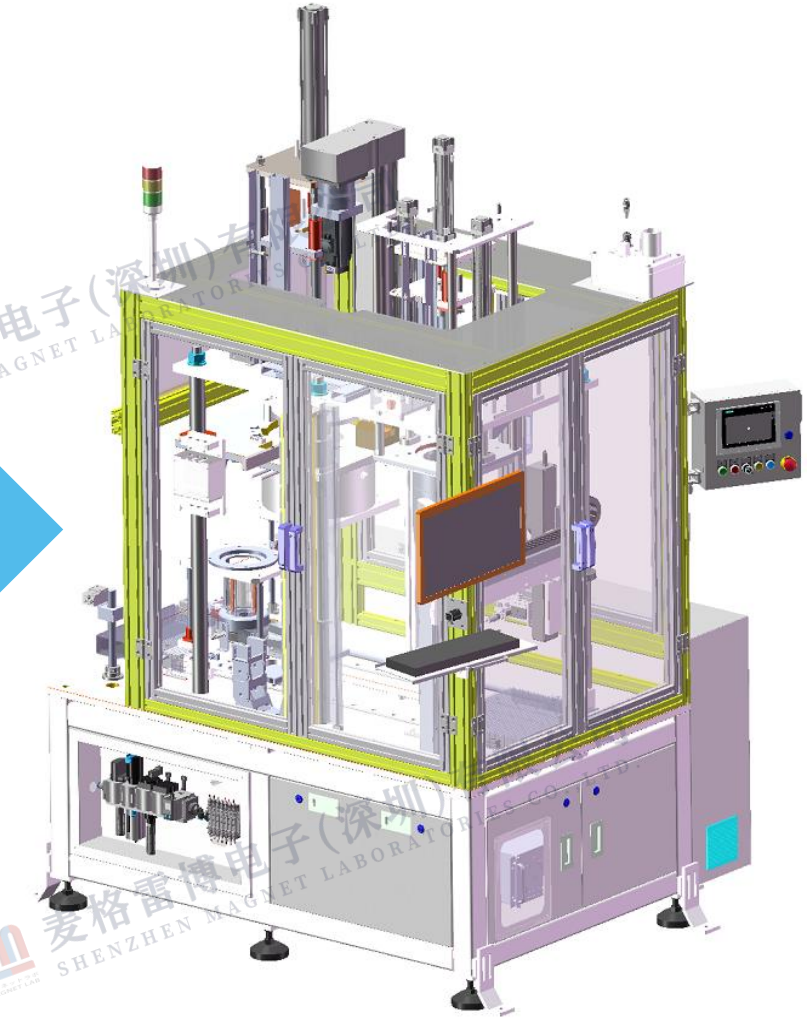
Post-assembly Magnetization & Magnetic Detector Equipment

Magnetizing Power Supply

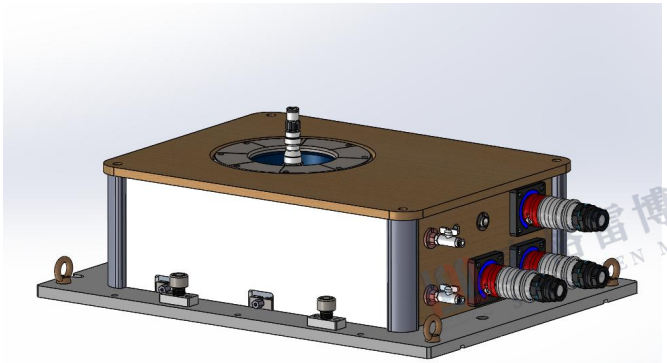
Fluxmeter



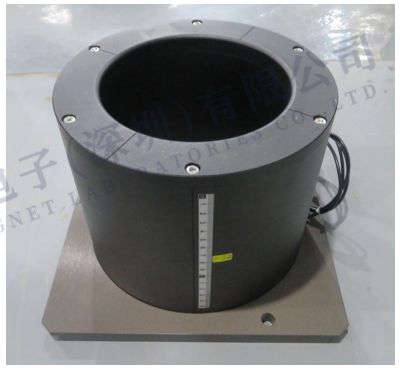
Tesla meter



Magnetization coil/built-in magnetic flux detection coil



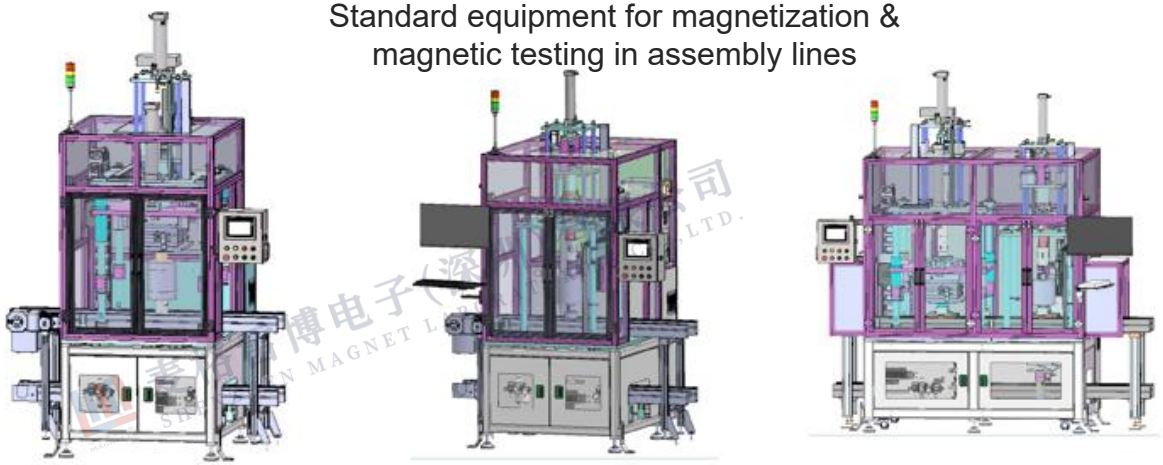
Independent magnetic flux detection coil



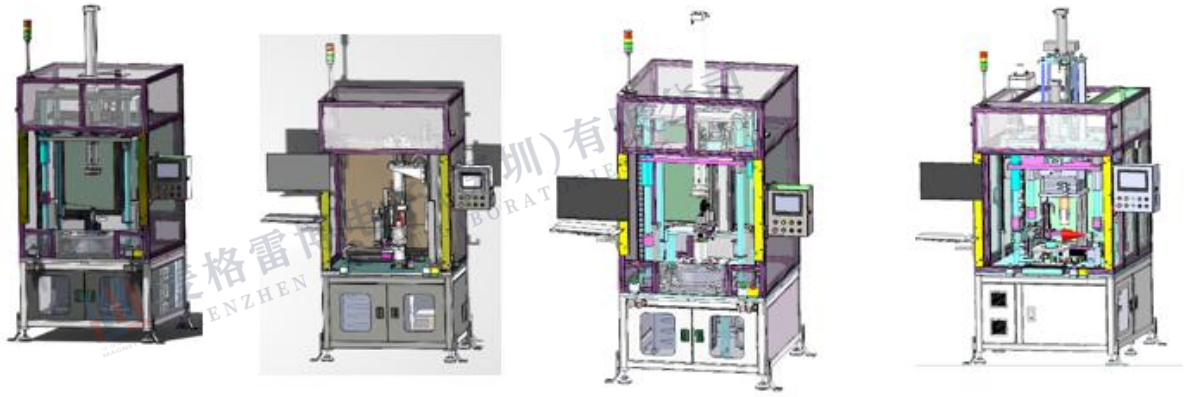
Detection probe

Post-assembly Magnetization & Magnetic Detector Equipment

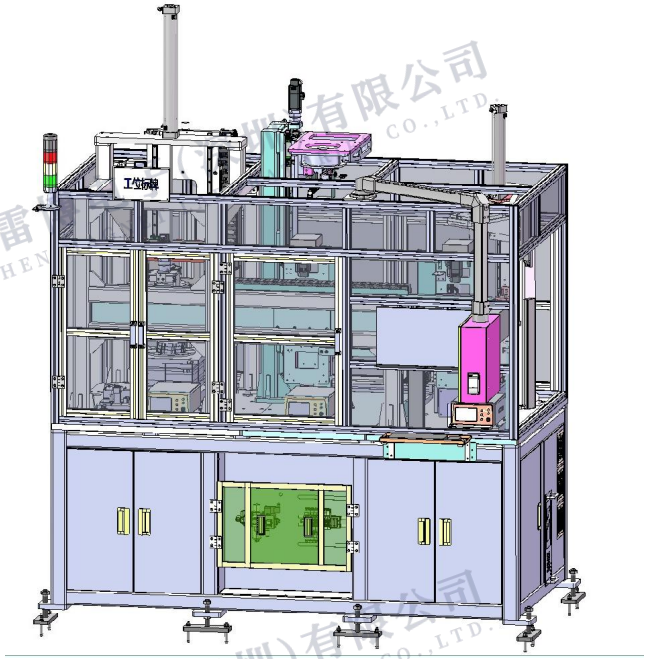
Standard equipment for magnetization & magnetic testing in assembly lines



Standard equipment for magnetization & magnetic testing outside the robot/transfer gripper line



Multi in one standard equipmen for magnetization & magnetic testing



THANKS

Official WeChat account of MAGLAB

Official WeChat service account of MAGLAB

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