LANMEC 兰菱机电

江苏 / 上海 / 深圳 ……

Company Introduction | 公司简介

兰菱机电研发转矩转速传感器、数据采集系统、测试模拟负载装置（磁粉制动器、电涡流制动器、磁滞制动器等）源于1974年，系国内最早研究、设计并投入规模生产该类产品的单位之一。

公司现有职工100多名，其中技术人员30多名，并常年与清华、北大、同济、哈工大等高校合作，开发各种相关产品。在产品设计上我们始终瞄准国外同行最先进的产品，引进、消化、吸收，开发出外形美观、性能可靠、经济耐用的同类产品，可以与进口产品相媲美。

公司于2006年通过ISO9001:2000质量体系认证。转矩转速传感器严格执行国家机械行业标准：JB/T6876-1993,并于2013年通过欧盟CE认证。

转矩转速传感器采用高线性弹性轴，热处理后经进口数控车床和加工中心精加工而成。转矩转速传感器出厂需经过静态校准、动态测试、振动试验、强磁试验等试验方可出厂，保证了传感器的精度和出厂的可靠性。

公司拥有0.5-500,000N.m扭矩标准机，均由中国航空工业集团公司北京长城测试技术研究所校准，精度达0.03%。

经过多年的不懈努力，工厂现占地30000平米、厂房15000多平米，固定资产4000多万元，年产销近50000台套。产品质量、生产规模及产量稳居全国前列。

过硬的产品质量和健全的售后服务体系，为公司赢得国内外客户5000多家。多年来，公司还与航天、航空等军工单位合作开发了多种产品，是中国酒泉卫星发射中心的定点配套单位。

兰菱机电位于美丽的黄海之滨，沿海开发的新兴城市-江苏海安。我们热忱欢迎您光临本公司，为我们兰菱机电向更高目标发展多提宝贵意见！

Haian Lanmec Electromechanical Equipment Co.,Ltd,which was founded in 1974, research and develop torque speed sensor, data acquisition system, test, analog load device (magnetic powder brake, eddy current brake, hysteresis brake and so on).....In China it is one of the earliest corporation to R&D and industrialize these kinds of products for mass production.

Today hundreds of employees with around 30 engineers commit themselves to the company.Cooperating with famous universities,such as Tsinghua university, PEKING university,Tongji university and Harbin Institude of Technology,aiming at worldwide advanced technology,the corporation develops more reliable、durable and beautiful devices for customers.

Lanmec Electromechanical acquired ISO 9001:2000 cerfification in 2006.Torque speed sensor strictly complies with China Administeation of Machinery Industry Standard:JB/T6876-1993 and acquried EU CE certification in 2013.

Torque speed sensor with high linear elastic shaft, refined processing by the imported CNC lathes and machining centers after heat treatment. Before leaving the factory, it must pass through the static calibration, dynamic test, vibration test, strong magnetic test and so on, to ensure the accuracy and reliability of the sensor.

We have 0.5-500000N.m torque standard machine, calibrated by the Chinese Aviation Industry group Corp Beijing Great Wall Testing Technology Research Institute, accuracy is up to 0.03%.

After year to year unremitting efforts,the corporation grows to land area of 30000 m² & workshops 15000 m² ,fixed assets value of RMB 40 Million, and output nearly 50000 units/sets one year. Product quality,scale of production and output,are in the forefront of the country.

Excellent product quality and perfect after sales service system bring more than 5000 worldwide clients to us.After collaborate with and delivery many excellent products to China Aerospace & Aviation Military Corporation,the company is authorized as a supplier for China Jiuquan Satellite Launch Center.

Lanmec,reliable partner!

Lanmec locates in the beautiful coast of Yellow Sea in East China-Haian.Welcome to Lanmec!Sincerely looking forward to your valued suggestion and cooperation!

兰菱公司辩证地看到发展中所取得的成绩和各种荣誉，荣誉是名，业绩和能力是实。
荣誉既是功劳和贡献的象征，也是客户对我们业绩的认可和表彰，更是每一个兰菱人对质量、对服务做出的庄严承诺。

Lanmec company has dialectical view of development in the achievements and honors, honor is the name, performance and abilities are real.
Honor also is a symbol of merit and contribution, even is recognized by the customers for our performance and recognition, that is a Solemn promise From every Lanmec people.


荣誉证书

江苏海安兰菱机电设备有限公司：

贵公司生产的磁粉制动器、离合器，张力控制系统在中国留学人员发射中心得以应用，产品质量可靠，售后服务一流。

中国人民 63602 部队
部 队 章
二〇〇六年六月


管理体系认证证书

海安县兰菱机电设备有限公司

GB/T 19001-2008/ISO 9001:2008标准要求


CERTIFICATE

Sales network | 营销网络

天津（售后服务）
Tianjin(After-sale service)

地址：天津西青道/外环线交口
Add：The junction of xiqing road and outer ring,Tianjin
电话（Tel）：022-27737897
传真（Fax）：022-27736972

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电话（Tel）：0513-88801222 88801555
传真（Fax）：0513-88802555
售后（After-sales）：0513-88802999

上海（办事处）
Shanghai（Office）

地址：上海市长寿路738号
Add：NO.738 Changshou Road,Shanghai City
电话（Tel）：021-62998831
传真（Fax）：021-62998832

深圳（办事处）
Shenzhen（Office）

地址：深圳市宝安大道4009号
Add：NO.4009 Baoan Avenue , Shenzhen city
电话（Tel）：0755-23029266
传真（Fax）：0755-23029566

公司产品以优异的品质和良好的服务享誉国际市场，远销台湾、美国、意大利、德国、土耳其、印度、中东等20余个国家和地区。

Products with superior quality and good service reputating the international market.Exported to Taiwan, USA, Italy, Germany, Turkey,India,the Middle East and more than 20 countries and regions.

中航工业

中国兵器工业集团

中核能源 CHINERGY

CSIC

清華大學

北京大學 PEKING UNIVERSITY

同济大学 TONGJI UNIVERSITY

东南大学

中国科学院

上电电机 SHANGDIAN MOTOR

上柴动力

SANY

XCMG 徐工集团

Schindler

ThyssenKrupp Elevator 蒂森克虏伯电梯(中国)

LUK INA FAG

SIEMENS

OTIS A United Technologies Company

YANMAR

Torque speed test functional parts | 转矩转速测试功能部件

ZJ-A Torque Speed Sensor
ZJ-A型 转矩转速传感器
P14

TR-3A Torque Speed Power Acquisition Instrument
TR-3A型 转矩转速功率采集仪
P23

Computer Measurement Board Card And Software
计算机测量板卡及软件
P26

ZJ-A-F/V signal converter
ZJ-A-F/V信号转换器
P32

Acquisition Card(USB Interface)
采集卡（USB接口）
P29

Test simulation load | 测试模拟负载

LANMEC 兰菱机电

FZ-J Magnetic Powder Brake
FZ-J型 磁粉制动器
P34

CW Eddy Current Brake
CW型 电涡流制动器
P38

DWZ Eddy Current Brake
DWZ型 电涡流制动器
P42

DW Eddy Current Dynamometer
DW型 电涡流测功机
P42

HB Hysteresis Brake
HB型 磁滞制动器
P46

Model Selection Design of Simulated Load
模拟负载选型设计
P53

SC-1D Tension Controller
SC-1D型 张力控制器
P56

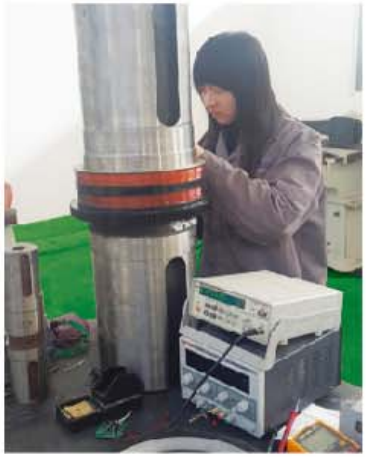
GFQ Power Amplifier
GFQ型 功率放大器
P57

SC-1W Power Supply
SC-1W型 程控电源
P58

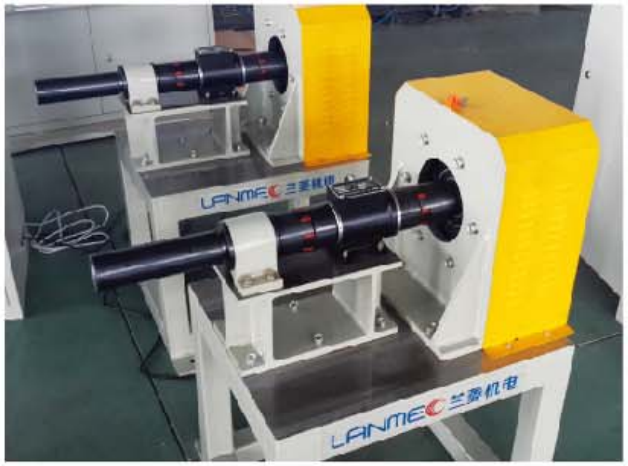
Torque Speed Sensor | 转矩转速传感器

Calibration scene of sensor
传感器校准现场

Sensor electronics workshop
传感器电子车间

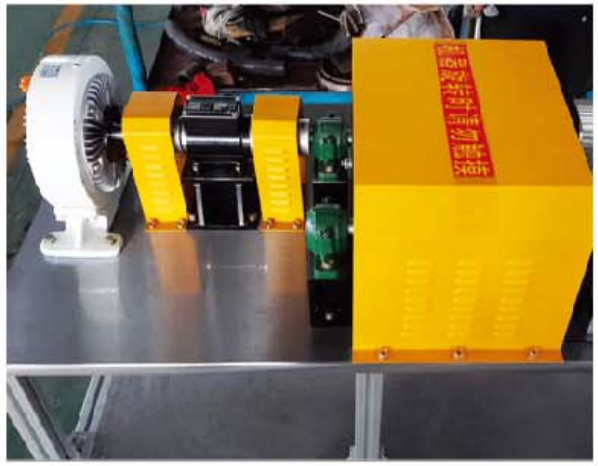


Sensor assembling
传感器装配



Sensor application (1)
传感器使用现场(1)

Sensor application (2)
传感器使用现场(2)



Sensor application (3)
传感器使用现场(3)

Taiwan “ Taichung” Numerical control lathe
台湾“台中”数控车床

Japan “Brother”、Taiwan “ Taichung ” Machining center
日本“兄弟”、台湾“台中”加工中心

Lanmec test,reliable performance
兰菱测试，性能可靠

Lanmec steel,material guarantee
兰菱制钢，材质保证

Panasonic automatic welding
松下自动焊接

Lanmec logistics,timely delivery
兰菱物流，发货及时

Company Qualification | 公司资质

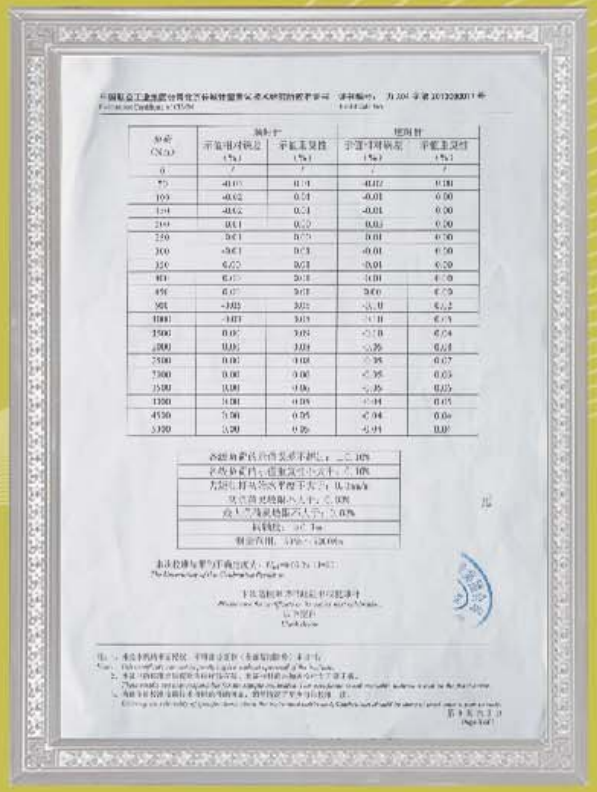
中国航空工业集团公司北京长城计量测试技术研究所

（国防科技工业第一计量测试研究中心）

校准证书

CALIBRATION CERTIFICATE

校准结果



NE-500标准扭矩机第三方校准证书(0.03%级)

Third Party calibration certificate of NE-500 standard torque machine (0.03% grade)

中国航空工业集团公司北京长城计量测试技术研究所

（国防科技工业第一计量测试研究中心）

校准证书

CALIBRATION CERTIFICATE

校准结果

10N.m转矩转速传感器第三方校准证书

Third Party calibration certificate of 10N.m torque speed sensor

Company Qualification | 公司资质

中国航空工业集团公司北京长城计量测试技术研究所
（国防科技工业第一计量测试研究中心）
CHANGCHENG INSTITUTE OF METROLOGY & MEASUREMENT

校准证书

CALIBRATION CERTIFICATE

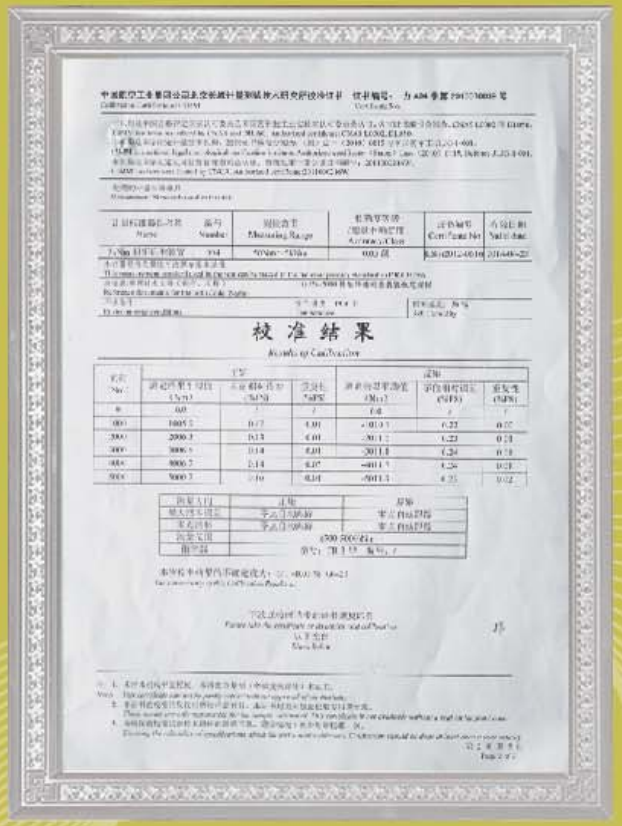
校准结果

1000N.m转矩转速传感器第三方校准证书
Third Party calibration certificate of 1000N.m torque speed sensor

中国航空工业集团公司北京长城计量测试技术研究所
（国防科技工业非金属计量测试研究中心）

校准证书

CALIBRATION CERTIFICATE



校准结果

5000N.m转矩转速传感器第三方校准证书

Third Party calibration certificate of 5000N.m torque speed sensor

ZJ-A Torque Speed Sensor

ZJ-A型 转矩转速传感器

Scope Of Application | 应用范围

转矩转速传感器是一种测量各种扭力、转速及机械功率的精密测量仪器。应用范围十分广泛，主要用于：
Torque speed sensor is a precision measuring instrument which used for measuring various torque, speed and the mechanical power.
Applications range are widely, mainly used for:

1、电动机、发动机、内燃机等旋转动力设备输出扭矩及功率的检测；
2、风机、水泵、齿轮箱、扭力板手的扭矩及功率的检测；
3、铁路机车、汽车、拖拉机、飞机、船舶、矿山机械中的扭矩及功率的检测；
4、可用于污水处理系统中的扭矩及功率的检测；
5、可用于制造粘度计；
6、可用于过程工业和流程工业中；
1. Detect the output torque and power of rotating power equipment,such as motor, engine, internal combustion engine ;
2. Detect the output torque and power of fan, water pump, gear box and torque wrench;
3. Detect the output torque and power of railway engine,car, tractor, plane, vessel and mining machine;
4. Detect the output torque and power of sewage treatment system;
5. Can be used in the manufacture of viscometer;
6. Can be used in process industry;

Basic Principle | 基本原理

转矩的测量：采用应变片电测技术，在弹性轴上组成应变桥，向应变桥提供电源即可测得该弹性轴受扭的电信号。将该应变信号放大后，经过压/频转换，变成与扭应变成正比的频率信号。如图1所示：

Measurement of torque:using strain gauges, form strain bridge on elastic axis, provide power to the strain bridge to measure the torsion electrical signal of the elastic axis. Amplified the strain signals, after the voltage / frequency converter, turn to a frequency signal which proportional to the torsion .
As shown in figure 1:

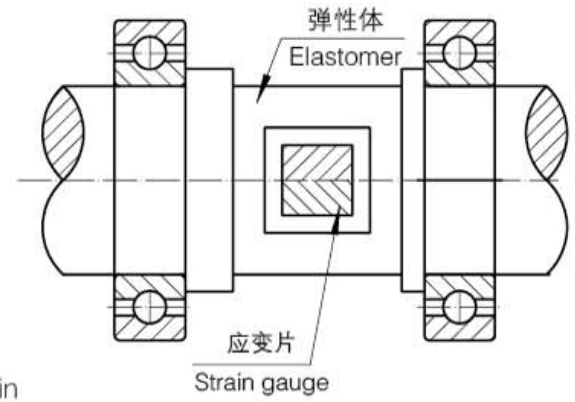


Fig. 1 Measurement principle diagram
图1 测量原理图

ZJ-A Torque Speed Sensor | ZJ-A型转矩转速传感器

Product Features | 产品特点

1、信号输出可任意选择波形—方波或脉冲波。
2、检测精度高、稳定性好、抗干扰性强。
3、不需反复调零即可连续测量正反扭矩。
4、既可测量静止扭矩，也可测量动态扭矩。
5、体积小、重量轻、易于安装。传感器可脱离二次仪表独立使用，只要按插座针号提供 ±15VDC（200mA）的电源，即可输出阻抗与扭矩成正比的等方波或脉冲波频率信号。
6、测量范围： 0—500000Nm标准可选,特殊量程定制。

1. Signal output can choose arbitrarily wave -square wave and pulse wave.
2. High precision, good stability, strong anti-interference.
3. Don't need repeat zero, can continuous measure positive and negative torque.
4. Can not only measure the static torque, but also can measure the dynamic torque.
5. Small volume, light weight, easy to install. Sensor can be separated from secondary instrument used independently, as long as provide ±15VDC (200mA) power according to socket pin No., then can output square wave or pulse frequency signal which proportional to the torque.
6. Measuring range: 0 -500000Nm is optional, special range can customization.

Main Function And Performance Index | 主要功能及性能指标

扭矩示值误差(Torque indication error)： ≤± 0.2 % F · S	电源电压(Power supply voltage)： +15VDC ± 5% , -15VDC ± 5%
灵敏度 (Sensitivity)： 1 ± 0.2 mv / V	转速输出信号：60-120个脉冲/转 Speed output signal: 60-120 pulse / turn
非线性(Nonlinear)： ≤ ± 0.2 % F · S	频率信号输出(Frequency signal output)： 5KHz—15KHz
重复性(Repeatability)： ≤ ± 0.2% F · S	零转矩频率输出(Zero torque frequency output)：10KHZ
滞后(Lag)： ≤0.2 % F · S	正向转矩满量程频率输出(Positive torque full scale frequency output)：15KHZ
零点飘移（24小时）Zero drift (24 hours)： ≤0.2 % F · S	反向转矩满量程频率输出(Reverse torque full scale frequency output)：5KHZ
输出阻抗(Output impedance)： 1KΩ ±3Ω	信号占空比(Signal duty ratio)： （50 ± 10）%
绝缘阻抗(Insulation resistance)： >500MΩ	传感器功耗(Power consumption of the sensor)： 4W
静态超载(Static overload)： 150 %	使用温度(Temperature when use)： -20 ~ 70℃
断裂负载(Breaking load)： 200 %	相对湿度(Relative humidity)： ≤90%RH

Product Outer Apperance | 产品外形

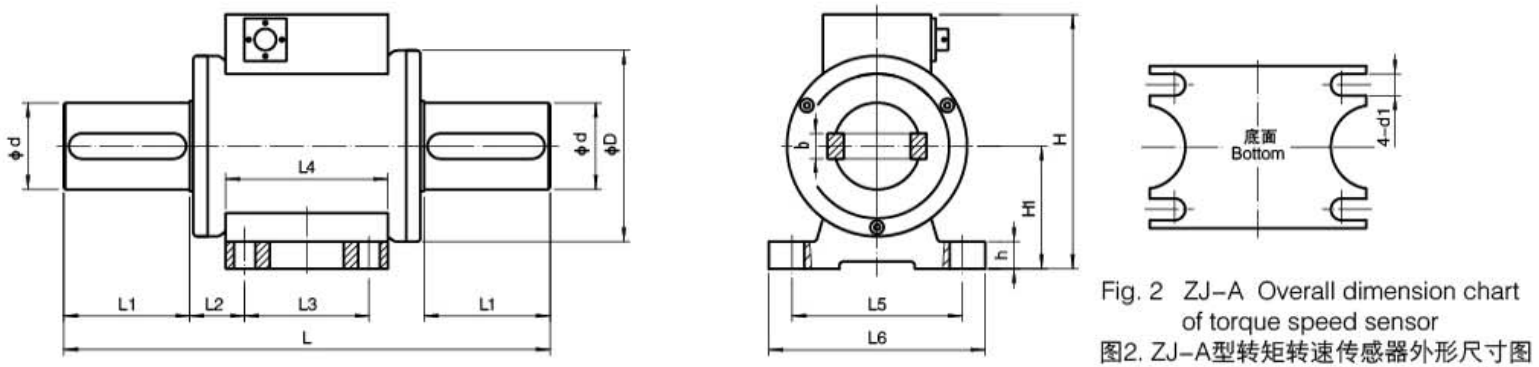


Fig. 2 ZJ-A Overall dimension chart of torque speed sensor
图2. ZJ-A型转矩转速传感器外形尺寸图

型号 (Model)	额定转矩 (N.m) Rated Torque	许用转速 (r/min) Allowable rotational speed	外形尺寸 Overall dimension			轴联结尺寸 Shaft couping size		机座支撑尺寸 Base support size									重量 (kg)
			H	L	D	d(h7)	键b(p7)X数量n	L1	L2	L3	L4	L5	L6	H1	d1	h	
ZJ-0.5/1/2/3A	0.5/1/2/3	6000	100	170	68	11	削扁至10(Cut to 10)	15	23	60	76	46	70	50	6	8	1.8
ZJ-5/10/20/50A	5/10/20/50	6000	114	188	78	18	6X1	31	14	75	90	61	100	55	8	12	3.8
ZJ-100A	100	6000	114	188	78	18	6X1	31	14	75	90	61	100	55	8	12	3.8
ZJ-200A	200	5000	125	209	92	28	8X1	41	14	75	90	61	100	60	8	12	5.1
ZJ-500A	500	4000	135	238	96	38	10X2	55	15	75	90	62	100	65	8	12	6.5
ZJ-1000A	1000	3000	143	270	106	48	14X2	70	19	69	90	78	120	68	12	15	9
ZJ-2000A	2000	3000	143	270	106	48	14X2	70	19	69	90	78	120	68	12	15	9.5
ZJ-5000A	5000	2000	187	347	144	75	20X2	105	32	69	100	156	180	90	13	15	23
ZJ-10000A	10000	2000	214	389	158	98	28X2	120	32	80	110	170	200	110	13	15	35
ZJ-20000A	20000	1800	225	420	168	105	28X2	125	36	88	125	180	205	115	4-M12	15	56
ZJ-30000A	30000	1500	258	420	206	125	32X2	125	36	88	125	180	205	136	4-M12	15	56
ZJ-40000A	40000	1500	296	480	240	150	40X2	153	42	90	125	185	230	153	4-M16	15	95
ZJ-50000A	50000	1500	296	480	240	150	40X2	153	42	90	125	185	230	153	4-M16	15	95
ZJ-100000A	100000	1200	305	572	247	180	45X2	180	42	90	130	250	290	162	4-M16	20	160
ZJ-150000A	150000	1000	420	900	350	235	56X2	310	48	180	220	250	290	220	4-M20	25	420
ZJ-200000A	200000	800	446	900	360	255	56X2	310	48	180	220	250	290	240	4-M20	25	480
ZJ-300000A	300000	800	480	900	416	295	70X2	320	48	180	220	268	308	250	4-M20	25	580

注：更大扭矩，更高转速的转矩转速传感器需要定制，订货前说明
Note: Higher torque and speed torque sensors need customization, pls. inform before make order.

Working Process | 工作过程

将专用的测扭应变片用应变胶粘贴在被测弹性轴上并组成应变桥，向应变桥提供电源即可测得该弹性轴受扭的电信号。将该应变信号放大后，经过压/频转换，变成与扭应变成正比的频率信号。本系统的能源输入及信号输出是由两组带间隙的特殊环型变压器承担的，因此实现了无接触的能源及信号传递功能。

Use strain gauge adhesive to stick the special measuring torsional strain to the measured elastic shaft ,and formed strain bridge, provide power to the strain bridge to measure the torsion electrical signal of the elastic axis. Amplified the strain signals, after the voltage / frequency converter, turn to a frequency signal which proportional to the torsion.

Energy input and signal output of the system is beared by special ring transformer which in the gap of two groups. Therefore,achieved the contactless energy and signal transfer function.

向传感器提供±15VDC电源，激磁电路中的晶体振荡器产生400Hz的方波，经过功率放大器即产生交流激磁功率电源，通过能源环形变压器T1从静止的初级线圈传递至旋转的次级线圈，得到的交流电源通过轴上的整流滤波电路得到±5V的直流电源，该电源做运算放大器的工作电源；由基准电源与双运放组成的高精度稳压电源产生±4.5V的精密直流电源，该电源既作为电桥电源，又作为放大器及V/F转换器的工作电源。当弹性轴受扭时，应变桥检测得到的mV级的应变信号通过仪表放大器放大成1.5v±1v的强信号，再通过V/F转换器变换成频率信号，通过信号环形变压器T2从旋转的初级线圈传递至静止次级线圈，再经过传感器外壳上的信号处理电路滤波、整形即可得到与弹性轴承受的扭矩成正比的频率信号，该信号为TTL电平，既可提供给专用二次仪表或频率计显示,也可直接送计算机处理。由于该旋转变压器动-静环之间只有零点几毫米的间隙，加之传感器轴上测量部分都密封在金属外壳之内，形成有效的屏蔽，因此具有很强的抗干扰能力。

Provide±15VDCpower supply to the sensor, crystal oscillator in excitation circuit produced 400Hz square wave,by the power amplifier generates AC excitation power supply,by the energy toroidal transformer T1 from the static primary coil transfer to the rotating secondary coil,through a rectifier and filter circuit on the shaft, change the AC power into±5V DC power, the power used as work power for operational amplifier; High precision regulated power supply which composed by reference power supply and Dual OP AMP,generate±4.5V precision DC power, the power supply not only as a bridge power supply, but as a working power supply for amplifier and V/F converter. When the elastic shaft torsion, the mV strain signal which obtained by strain bridge detection amplified into a strong signal of 1.5V±1V by instrumentation amplifier, through the V/F converter transformed into frequency signal,transfer from the rotating primary coil to the static secondary coil through signal annular transformer T2,and after signal processing circuit filtering, shaping ofthe sensor housing, then gain the frequency signal which bearing torque is proportional to the elastic axis,this signal is a TTL electrical level, can be provided to the special secondary instrument or frequency meter display,can also be sent directly to the computer processing.Because the rotary transformer —the gap between the static ring and seal stationary ring is only less than a millimeters, and the measuring part of sensor shaft is sealed in a metal casing,forming an effective barrier,so it has strong capacity of resisting disturbance.

传感器输出的频率信号在零点时为10kHz，正向旋转满量程时为15KHz，反向旋转满量程时为5KHz，即满量程变量为5000个数/每秒。转速测量采用光电齿轮或者磁电齿轮的测量方法，轴每旋转一周可产生60个脉冲，高速或中速采样时可以用测频的方法，低速采样时可以用测周期的方法。本传感器精度可达±0.2%（F·S）。 由于传感器输出为频率信号，所以无需转换即可直接送至计算机进行数据处理。

The frequency of the output signal from the sensor at zero for 10kHz. The forward rotation of the full-scale is15KHz,the reverse rotation of the full-scale is 5KHz.The full range of variables is 5000 / per second. Speed measurement by using the measuring method of photoelectric gear or magnetic gear, shaft rotates a circle can produce 60 pulses, high or medium speed sampling can be used to measure frequency, low speed sampling can be used to test period. The sensor precision is up to ± 0.2% (F · S).Because the sensor output frequency signal, so no conversion can be directly sent to the computer for data processing.

Signal Output And The Signal Acquisition
信号输出与信号采集

1、扭矩信号输出基本形式:
The basic form of torque signal output:

- 方波信号、脉冲信号。
  Square signal, pulse signal
- 可根据用户需要制成电压模拟信号输出或电流模拟信号输出。
  According to user' needs made into voltage analog signal output or current analog signal output.

2、扭矩信号处理形式:
Torque signal processing form

- 转矩传感器输出的频率信号送到频率计或数字表，直接读取与扭矩成正比的频率信号或电压、电流信号。
  Frequency signal from torque sensor send to the frequency meter or digital meter, read directly frequency signal or a voltage, current signal which proportional to the torque.
- 转矩传感器的扭矩与频率信号送给单片机二次仪表，直接显示实时扭矩值、转速功率值及 RS232通讯信号。
  Torque of torque sensor and frequency signal sent to MCU secondary instrument, direct display real-time torque, speed and power value and RS232 communication signal.
- 直接将扭矩与转速的频率信号送给计算机或 PLC进行处理。
  Directly send the the frequency signal of torque and speed to the computer or PLC for processing.

Maintenance | 维护与保养

1.每隔一年给转矩传感器两端轴承加润滑脂。加润滑脂时，仅将两端轴承盖打开，将润滑脂加入轴承，然后装上两端盖。
Should give grease to both ends of the bearing of torque sensor every year.When add the grease, only open the two ends of the bearing cover, add the grease into bearing, and then loaded on the two end covers.

2.应储存在干燥、无腐蚀、室温为 -20℃—70℃的环境里。
Should be stored in a dry, non corrosive, room temperature is -20 ℃ —70 ℃ environment.

Attentions | 注意事项

1、安装时，不能带电插入或拔出航空插头，切莫直接敲打、碰撞传感器。
When installation, non electricity when inserting or pulling out the aviation plug, do not directly tap, crash sensor.

2、联轴器的紧固螺栓应拧紧，联轴器的外面应加防护罩，避免人身伤害。
Should tighten the fastening bolts of the couplings, should add the shield to the outside of the coupling,to avoid personal injury.

3、信号线输出不得对地，对电源短路，输出电流不大于10mA，屏蔽电缆线的屏蔽层必须与 +15V电源的公共端（电源地）连接。
Signal line output should not be to the ground,if power supply short circuit, the output current is not more than 10mA , shielding layer which shielded cable must connect to the public end (power ground) of +15V power.

Installation And Usage | 安装使用

1、安装方式 Installation:

(1) 水平安装:如图3所示:
Horizontal installation: as shown in figure 3:

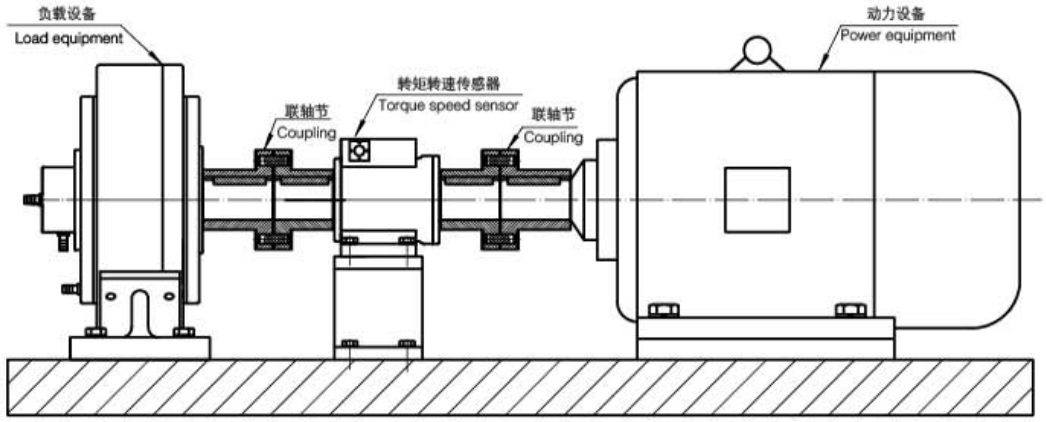


Figure 3 Horizontal installation schematic diagram of torgue speed sensor
图3 转矩转速传感器水平安装示意图

(2) 垂直安装:图4所示:
Vertical installation: as shown in figure 4:

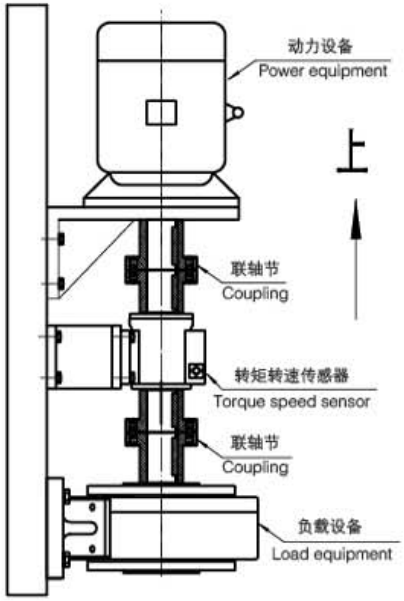


Figure 4 Vertical installation schematic diagram of torque speed sensor
图4 转矩转速传感器垂直安装示意图

2、连接方式：（转矩传感器与动力设备、负载设备之间的连接）
Connection mode: (torque sensor connect with power equipment and load devices)

（1）弹性柱销联轴器连接如图5所示，此种连接方式结构简单，加工容易，维护方便。能够微量补偿安装误差造成的轴的相对偏移，同时能起到轻微减振的作用。适用于中等载荷、起动频繁的高低速运转场合，工作温度为-20-70℃。

Elastic pin coupling connection is shown as Figure 5, the connection mode has the advantages of simple structure, easy processing and convenient maintenance. Can relative offset the relative offset of axis which caused by installation error, also can have a slight damping effect. Suitable for medium load. Applicable to high low speed applications,such as medium load and frequent starting , the working temperature is -20-70 ℃.

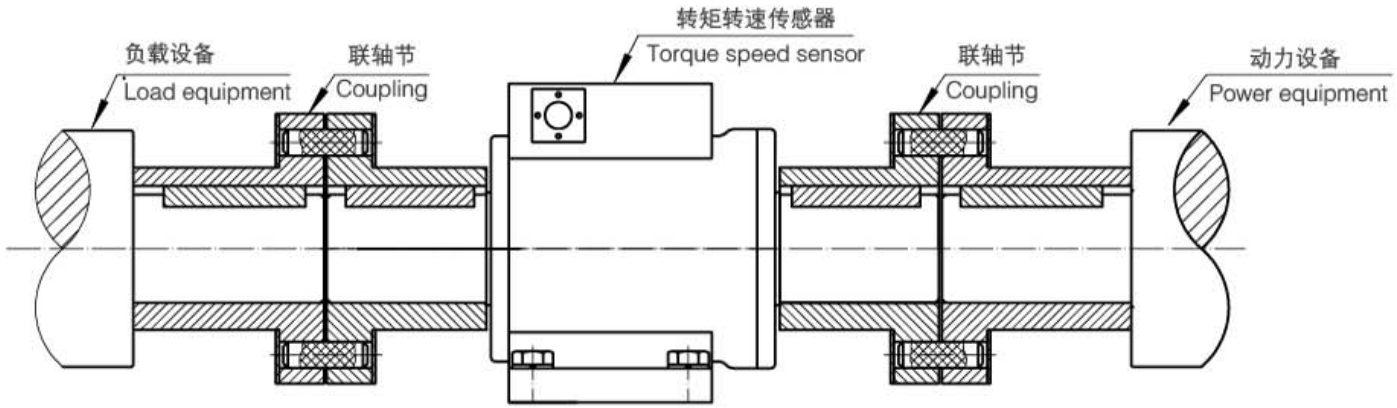


Fig.5 Schematic diagram of elastic pin connection

图5 弹性柱销联接示意图

（2）刚性联轴器连接如图6所示，这种连接形式结构简单，成本低，无补偿性能，不能缓冲减振，对两轴的安装精度较高。用于振动很小的工况条件。

Rigid couplings as shown in Figure 6, this form of connection has the advantages of simple structure, low cost, no compensation performance, no damping, the installation precision is high for two shaft. For small vibration condition.

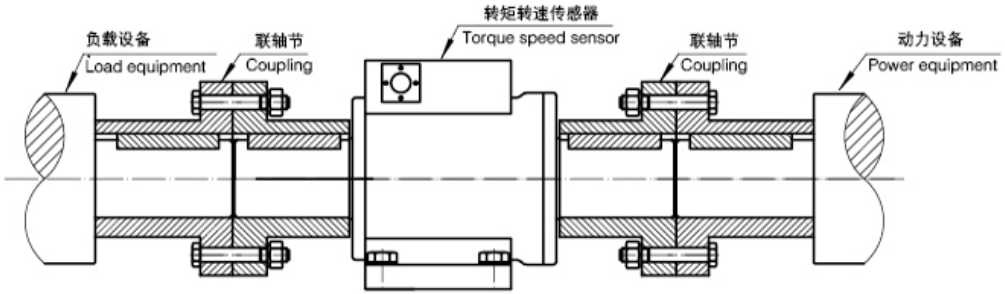


Fig.6 Schematic diagram of rigid couplings
图6 钢性联轴器联接示意图

3、安装要求：
The installation requirements:

（1）转矩传感器可水平安装，也可垂直安装。

The torque sensor can in horizontal or vertical installation.

（2）动力设备、传感器、负载设备应安装在稳固的基础上，以避免过大的震动，否则可能发生数据不稳，降低测量精度，甚至损坏传感器。

Power equipment, sensors and load equipment should be installed in a stable basis, to avoid excessive vibration, otherwise possible data instability, reduce the measurement accuracy, and even damage the sensor.

（3）采用弹性柱销联轴器或刚性联轴器连接。

Usage elastic pin coupling or rigid coupling.

（4）动力设备、传感器、负载设备轴线的同心度应小于Φ0.05mm。

The concentricity of power device, sensor and the axis of load equipment should be less than Φ0.05mm.

TR-3A Torque Speed Power Acquisition Instrument

TR-3A型 转矩转速功率采集仪

Product brief introduction | 产品简介

TR-3A型 转矩转速功率采集仪以频率输出式转矩传感器为检测元件，可以测量传动机械的转矩、转速、功率。该仪器以5位数码管显示测量结果，备有RS232（或定制半双工RS485）标准串行接口，实现与计算机通信。

TR-3A torque speed power acquisition instrument use the frequency output torque sensor as the detection device, can measure torque, speed and power of the transmission machinery. The instrument is based on 5 bit digital tube to display measurement results, has a RS232 (or custom half duplex RS485) standard serial interface, achieve the communication of the computer.

该仪器采用M/T法测量频率，在整个测量范围内具有较高的精度。

The instrument adopts the M/T method to measure frequency, high accuracy in the entire measuring range.

Techinical Parameters | 技术参数

1. 转矩测量(Torque measurement)	
测量范围：0~500000Nm	Measuring range: 0~500000Nm
测量误差：小于0.05%F · S	Measuring error: less than 0.05%F · S
转矩信号(Torque signal)：	
频率：5KHz~15KHz，10KHz为转矩零点。	
Frequency: 5KHz~15KHz, 10KHz is torque zero point.	
脉冲幅度：低电平<1V；高电平>3V。	
Pulse amplitude: low level <1V; high level >3V.	
转矩测量电路输入阻抗：10KΩ	
Torque measuring circuit input impedance: 10KΩ	

2. 转速测量(Speed measurement)	
测量范围：0~50000r/min	Measuring range: 0~50000r/min
测量误差：小于0.05%F · S	Measuring error: less than 0.05%F · S
转速信号(Speed signal)：	
频率：1Hz~100KHz。	
Frequency: 1Hz~100KHz	
脉冲幅度：低电平<1V；高电平>3V。	
Pulse amplitude: low level <1V; high level >3V.	
转速测量电路输入阻抗：10KΩ	
Torque measuring circuit input impedance: 10KΩ	

3. 测量周期：0.03s~2.50s。	Measurement cycle: 0.03s~2.50s

4. 模拟量输出（选配）Analog quantity output (optional)

4.1 转矩模拟量 (Torque analog quantity)：

信号范围： Signal range

(1) 0-20mA输出时，10mA为零转矩，0mA为负满度量程，20mA为正满度量程

When output 0-20mA, 10mA is zero torque, 0mA is negative full scale range, 20mA is positive full scale range

(2) 4-20mA输出时，12mA为零转矩，4mA为负满度量程，20mA为正满度量程

When output 4-20mA , 12mA is zero torque, 4mA is negative full scale range, 20mA is positive full scale range

误差：小于0.5%F · S Error: less than 0.5%F · S

负载阻抗：小于600Ω Load impedance: less than 600Ω

4.2 转速模拟量 (Speed analog quantity)：

信号范围： Signal range

(1) 0-20mA输出时， 0mA为零转速，20mA为满度量程

When output 0-20mA , 0mA is zero speed, 20mA is full scale range

(2) 4-20mA输出时， 4mA为零转速，20mA为满度量程

When output 4-20mA , 4mA is zero speed, 20mA is full scale range

误差：小于0.5%F · S Error: less than 0.5%F · S

负载阻抗：小于600Ω Load impedance: less than 600Ω

5. 供电电源： AC 200V-240V，50Hz

Power supply : AC 200V-240V，50Hz

6. 电源耗散功率：小于10W

Power dissipation power: less than 10W

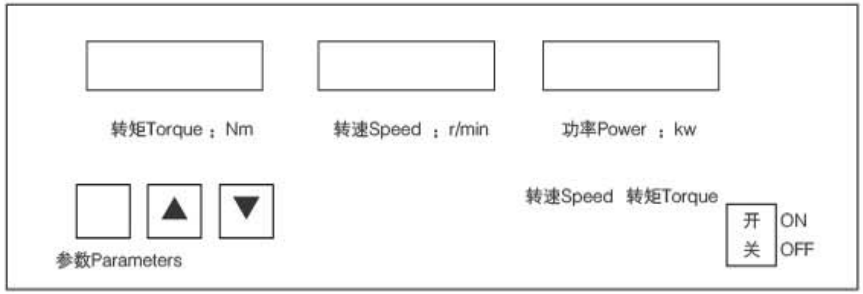
7. 显示位数：5位

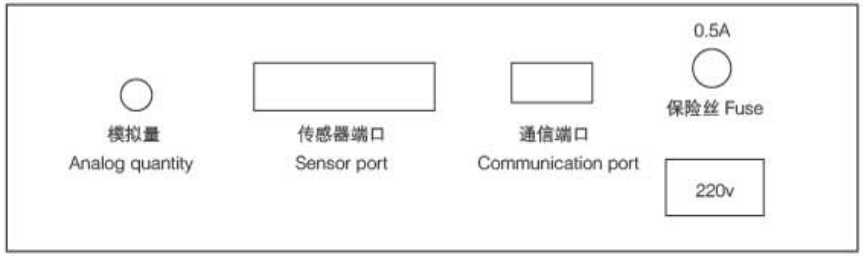
Display bit : 5

8. 自动判别并显示正负转矩

Automatic identification and display positive and negative torque

Instruction of Front And Rear Panel
前后面板介绍





开孔尺寸（Panel hole size）:长（Length）298mm x 宽（Width）75mm

前面板配置了“参数”、“向上”、“向下”三只按键，以实现人机对话。
配置了“转矩”、“转速”灯指示对应信号是否输入。

Front panel configurate "parameters", "up", "down" three keys, in order to realize the man-machine dialogue.
Configurate the "torque", "speed" indicator light corresponding to whether the signal input.

Product Brief Introduction | 产品简介

该产品只能同ZJ-A系列传感器配套使用。
The product can only be matched with ZJ-A series sensors.

适用于普通个人电脑（PC机）、工业控制计算机等。
Suitable for ordinary personal computer (PC), industrial control computer.

计算机测量板卡可以直接将计算机内部的5V电源转换为±15VDC电源，外供给所连接的传感器使用。
Computer measurement board card can directly turn the 5V power supply inside of the computer into a ± 15VDC power supply, external supply to the connected sensor for using.

购买计算机测量板卡时，提供包含频率测量函数的动态链接库，供VB、VC等编程软件调用。通过对输入信号频率数值的测量，可以进一步换算成相应的转矩或转速数值。
When buying the computer measuring board card, provides a dynamic link library containing the frequency measurement function, for VB, VC programming software.
By measuring the frequency values of the input signal,can be further converted into the corresponding torque or speed values.

购买计算机测量板卡产品时，提供配套的ZJ-A系列传感器的数据连接线。
When buy the computer measurement board card, we provide data connection line of ZJ-A series sensors.

计算机测量板卡提供隔离的8位数字量输入和8位数字量输出。
Computer measurement board card provides isolated 8 bit digital input and 8 bit digital output.

Technical Parameters | 技术参数

总线接口：PCI总线	Bus interface: PCI bus
输出接口：DB37	Output interface: DB37
输入阻抗：500Ω	Input impedance : 500Ω
输入频率：小于50kHZ	Input frequency: < 50kHZ
输入幅度：5V	Input range: 5V
测量精度：0.1级	Measurement accuracy: 0.1 class
测量时间：1-2000ms	Measurement time: 1-2000ms
使用环境：温度为-20℃~60℃；湿度为0-90%RH；无腐蚀性气体环境等	
Use environment : the temperature is -20 ℃ ~ 60 ℃; humidity is 0-90%RH; no corrosive gas environment and so on	
外形尺寸(mm)：180 X 105	Outline dimensions (mm):180 X 105
计算机操作系统：支持WINDOWS98/WINDOWS2000/WINDOWS XP直接编程	
Computer operating system: support WINDOWS98/WINDOWS2000/WINDOWS XP directly programming	

Torque,Speed,Power Measuring Software
转矩、转速、功率测量软件

可测量、记录、显示、打印动态过程中转矩、转速和功率的连续变化曲线。

Can measure, record, display and print continuous change curve of torque, speed and power in the dynamic process.

实时在荧屏上以游标刷新的方式显示数据曲线并同时显示其数值，大约每1秒钟刷新一次。

Real time on the screen to refresh by the cursor to display data curves,and at the same time to display the numerical value,refresh approximately every 1 second.

连续保存数据及曲线，或重新调出数据文件进行曲线显示、浏览、分析和打印。保存数据的时间仅受硬盘容量的限制。

Continuous save data and curve, or to load data file to curve display, browse, analysis and printing. The time of save the data is only by limiting of disk capacity.

可以根据《传感器标定报告》设置所用ZJ-A系列转矩转速传感器的量程和输出频率参数，根据测试需要分别选择转矩或转速信号的测量周期。

Can set the ZJ-A series torque speed sensor’s range and output frequency parameters according to the "sensor calibration report", respectively choose torque or speed signal's measuring period according to the test requirements.

可以根据需要任意设置改变转矩、转速和功率的显示坐标量程，以便于曲线的观察。

Can set arbitrarily change display coordinate range of torque, speed and power according to the requirements, in order to facilitate observe curve easliy.

Technical Parameters | 技术参数

硬件要求：普通个人电脑（PC机）或工业控制计算机，ZJ-A型计算机测量板卡以及配套的ZJ-A系列传感器。

Hardware requirements: ordinary personal computer (PC) or industrial control computer, ZJ-A type computer measuring board card and the supporting ZJ-A series sensors.

测量精度：0.1级	Measurement accuracy: class 0.1
测量时间：1---2000ms	Measurement time: 1---2000ms
使用环境：温度为-20℃～60℃；湿度为0-90%RH；无腐蚀性气体环境等。	
Use environment: the temperature is -20 ℃ ~ 60 ℃; humidity is 0-90%RH; no corrosive gas environment and so on.	
计算机操作系统：支持WINDOWS98/WINDOWS2000/WINDOWS XP	
Computer operating system:support WINDOWS98/WINDOWS2000/WINDOWS XP	

Torque Testing System | 扭矩测试系统

扭矩测试系统由信号适配器和软件两部分组成，配合ZJ-A型扭矩传感器实现现场显示、采集扭矩、转速、功率信号。可设置上下限报警点，同时还具有数据存盘功能和历史曲线回放功能。

Torque testing system is composed of a signal adapter and software of two parts, with the ZJ-A type torque sensor to realize the scene display, the acquisition of torque,speed and power signal. Can set the upper and lower alarm point, but also with data saving function and historical curve playback function.

(1)、能实时采集、处理、显示、存储扭矩、转速、功率值。
Real-time acquisition, processing, display, storage torque, speed and power values.

(2)、能对扭矩测量参数分别进行上下限报警，报警值可任意设定。
Can alarm of torque measurement parameters, the alarm value can be set arbitrarily.

(3)、扭矩测试系统可以设置多个通道对测试数据进行存储。
Torque testing system can set a plurality of channels to store test data.

(4)、可以对测试曲线进行自动连续存储或按使用者的意愿进行手动存储。
Automatic continuous storage the test curve or manual storage according to the user's intention.

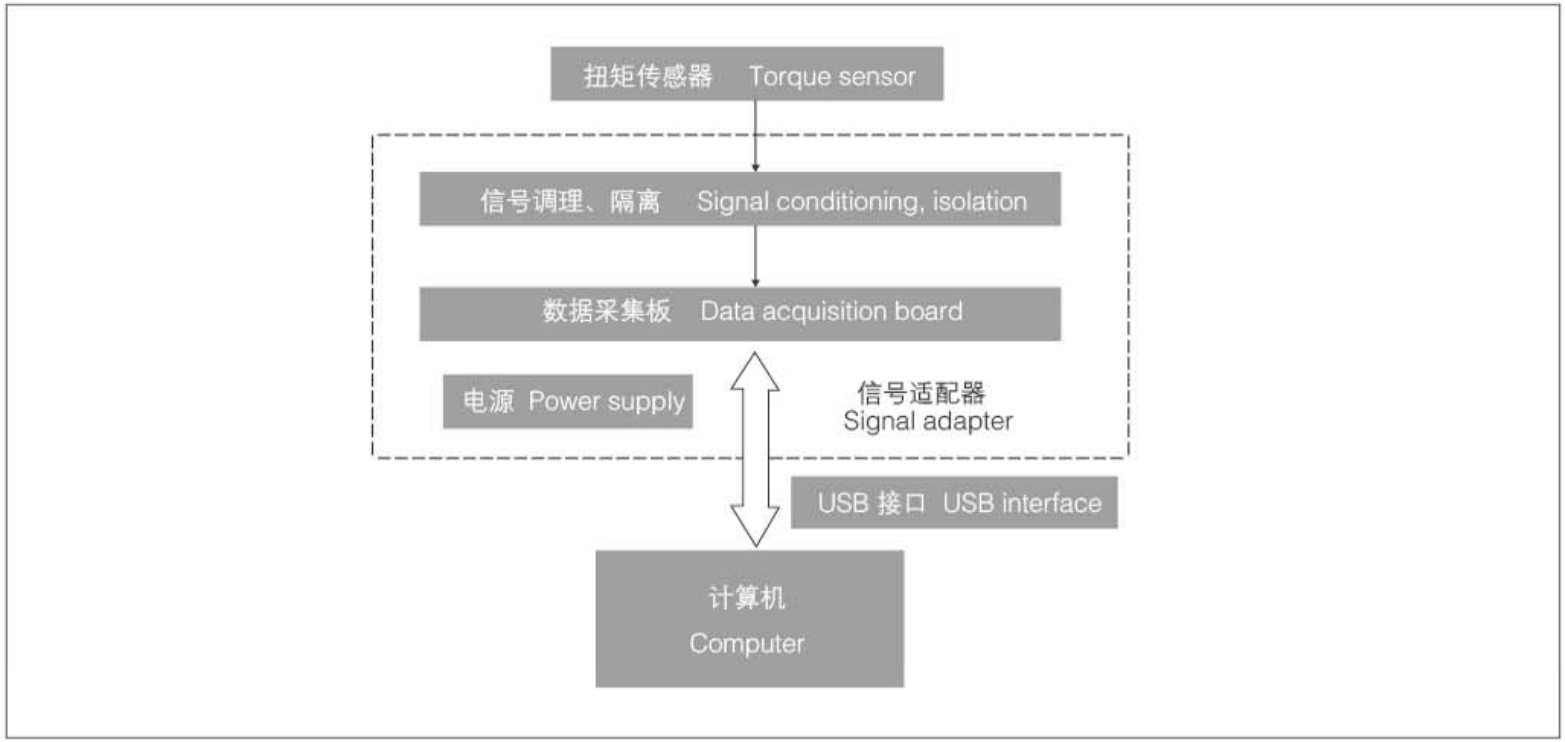
(5)、对于各种参数的设置具有记忆功能，只需输入一次即可。
With memory function for various parameter settings, only need to input once.

(6)、具有历史数据曲线回放功能。
With historical data curve playback function.

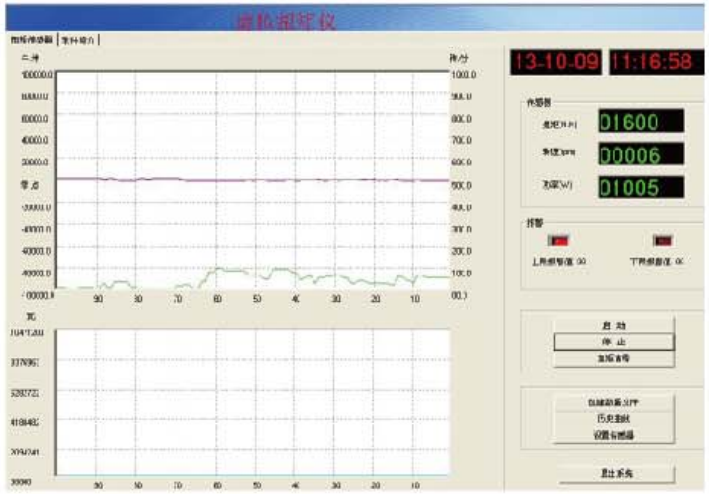
Acquisition Card(USB Interface) | 采集卡（USB接口）

(7)、可以将试验数据及曲线导出，可以通过打印机对测试结果进行数据、曲线打印。
Can derive the test data and curve, through the printer to print data and curve of test results.
(8)、扭矩测试系统的整个功能具有菜单和快捷键双重操作。
The function of torque testing system with menus and shortcuts operating.
(9)、在WINDOWS环境下运行，整个界面生动、美观。
Running in the WINDOWS environment, the entire interface is vivid and beautiful.
(10)、扭矩测试系统操作简洁，数据显示直观，维护方便。
Torque testing system has simple operation, data display objective, convenient maintenance.

Structure Diagram of Torque Testing System | 扭矩测试系统结构框图



Software Interface(Screenshot) | 软件界面（截图）



Environmental Requirements | 环境要求

(1) 扭矩测试系统硬件运行环境　Hardware running environment of torque testing system:

处理器：最小配置为Pentium Ⅲ或Celeron 866 MHz及以上处理器，推荐配置Pentium 4/M以上或类似处理器。

Processor: minimum configuration is the Pentium III or Celeron 866 MHz and above processor, the recommended configuration is Pentium 4/M or similar processor.

硬盘空间：安装需要至少100MB的硬盘空间。

Hard disk space: installation requires at least 100MB of hard disk space.

内存配置：最小内存为512MB，推荐内存配置为2GB。

Memory configuration: the minimum memory is 512MB, recommended memory configuration is 2GB.

屏幕分辨率：1024×768像素。

Soreen resolution:1024 x 768 pixels.

(2) 扭矩测试系统软件环境　Software running environment of torque testing system:

操作系统（Windows 2000/xp），办公软件（Word、Execl）。

Operating system (Windows 2000/xp), office software (Word, Execl).

ZJ-A-F/V Signal Converter | ZJ-A-F/V信号转换器

Product Brief Introduction | 产品简介

信号转换器作为ZJ-A系列转矩转速传感器的配套产品，供用户选购使用。当用户不方便直接测量传感器输出的频率信号时，可以选用该产品进行输出信号的变换，其中F/V信号转换器可以将传感器输出的频率信号转换为标准的电压信号，F/I信号转换器可以将传感器输出的频率信号转换为标准的电流信号。

The signal converter is the matching products of the ZJ-A series torque speed sensor , for the user to choose and use. When the user is not convenient directly measure the frequency signals which output by the sensors, can choose the product to transform the output signal, F/V signal converter can convert output frequency signal of the sensor into standard voltage signal, F/I signal converter can convert output frequency signal of the sensor into the standard current signal.

Features | 特点

1、设计采用高性能集成电路，转换精度高，稳定性好。
Adopt a high performance integrated circuit, high conversion accuracy, good stability.

2、输入信号和输出信号完全隔离，便于用户进行系统的抗干扰设计。
Input signal and output signal is completely isolated, which convenient users to the anti-interference design of the system.

3、体积小，安装方便，可以直接进行导轨安装或者平面安装。
Small volume, convenient installation, can be directly used for guide rail mounted or plane mounted.

4、采用±15VDC直流供电，功耗低。
Adopt ± 15V DC power supply, low power consumption.

Wiring Schematic Diagram | 接线示意图

Technical Indicators | 技术指标

供电电源：±15VDC，误差±0.4V	Power supply: ±15VDC, error±0.4V
电源耗散功率：小于1W	Dissipation power: < 1W
转换精度：0.1级	Conversion accuracy: class 0.1
信号输入：光电隔离，同ZJ-A 传感器配套使用。	Signal input :photoelectric isolation, matching with the ZJ-A sensor.
F/V信号输出：0-5V，±5V, 0-10V, ±10V(任选)	F/V signal output: 0-5V, ± 5V, 0-10V, ±10V (optional)
F/I信号输出：0-20mA , 4-20mA	F/I signal output: 0-20mA , 4-20mA
响应时间：≤100mS 具有零点、满度调节功能。	Response time: ≤ 100mS With zero, full scale adjustment function.
使用环境：温度为-20℃-60℃，湿度为0-90%RH，无腐蚀性气体等	
Use environment: the temperature is -20 ℃ -60 ℃, humidity is 0-90%RH, non corrosive gas and so on.	
外形尺寸(mm)：145 X 90 X 40	Outline dimension (mm)：145 X 90 X 40
安装方式：标准35mm DIN导轨安装。	Installation mode: Standard 35mm DIN guide rail mounted.

注：客户有其它特殊要求的产品，公司可以定做。
Note: if customers have other special requirements of the prod uct, our company can be customized.

FZ-J Magnetic powder brake

FZ-J型 磁粉制动器

Structure and working principle
结构及工作原理

磁粉制动器是由转子（输入轴）、定子、含激磁线圈的磁轭组成，三部分相对同心装配，形成了一个可以相对转动的整体，在转子和定子之间的环形空隙（工作腔）内填有高导磁性的合金磁粉。

激磁线圈无电流通过时，工作腔中的磁粉呈松散状态。在转子所产生的离心力的作用下，磁粉被均匀地甩在转子的内壁上，转子、定子之间无力的相互作用，磁粉制动器处于空载状态，没有转矩的输出。

激磁线圈有电流通过时，磁轭中产生工作磁通，工作腔中的磁粉沿磁通方向呈链状连接起来（形成磁粉链），磁粉制动器就是靠此时磁粉与磁粉、磁粉与工作面之间的摩擦力和磁粉链之间的抗剪力来产生转矩，磁粉制动器处于加载状态。（见图7）

切断电流时，磁通随激磁电流的消失而消失，磁粉在重力的作用下又重新处于松散状态，并在离心力的作用下，被甩在转子的内壁上，磁粉制动器又处于空载的状态。

The magnetic powder brake is composed of active rotor(input shaft), and Yoke with excitation coil. The three parts are assembled relative concentric and form a system which can rotate relatively. The annular gap between rotor and stator is full of alloy powder which has high magnetic conductivity.

The magnetic powder will be in the state of loose when the current do not pass the excitation coil.The magnetic powder will be thrown on the inner wall of rotor.Interaction force between the rotor and stator, so the magnetic powder brake is in the state of no load ,no torque output.

The magnetic powder in the working chamber will link in a link state under the action of the magnetic flux generated from the Yoke when the current pass the excitation coil. The magnetic powder brake can produce torque relying on the shear force generated from magnetic chain and the friction generated from the magnetic powder and working face.In this case,the magnetic powder brake is in the state of noad(see chart 7).

When the current is cut off,the magnetic flux will disappear with the disappearance of the magnetizing current,the magnetic powder will be in the state of loose under the action of gravity again,and will be thrown on the inner wall of rotor under the action of the centrifugal force.In this case, the magnetic powder brake will be in the state of no load.

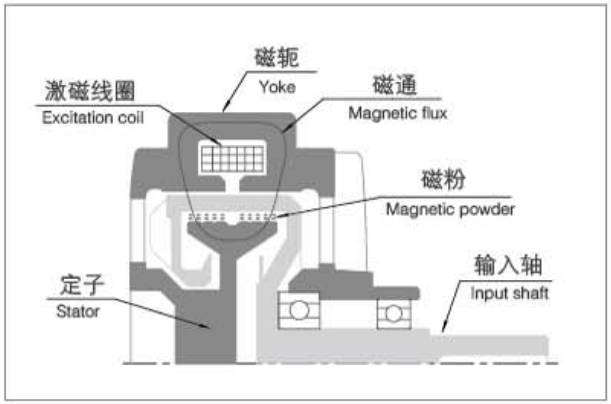


Chart 7 working principle of the magnetic powder brake
图7 磁粉制动器工作原理

Features | 特性

The magnetizing current has a linear relationship with torque
激磁电流与转矩呈线性关系

如图8所示，转矩与激磁电流基本成线性关系。只要改变激磁电流的大小，便可在较大范围内控制转矩的大小。一般情况下，在5%-100%的额定转矩范围内，激磁电流与转矩基本成正比例线性关系。

As is shown in chart 8,torque has a linear relationship with the magnetizing current.The size of the torque can get controlled within larger range.Under normal circumstance,the magnetizing current has a linear relationship with torque within range of 5%-100% rated torque.

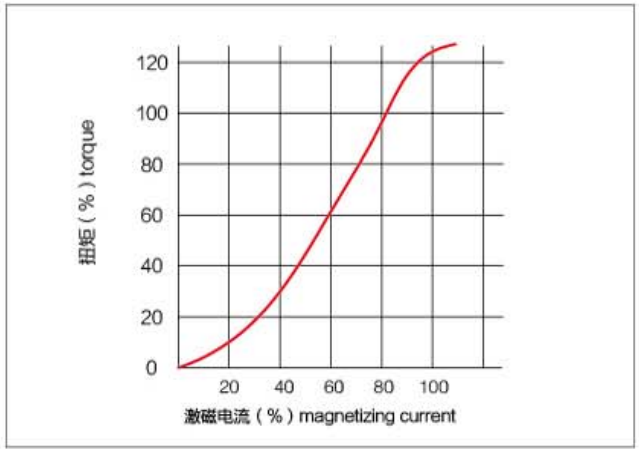


Chart 8 The relationship of the magnetizing current and torque
图8 激磁电流与扭矩之关系

Stable slip torque 稳定的滑差转矩

当激磁电流保持不变时，其转矩不受转子（输入轴）的转速（滑差转速）影响，如图9所示。也就是说，静摩擦转矩与动摩擦转矩无差别，因此可以稳定地实现转矩恒定。此特性应用于动力测试，用户只要调整激磁电流便能准确地控制转矩，从而有效地控制负载阻力的大小。

The slip rotational speed of rotor(input shaft) do not affect the torque when the magnetizing current retain unchanged,as shown in chart 4.That is to say,the static friction torque and the dynamic friction torque have no difference.Therefore,the torque can retain constant stably.The features are applied to dynamic test,users can control the load resistance effectively as long as adjust the magnetizing current accurately.

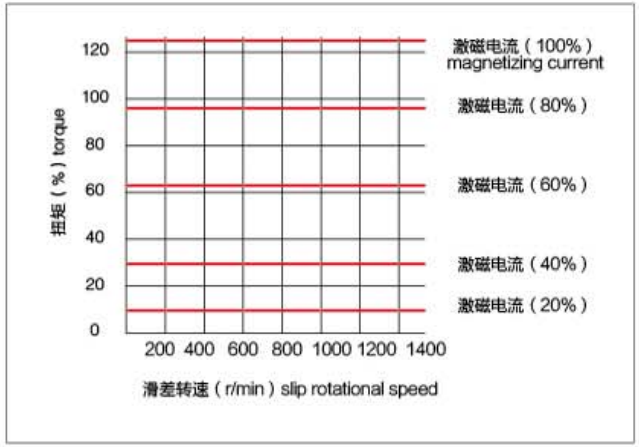


Chart 9 The relationship of the slip rotational speed and torque
图9 滑差转速与扭矩之关系

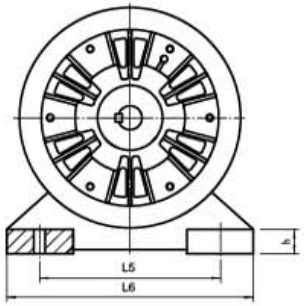
Prevention heat phenomenon from slip
防止由于滑差所致的发热现象

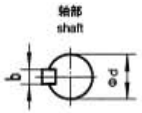
通常连续滑动时摩擦部分免不了会发热，甚至烧毁。但是本设备具备完备的散热装置，长时间运转也不会过于发热，而且使用寿命长。

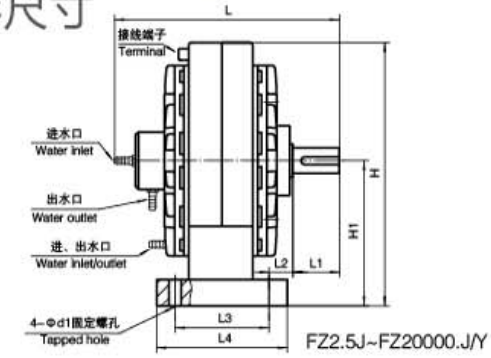
The friction part will generate heat inevitably or even destroyed when it keep continuous sliding.But this device has a complete cooling set,it will not generate a lot of heat after long time running and it has a long service life.

FZ-J magnetic powder brake technical parameters and outline dimension

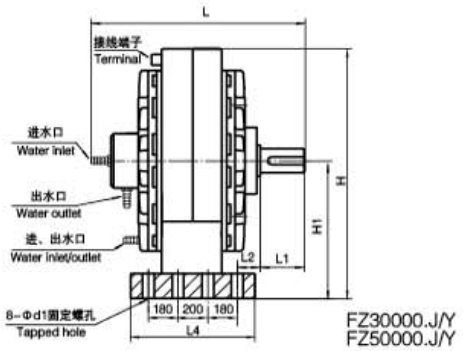
FZ-J型 磁粉制动器技术参数及外形尺寸







FZ2.5J~FZ20000.J/Y



FZ30000.J/Y
FZ50000.J/Y

型号 Model	额定转矩 (N.m) Rated torque	激磁线圈 DC Excitation coil		许用转速 (r/min) Allowable rotational speed	滑差功率 (KW) Slip power	外形尺寸 Outline dimension		轴联结尺寸 Shaft coupling size				机座支撑尺寸 Base support size							冷却方式 Cooling mode
		电压 (V) Voltage	电流 (A) Current			H	L	d (h7)	b (p7)	L1	L2	L3	L4	L5	L6	H1	d1	h	
FZ2.5.J	2.5	24	0.4	1500	0.03	110	88	10	3	20	9	50	68	100	120	60	7	12	自冷 Self cooling
FZ5.J	5	24	0.5	1500	0.06	138	94	12	4	25	10	50	68	120	140	75	7	12	
FZ10.J	10	24	0.6	1500	0.12/0.8	166	103	14	5	25	7	60	85	120	150	90	10	12	自冷/单水冷 Self/single water cooling
FZ25.J	25	24	0.8	1500	0.2/1.2	196	115	20	6	36	5	70	96	150	180	110	12	15	
FZ50.J	50	24	1.0	1500	0.3/2	240	140	25	8	42	11	80	105	180	210	130	12	16	
FZ100.J/Y	100	24	1.2	1500	3/5	284	249	30	8	58	11	100	130	250	290	155	12	18	单/双水冷 Single/double water cooling
FZ200.J/Y	200	24	1.8	1000	4/8	329	260	35	10	58	10	120	165	280	330	180	15	22	
FZ400.J/Y	400	24	2.5	1000	5/12	400	313	45	14	82	14	130	180	330	390	215	15	22	
FZ630.J/Y	630	36	2.5	750	15	441	374	60	18	105	20	150	210	410	480	240	19	30	双水冷 Double water cooling
FZ1000.J/Y	1000	36	2.5	750	20	523	417	70	20	105	35	160	210	470	540	280	19	35	
FZ1500.J/Y	1500	36	3.0	750	25	556	480	75	20	105	70	160	210	470	540	300	19	40	
FZ2000.J/Y	2000	36	3.0	500	30	619	486	80	22	130	56	170	240	580	660	330	24	40	
FZ5000.J/Y	5000	36	3.5	400	50	824	576	90	25	140	13	320	388	600	700	430	24	50	
FZ10000.J/Y	10000	36	4.0	300	65	1126	651	120	32	160	18	360	450	900	1030	600	28	88	
FZ20000.J/Y	20000	48	5.0	300	90	1205	916	140	36	180	45	480	560	950	1100	650	34	100	
FZ30000.J/Y	30000	90	5.0	300	132	1205	1271	160	40	200	194	见图	690	1050	1180	650	34	120	
FZ50000.J/Y	50000	90	5.0	250	160	1298	1965	180	45	250	549	见图	690	1050	1180	700	34	120	

CW series eddy current brake

CW系列 电涡流制动器

Product brief introduction | 产品简介

电涡流制动器作为一种负载，主要用来测量动力机械特性的检验设备，它和其它控制测量仪(包括加载仪、转矩转速传感器、转矩转速功率采集仪等)可组成电涡流测功机。可用于内燃机、电机、燃气轮机、汽车及其动力机械部件的性能测试，与其它测功装置相比，CW系列测功装置具有更高的可靠性、稳定性，和实用性。

Eddy current brake as a load is mainly used to measure the dynamic mechanical characteristics of inspection equipment, it and other control instrument (including loading apparatus, torque speed sensor and torque speed power acquisition instrument etc.) can be composed of eddy current dynamometer. Can be used for performance testing of the internal combustion engine, motor, gas turbine, automobile and its dynamic mechanical components, compared with other power measuring device, the CW series power measuring device has the advantages of reliability, high stability, and practicability.

Main features | 主要特点

(1) 结构简单，运行稳定，价格低廉，使用维护方便。
Has the advantages of simple structure, stable operation, low price, convenient use and maintenance.

(2) 采用水冷却，噪音低，振动小。
Water cooling, low noise, small vibration.

(3) 输入转速范围宽(200~3600r/min)。
Input speed wide range (200~3600r/min).

(4) 励磁控制功率小，采用单相直流电源。
Excitation control power is small, adopt single-phase DC power supply.

(5) 与测控系统配套，可实现自动化控制。
Supporting with dynamometer system, can realize automation control.

(6) 作为制动器使用，具有制动力大，且稳定性能好等优点。
Used as a brake, has advantages of large braking force, and stable performance etc..

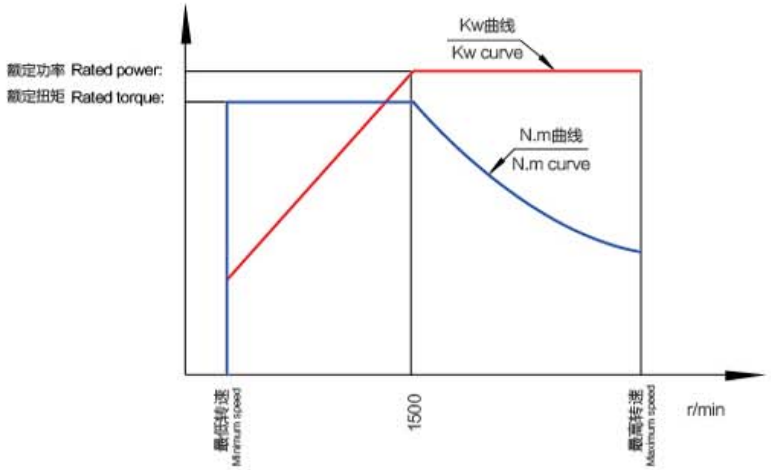
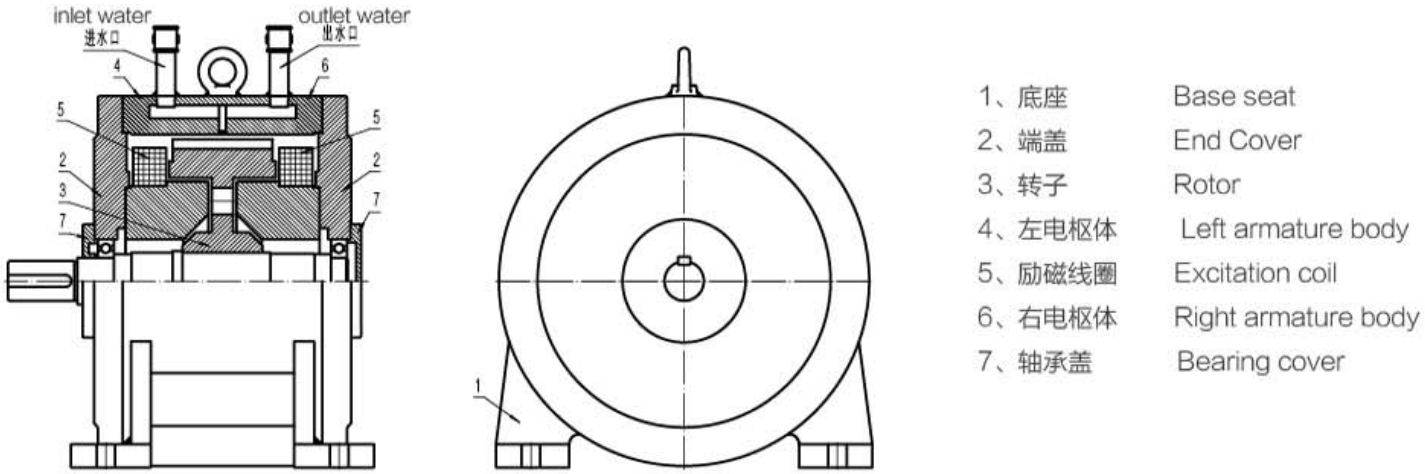


Chart 10 CW eddy current brake / dynamometer characteristics curve
图10 CW型电涡流制动器/测功机特性曲线

Basic structure and working principle | 基本结构和工作原理

(1) CW系列电涡流制动器的基本结构(见图11)
Basic structure of CW series eddy current brake (see chart 11)



1、底座 Base seat
2、端盖 End Cover
3、转子 Rotor
4、左电枢体 Left armature body
5、励磁线圈 Excitation coil
6、右电枢体 Right armature body
7、轴承盖 Bearing cover

Chart 11 Structure chart of CW eddy current brake
图11 CW型电涡流制动器结构图

如图11，CW型电涡流制动器由转子(带有槽轮)、定子(包括左右电枢体、励磁线圈、端盖、轴承盖)、机座组成。
As shown in chart 11, CW eddy current brake consists of rotor (with groove wheel), stator (including left and right armature body, excitation coil, end cover, bearing cover),and base seat.
左右电枢体(带有涡流环)中设置有相同的冷却水路，励磁线圈装在两个电枢体之间，冷却水从进水口进入后经电枢体下半部进入涡流环冷却水槽中，然后从电枢体的上半部流进出水口，通过出水口流出。
Right and left armature body (with vortex ring) is provided with the same cooling water, excitation coil is installed between the two armature body, cooling water enters from the water inlet into the vortex ring cooling water tank through the lower part of the armature body , and then flow into water outlet from the upper part of the armature body, flow by the water outlet.

(2) CW系列电涡制动器的工作原理 Working principle of CW series eddy current brake

当与转子同轴装配的励磁线圈通有直流电时，其产生的磁通经电枢体、涡流环、气隙和转子形成磁闭合回路。由于转子外圈面被制成均匀分布的齿和槽，故在气隙和涡流环内表面产生疏密相间的磁场。因此，当转子被拖动旋转时，在涡流环内表面的任一点的磁场产生交变变化，由此感应出“涡流”，该“涡流”所形成的磁场又与原气隙磁场相互作用，在转子上就产生了制动力矩。动力机输出的功率被转化成涡流环上“涡流”产生的等值发热量，该热量由进入涡流环冷却水槽中持续不断的冷却水带走。

When the excitation coil which coaxial with the rotor assembly get DC, its magnetic flux through the armature body,vortex ring, air gap and rotor to form a closed loop. Because the rotor outer surface is made of tooth and slot which uniform distribution, so in the inner surface of air gap and vortex ring produced density magnetic field.Therefore, when the rotor rotates by dragging, the magnetic field at any point on the inner surface of vortex ring produces an alternating change, which induces a "vortex", magnetic field formed from "vortex" interaction with the air gap magnetic field , produce braking torque on the rotor. The engine output power is transformed into the equivalent heat which produced by "vortex" in vortex ring, the heat be taken away by continuous cooling water which from the vortex ring cooling water tank.

Main technical parameters | 主要技术参数

型号 Model	输入转速 Input speed (r/min)	额定力矩 Rated torque (N.m)	吸收功率 Absorbing power (KW)	励磁电压 Excitation voltage (V)	励磁电流 Excitation current (A)	冷却水量 Cooling water quantity(L/min)	重量 Weight	备注 Remark
CW 5B	300-3600	5	0.75	<90 DC	<5	1	36	转速1500r/min以下为恒转矩，1500r/min以上为恒功率。Speed below 1500r/min is constant torque, Speed above 1500r/min is constant power.
CW 10B		10	1.5				40	
CW 20B		20	3			2	52	
CW 50B		50	8			5	83	
CW 100B		100	15			8	120	
CW 200B	200-3200	200	30			15	210	
CW 300B		300	45			25	300	
CW 650B		650	100	<180 DC	<10	55	730	
CW 1000B		1000	150			80	1200	
CW 2000B		2000	315			160	2470	
CW 3000B		3000	470		<20	240	3500	
CW 6500B		6500	1000		<40	550	4600	
CW 10000B		10000	1570		<60	800	5800	
CW 14000B		14000	2200		<90	1100	8200	

DW Eddy current dynomometer
DW型 电涡流测功机

DWZ Eddy current brake
DWZ型 电涡流制动器

Main application | 主要用途

DWZ系列盘式电涡流制动器，主要在加载测功设备中作为负载使用，用来测量动力机械特性的试验仪器，尤其用在中小功率和微小功率的动力加载测试中，也为作为其它动力设备的吸功装置。

DW系列盘式电涡流测功机，是在DWZ系列盘式电涡流制动器机体上加上测量扭矩和转速的装置的测功机，主要用来测量动力机械特性的试验仪器，尤其用在中小功率和微小功率的动力加载测试中。

DWZ disc eddy current brake is mainly used as load in loading dynamometer equipment, it is experimental apparatus which can measure the dynamic mechanical properties, especially in dynamic loading test whose power value is small or tiny,also can be treated as suction power devices of the other dynamic devices.

DW series disc eddy current dynamometer, is the dynamometer which add device for measuring torque and rotational speed on DWZ series disc eddy current brake, it is experimental apparatus which can measure the dynamic mechanical properties, especially in dynamic loading test whose power value is small or tiny.

Performance characteristics | 性能特点

DWZ/DW系列盘式制动器/测功机具有结构简单，转动惯量小，制动力矩大，允许速度高，工作性能稳定性好，动态响应快，使用寿命长，维护方便等优点。

DWZ/DW series disc brake/dynamometers has advantages of simple structure,low turning of inertia,large brake torque,high allowable speed,high stability of working performance,fast response time,long service time and easy maintenance.

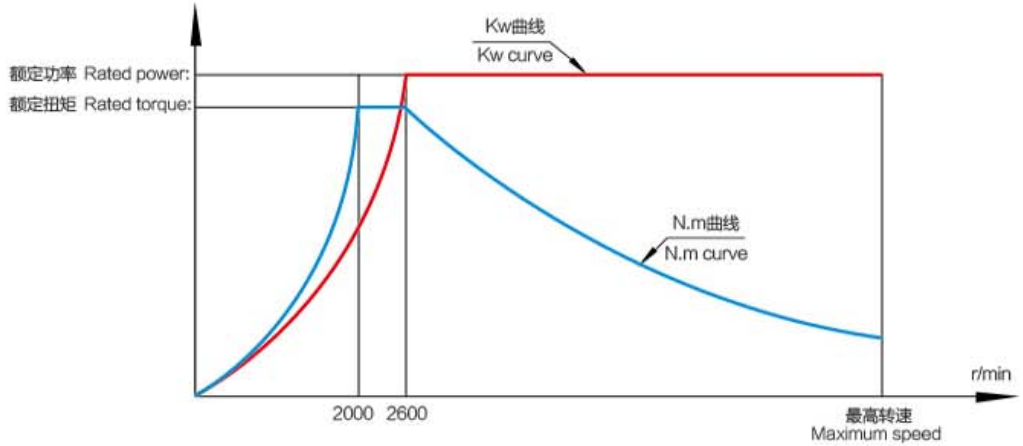
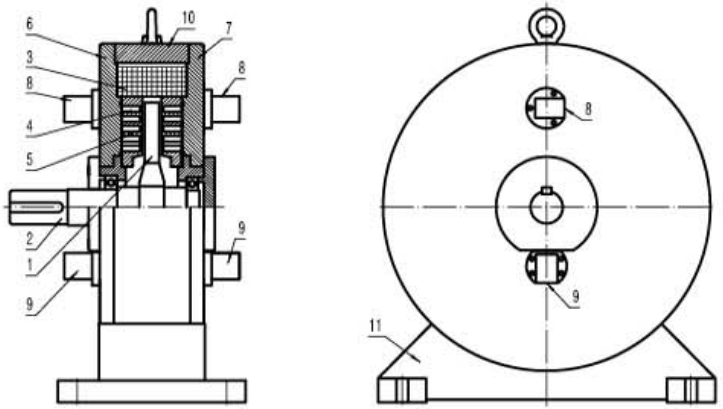


Chart 12 Characteristics curve of DW/DWZ eddy current brake / dynamometer
图12 DW/DWZ型电涡流制动器/测功机特性曲线

Basic structure and working principle | 基本结构及工作原理

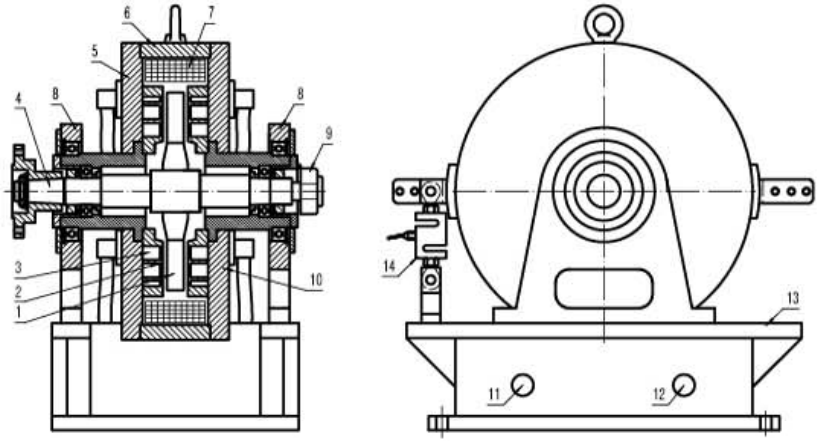
DWZ series eddy current brake (chart 13)　DWZ系列电涡流制动器（图13）



1、感应盘　Induction disc
2、主轴　Spindle
3、励磁线圈　Excitation coil
4、冷却室　Cooling chamber
5、涡流环　Eddy current ring
6、左电枢体　Left armature body
7、右电枢体　Right armature body
8、出水管道　Outlet pipe
9、进水管道　Inlet pipe
10、外套　Outer
11、机座　Base seat

Chart 13 Structure chart of DWZ eddy current brake
图13 DWZ型 电涡流制动器结构图

DW series eddy current dynamometer (chart 14)　DW系列电涡流测功机（图14）



1.感应盘　Induction disc
2.涡流环　Eddy current ring
3.冷却室　Cooling chamber
4.主轴　Spindle
5.左电枢体　Left armature body
6.外套　Outer
7.励磁线圈　Excitation coil
8.支撑座　Supporting seat
9.测速编码器　Encoder
10.右电枢体　Right armature body
11.出水管道　Outlet pipe
12.进水管道　Inlet pipe
13.机座　Base seat
14.扭矩测量装置　Torque measurement device

Chart 14 Structure chart of DW eddy current dynamometer
图14 DW型 电涡流测功机结构图

由结构图可知：当激磁线圈通上直流电时，其产生的磁通经左右电枢体、涡流环、感应盘，形成闭合磁路，由于转子形状犹如直齿轮，当感应盘被原动机带动旋转时，涡流环内表面产生疏密相间的磁场，该磁场在涡流环的表面上任一点呈交变变化，因此在涡流环内表面及一定深度范围内产生涡流，由于涡流形成的磁场与原磁场的相互作用，在感应盘上就产生了制动力矩。

By the structure figure: when the excitation coil get on the DC, the caused magnetic flux through the armature body, eddy current ring, induction disc, forming a closed magnetic circuit. Due to the rotor shape is like the straight gear, when the induction disk rotates is driven by the prime mover , the inner surface of vortex ring bring spacing magnetic field, the magnetic field in alternating changes in any point of surface of vortex ring, resulting the eddy current in the inner surface of vortex ring and a certain depth range, due to the interaction of the original magnetic field and magnetic field caused by the eddy current, produced the braking torque in the induction disc.

Main technical datas of DWZ/DW series eddy current brake/dynamometer

DWZ/DW系列电涡流制动器/测功机的主要技术指标

电涡流制动器 /测功机 Eddy current brake/dynamometer	额定吸收功率（KW） Rated Power	额定扭矩（N.m） Rated torque	额定转速（r/mn） Rated speed	最高转速（r/min） Maximum rotational speed	转动惯量（kgm²） Turning inertia	最大激磁电压（V DC） Maximum excitation voltage	最大激磁电流（A DC） Maximum excitation current	冷却水压（MPa） Cooling water pressure	冷却水流量（L/min） Flow of the cooling water
DWZ/DW -0.75	0.75	5	2000-2600	16000	0.002	80	3	0.1 ~ 0.3	1
DWZ/DW-3	3	10	2000-2600	14000	0.003	80	3	0.1 ~ 0.3	2
DWZ/DW-6	6	25	2000-2600	14000	0.003	80	3	0.1 ~ 0.3	3
DWZ/DW-10	10	50	2000-2600	13000	0.01	80	3	0.1 ~ 0.3	4.5
DWZ/DW-16	16	70	2000-2600	13000	0.02	80	3.5	0.1 ~ 0.3	6.5
DWZ/DW-25	25	120	2000-2600	11000	0.05	80	3.5	0.1 ~ 0.3	15
DWZ/DW-40	40	160	2000-2600	10000	0.1	90	4	0.1 ~ 0.3	25
DWZ/DW-63	63	250	2000-2600	9000	0.18	90	4	0.1 ~ 0.3	45
DWZ/DW-100	100	400	2000-2600	8500	0.32	120	4	0.1 ~ 0.3	60
DWZ/DW-160	160	600	2000-2600	8000	0.52	120	5	0.1 ~ 0.3	100
DWZ /DW-250	250	1100	2000-2600	7000	1.8	150	5	0.2 ~ 0.4	180
DWZ/DW-300	300	1600	2000-2600	6000	2.7	150	5	0.2 ~ 0.4	210
DWZ /DW-400	400	2200	2000-2600	5000	3.6	180	10	0.2 ~ 0.4	300
DWZ/DW-630	630	3600	2000-2600	5000	5.3	180	10	0.2 ~ 0.4	450

HB Series hysteresis brakes

HB系列 磁滞制动器

Product introduction | 产品简介

磁滞制动器是一种优越的扭矩、张力控制部件。它利用磁滞原理，产生一定的扭矩。控制电流和输出扭矩有较好的线性关系。它能提供光滑、无级可调、与转速无关的转矩控制。除了轴承以外，系统内无其它摩擦，具有稳定可靠、使用转速高、噪音小、使用寿命长，维护成本低等特点。

Hysteresis brake is a kind of superior torque, tension control unit. It uses the hysteresis theory, have a certain torque. There is a good linear relationship between the control current and output torque. It can provide smooth, stepless adjustable torque control, which has nothing to do with speed.Expect for bearing, no other friction in the system,has advantages of stable and reliable, high speed, small noise, long service life, low maintenance cost.

磁滞制动器主要应用于高速绕线设备；电机、小型内燃机、齿轮箱及其它旋转装置的寿命试验的模拟负载；高端运动器材的精确负载。

Hysteresis brake is mainly used in high speed spooling equipment;load simulation for motor, small internal combustion engine, gearbox and other life test for rotating device; accurate load for high-end sports equipment.

当磁滞制动器长时间工作时，会使其温度急剧升高，气冷式磁滞制动器可在较高滑差功率下长时间连续运转。

When the hysteresis brake works for a long time, its temperature will rise suddenly, air-cooled hysteresis brake can has continuous operation at high slip power long time.

Structure characteristics | 结构特征

磁滞制动器由转子和定子磁极两大部分组成。转子由特殊的磁滞材质制成，内、外侧定子磁极之间有一定的间隙，转子在间隙中转动。当线圈通电时，间隙中产生磁场，使转子产生磁滞效应。当磁滞转子在外力作用下克服磁滞力转动时，产生额定的扭矩。扭矩仅与激磁电流大小有关，与转速无关，实现非接触的扭矩传输。右图(15)所示的是磁滞制动器的典型结构图。

Hysteresis brake is composed of two parts- rotor and stator pole.The rotor is made of special hysteresis material,there is a certain gap in inner and outer stator pole , the rotor rotates in the gap.When the coil is energized, brings magnetic field in the gap, so that the rotor produces hysteresis effect. When the hysteresis rotor overcome hysteresis force rotates under the action of external force,produce the rated torque.The torque has the relationship with excitation current, has nothing to do with the speed, achieve non-contact torque transmission. Right chart 15 shows typical structure diagram of hysteresis brake.

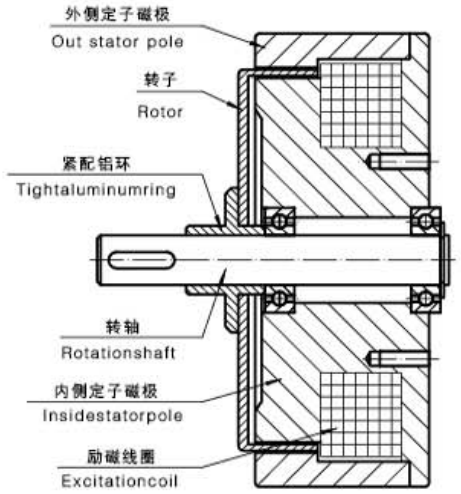


Chart 15 Structure chart of hysteresis brake
图15 磁滞制动器结构图

Product features | 产品特点

●励磁电流与输出转矩基本成比例关系，转矩在额定值的5-100%范围内可以控制，小电流可以控制输出较大的转矩。

Excitation current has basic proportional relationship with output torque, can be controlled when the torque in the range of 5-100% rating,small current can control output biggish torque.

●无论转速的变化如何，其传送的转矩能基本保持不变。

No matter how the speed changes, the transmission torque can remain unchanged.

●能够在容许的滑差功率下连续旋转，除轴承外没有其他摩擦件。

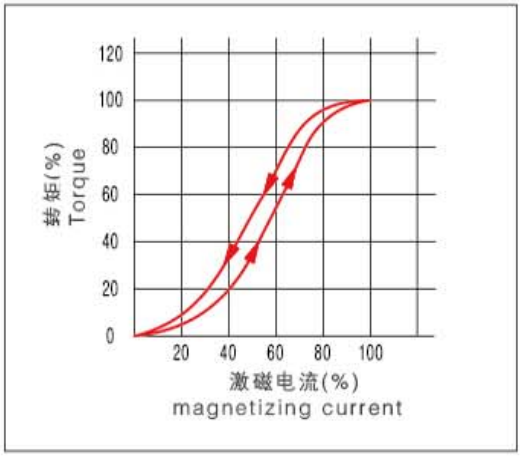
Can continuous rotate under the allowable sliding power, no other friction piece expect the bearing.

●无接触产生扭矩，运转平滑，转速范围大，免维护，使用寿命长。

Torque produced without contact,smooth operation,large speed range, maintenance free, long service life.

●具体单款产品的电流与扭矩对应图详见产品包装盒内规格说明书

The current and torque corresponding graph of single product, pls. check the specifications instructions in the packing box.



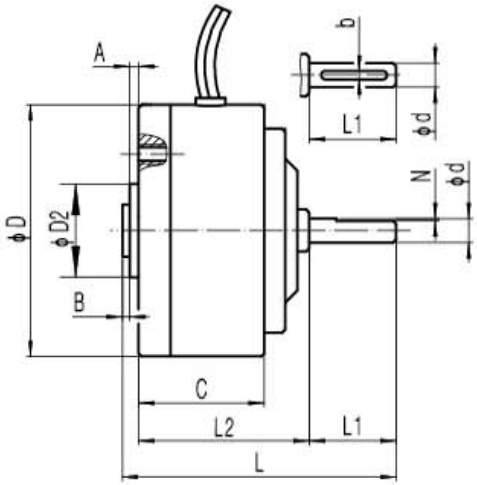
Chatr 16 The corresponding characteristic curve of excitation current
图16 激磁电流对应转矩特性曲线

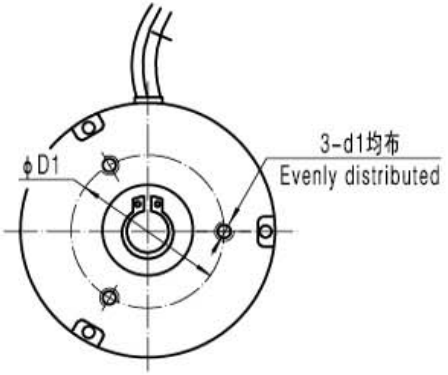
HB series standard hysteresis brake | HB系列标准型磁滞制动器

Technical parameters 技术参数

型号 Model	额定扭矩 Rated torque	额定电流 Rated Current	电压 Voltage	线圈电阻 (于25℃±10%) Coil resistance (at 25℃±10%)	重量 Weight	额定功率Rated power		惯性矩 Inertia torque	最高转速 Max speed
						5分钟(min)	持续Continuous		
	Kg · cm	mA	V DC	Ω	Kg	W	W	Kg · cm²	r/min
HB-300	0.03	126	24	190	0.12	8	2	3.3×10^{-4}	20000
HB-201	0.2	160	24	150	0.15	25	6	1.5×10^{-3}	20000
HB-301	0.3	192	24	125	0.17	30	8	6.8×10^{-3}	20000
HB-501	0.5	192	24	125	0.21	30	8	6.8×10^{-3}	20000
HB-102	1	192	24	125	0.39	55	15	4.6×10^{-2}	20000
HB-202	2	200	24	120	0.51	75	20	6.8×10^{-2}	15000
HB-302	3	250	24	96	1.35	120	35	1.8×10^{-1}	15000
HB-502	5	250	24	96	1.35	120	35	1.8×10^{-1}	15000
HB-103	10	250	24	96	1.8	320	80	1.1×10^{0}	15000
HB-203	20	300	24	80	3.5	460	115	3.2×10^{0}	10000
HB-303	30	400	24	60	5.2	680	165	6.8×10^{0}	10000
HB-503	50	750	24	32	9.6	1000	200	1.3×10^{1}	10000
HB-603	60	800	24	30	9.6	1400	225	1.4×10^{1}	10000
HB-124	120	480	24	50	21.8	1200	350	6.2×10^{1}	6000

Outline dimension 外形尺寸





实物照片—联轴结安装在反面
Picture—the coupling is installed at the back side

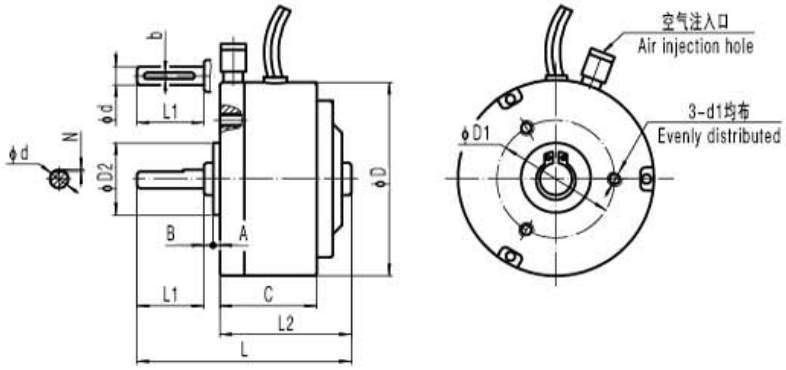
型号 Model	外形尺寸 Outline dimension		轴联尺寸 Shaft coupling size					止口支撑尺寸 Center ring supporting size			其余尺寸 Other sizes		
	D	L	d(h7)	b(p7)	N	L1	L2	D1	D2(g7)	d1 X 深度(depth)	A	B	C
HB-301C	42	45	4	-	0.4	14.5	28.5	26	11	M3×5	-	0.5	23
HB-501C	42	45	4	-	0.4	14.5	28.5	26	11	M3×5	-	0.5	23
HB-102C	53	52	6	-	0.5	16.4	31.2	30	15	M3×6	2	1.2	26
HB-202C	58	56	6	-	0.5	20	32	30	15	M4×6	2	0.8	27
HB-302C	69	70	8	-	0.8	24.9	40.6	40	22	M4×8	2.5	1	35
HB-502C	69	70	8	-	0.8	24.9	40.6	40	22	M4×8	2.5	1	35
HB-103C	91	83	10	-	0.8	27.5	51	38	22	M4×9	2	1	40
HB-203C	115	100.5	12	4	-	29.3	64.5	70	28	M5×10	4	1.2	51
HB-303C	138	114	15	5	-	38.5	68.5	80	32	M5×10	3.5	1.5	53
HB-503C	157	140	17	5	-	38.5	93.8	90	35	M6×10	4.2	1.5	72.3
HB-124C	226	166	25	8	-	50	106.9	100	52	M6×12	6	1.3	76.5

AHB series air cooled hysteresis brake | AHB系列气冷式磁滞制动器

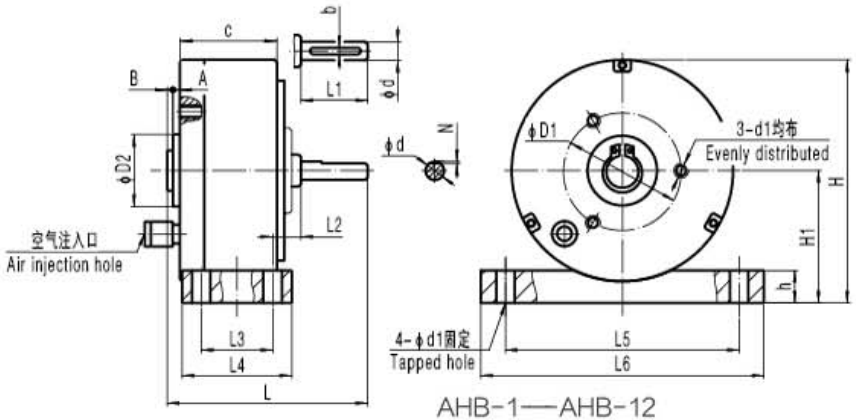
Technical parameters 技术参数

型号 Model	额定扭矩 Rated torque	额定电流 Rated Current	电压 Voltage	线圈电阻 (于25℃ ± 10%) Coil resistance (at 25℃ ± 10%)	重量 Weight	额定功率Rated power				惯性矩 Inertia torque	最高转速 Max speed
						加压缩空气 With compressed air		不加压缩空气 Without compressed air			
						5分钟 (min)	持续 Continuous	5分钟 (min)	持续 Continuous		
	Kg · cm	mA	V DC	Ω	Kg	W	W	W	W	Kg · cm²	r/min
AHB-202	2	200	24	120	0.5	200	200	75	20	6.8×10^{-2}	25000
AHB-502	5	250	24	96	0.9	400	400	120	35	1.8×10^{-1}	25000
AHB-103	10	252	24	95	1.8	800	800	320	80	1.1×10^{0}	25000
AHB-203	20	300	24	80	3.5	1000	800	460	115	3.2×10^{0}	25000
AHB-303	30	400	24	60	5.2	1300	1300	680	165	7.3×10^{0}	20000
AHB-1	10	400	24	60	2.1	1200	1200	320	80	8.7×10^{-1}	25000
AHB-1.5	20	480	24	50	3.8	1300	1300	460	115	2.7×10^{0}	25000
AHB-3	30	750	24	32	5.7	1800	1800	680	165	6.8×10^{0}	20000
AHB-5	50	750	24	32	10	2500	2300	1000	200	1.31×10^{1}	15000
AHB-6	60	1500	24	16	11	3000	2800	1400	225	1.38×10^{1}	20000
AHB-10	100	1500	24	16	20.6	3800	3500	1800	280	2.62×10^{1}	12000
AHB-12	120	1200	24	20	23	2800	2500	1200	350	5.60×10^{1}	12000

Outline dimension 外形尺寸



AHB-202B—AHB-303B



AHB-1—AHB-12

型号 Model	外形尺寸 Outline dimension			轴联尺寸 Shaft coupling size					止口支撑尺寸 Center ring supporting size			机座支撑尺寸 Base support size							其余尺寸 Other sizes		
	D	L	H	d(h7)	b(p7)	N	L1	L2	D1	D2(g7)	d1 X 深度 (depth)	L3	L4	L5	L6	H1	d1	h	A	B	C
AHB-202B	58	55	-	6	-	0.5	20	32	30	15	M4×6	-	-	-	-	-	-	-	2	0.8	27
AHB-502B	69	70	-	8	-	0.8	25	41.5	40	22	M4×8	-	-	-	-	-	-	-	2.5	1	35
AHB-103B	91	83	-	10	-	0.8	29	51	38	22	M4×9	-	-	-	-	-	-	-	2	1	40
AHB-203B	115	100.5	-	12	4	-	31	64.5	70	28	M5×10	-	-	-	-	-	-	-	4	1	51
AHB-303B	138	114	-	15	5	-	40.5	68.5	80	32	M5×10	-	-	-	-	-	-	-	3.5	1.5	53
AHB-1	-	83	106	10	-	0.8	27.5	16	38	22	M4×8	25	45	100	120	60	5.5	19	2	2.5	40
AHB-1.5	-	100.5	128	12	4	-	29.3	19.5	70	28	M5×10	35	55	130	150	70	5.5	19	4	2.7	51
AHB-3	-	114	149	15	5	-	40.7	8.8	80	32	M5×10	50	65	150	165	80	8.3	19	3.5	3.5	53
AHB-5	-	140	179	17	5	-	38	29.3	90	35	M6×10	55	75	200	220	100	8.3	25	4.2	3.5	72.8
AHB-6	-	205	149	双出轴15 (Double shaft)	5	-	27.7	32	-	-	-	85	105	150	165	80	8.3	19	-	-	106
AHB-10	-	265	179	双出轴17 (Double shaft)	5	-	38	32	-	-	-	125	145	200	220	100	8.3	25	-	-	145
AHB-12	-	165	233	25	8	-	50	39	100	52	M6×12	55	80	250	270	120	8.3	25	4	4	76.2

Design reference | 设计参考

首先，我们解释一下两个名词：
First，let us learn the meaning of the following words:

1、滑差转速：模拟负载设备输入轴的转速
slip rotational speed:the input shaft’s speed of simulation load equipment.
2、滑差功率：模拟负载设备在产生扭矩时，因为有滑差转速而产生的功率。
slip power:the power generated from the slip rotational speed when simulation load equipment produces torque.

模拟负载设备的选型一般以其所需的最大转矩、转速为依据来定。但同时也要保证其实际工作的滑差功率小于额定值，因为滑差功率会转化成热量造成各部位零件的温度上升。具体计算公式如下：
The selection of the simulation load equipment rely on the maximum required torque and rotational speed.Because the temperature of all parts will rise when the slip power is converted into heat,it is guaranteed that the actual slip power is less than the rated value.

$$P = \frac{2\pi}{60} \times M \times n \text{ (unit:w)}$$

式中 in this formula :

P-滑差功率 slip power （ unit:w ）

M-工作转矩 working torque （ unit:N.m ）

n-转速 speed （ unit:r/min ）

举例：FZ100/Y双水冷却磁粉制动器，滑差功率为7000W，额定转矩为100N.m，许用转速为 1500 r/min。
Example：FZ100/Y double water cooling magnetic powder brake，the slip power is 7000W，the rated torque is 100 N.m，the allowed rotational speed is 1500 r/min。

当其在额定转矩工作时，允许的最高转速为：
When it works at the rated torque,the allowed highest rotational speed is:

$$n = \frac{60 \times P}{2\pi \times M} = \frac{9.55 \times P}{M} = \frac{9.55 \times 7000}{100} = 668.8(r/min)$$

当其在最高滑差转速工作时，允许的最大转矩为：
When it works at the highest slip rotational speed，the allowed highest torque is:

$$M = \frac{60 \times P}{2\pi \times n} = \frac{9.55 \times P}{n} = \frac{9.55 \times 7000}{1500} = 44.6(N.m)$$

Notes | 注意事项

Don’t overload,meanwhile cool to appropriate temperature
不得超载、冷却到位

模拟负载设备在工作时，其转矩、转速、滑差功率均不得超过额定值。冷却方式（自然冷却、强制气冷却、水冷却）需根据实际工作时产生的最大滑差功率而定。冷却空气需过滤油和水。有条件，可加装温度检测、报警装置，防止温度过高，影响使用寿命。（最高温度80℃）

The value of the torque/rotational speed/slip power should be less than the rated value when the simulation load equipment works. The cooling mode(natural cooling/forced air cooling/water cooling)should depend on the maximum slip power when it works and the cooling air should filter the water and oil.The temperature detector and the alarm device should be installed to prevent high temperature which can affect the service life.(the highest temperature is 80℃)

Concerning the service life 关于寿命

磁粉制动器的使用寿命在于磁粉的使用寿命。一般而言，磁粉在不超载的状态下，其使用寿命为4500-7500小时；但在有些状态下其使用寿命可延长数倍，如：降低磁粉制动器的工作转矩、转速和滑差功率到额定值的50%-70%。也就是说，在设计时，余量尽可能放大一些。

电涡流制动器/测功机、磁滞制动器的使用寿命为长期，只要定期更换轴承润滑油脂即可。

The life of the magnetic powder brake rely on the life of the magnetic powder.Generally speaking,its service life is 4500-7500 hours in the state of non overloaded;But its service life can extend several times in some cases,such as:the working torque of the magnetic powder brake, speed and slip power can be reduced to 50%-70% of the rated value.That is to say,the margin can be enlarged as soon as possible when designing.

The service life of eddy current brake/dynamometer and hysteresis brake is long,as long as replace the bearing grease regularly.

Performance of various simulation load | 各种模拟负载性能一览表

产品 Product	高速 High speed	低速 Low speed	堵转 Blockage	扭转 Torsion	吸收功率 Absorbing power
FZ-J型磁粉制动器 FZ-J Magnetic powder brake	差 Bad	优 Good	√	大 Large	中 Medium
CW型电涡流制动器 CW Eddy current brake	良 Medium	优 Good	X	中 Medium	大 Large
DWZ型电涡流制动器 DWZ Eddy current brake	优 Good	-	X	中 Medium	大 Large
DW型电涡流测功机 DW Eddy current dynamometer	优 Good	-	X	中 Medium	大 Large
HB型磁滞制动器 HB Hysteresis brake	优 Good	优 Good	√	小 Small	小 Small

Data test acquisition system

测试数据采集系统

SC-1 tension controller(stabilized power supply)
SC-1型张力控制器（稳流电源）

Overview 概述

SC-1型张力控制器输出的电流可在0到标称值之间连续可调，具有稳定度高，纹波系数小，限流保护等功能。是磁粉制动器或磁粉离合器的专用稳流电源。

The current of the SC-1 tension controller can be adjusted continuously from zero to the nominal value.The tension controller is the special stabilized power supply with high stability,low ripple coefficient and function of current limit protection.

Technical parameters 技术参数

1.电源电压：AC220V ± 10% 50HZ
2.工作环境：环境温度：-10℃~40℃ 相对湿度：小于85%（不允许在腐蚀性气体及尘埃条件下工作）
3.控制方式：手动调节
4.显示方式：数字显示

1.Power supply voltage：AC220V ± 10% 50HZ
2.Working environment：Temperature：-10℃~40℃ relative humidity < 85%（it is not allowed to work under corrosive gasses and dust condition）
3.Control method:Manual
4.Display mode:Digital display

Shape and installation size 外形及安装尺寸

SC-1D型张力控制器 SC-1D tension controller

长(Length)：210mm 宽(Width)：115mm 高(Height)：156mm

型号 Model	输出电压 DC Output voltage	输出电流 DC Output current	安装方式 Installation mode	重量 Weight
SC-1D(1A)	0-24V	0-1A	台式安装 Desktop installation	2.8 kg
SC-1D(2A)	0-24V	0-2A		3.3 kg
SC-1D(3A)	0-36V	0-3A		3.8 kg
SC-1D(5A)	0-36V	0-5A		4.5 kg

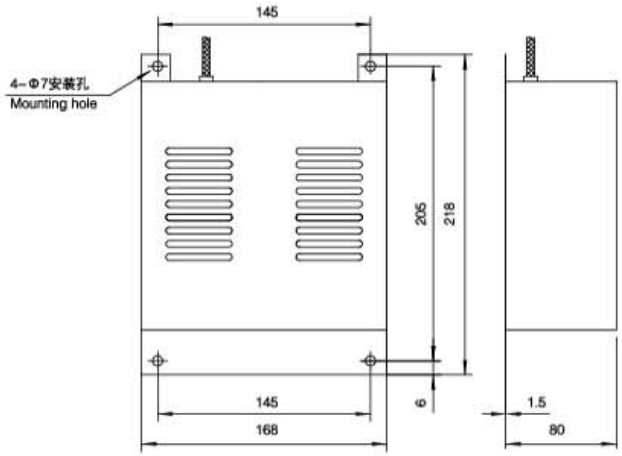
GFQ power amplifier | GFQ型功率放大器

Technical parameters 技术参数

1.电源电压：AC220V ± 10% 50HZ
2.输入信号：DC 0-5V、DC 0-10V、DC 0-20mA（订货时注明）
3.控制输出：电压DC24V或36V；电流DC 0-1A、0-2A、0-3A
4.特　　性：输出电流与输入信号成正比例关系
5.功　　能：短路保护，A、B轴切换接口
6.工作环境：环境温度：-10℃~40℃ 相对湿度：小于85%（不允许在腐蚀性气体及尘埃条件下工作）

1.Power supply voltage：AC220V ± 10% 50HZ
2.Input signal：DC 0-5V、DC 0-10V、DC 0-20mA（Please specify when make order）
3.Control output：voltage is DC24V or 36V；current is DC 0-1A、0-2A、0-3A
4.Features：output current is proportional to the input signal
5.Function：short-circuit protection，A、B shaft switch interface
6.Working environment：Temperature：-10℃~40℃ relative humidity < 85%（it is not allowed to work under corrosive gasses and dust condition）

GFQ型功率放大器
GFQ power amplifier



GFQ型功率放大器外形及安装尺寸
GFQ power amplifier's shape and installation size

SC-1W series programmable power supply | SC-1W系列程控稳流电源

SC-1W系列程控稳流电源为开关型稳流电源，主要用于提供磁粉制动器、磁粉离合器、电涡流制动器、磁滞制动器的激磁电流；具有RS232（或定制RS485）串行接口，可与计算机、PLC控制器通讯。

SC-1W series programmable power supply is switching power supply, mainly used to provide exciting current for magnetic powder clutch, magnetic powder brake， eddy current brake and hysteresis brake; with RS232 (or custom RS485) serial interface, can communicated with computer and PLC controller.

Working mode 工作方式

SC-1W 系列程控电源具有如下3种工作方式：

SC-1W series programmable power supply has the following 3 kinds of work mode:

(1)“通信”方式。由RS232（或定制RS485）端口接收计算机的数据指令，输出电流。

"Communication" mode. Receiving computer data command by RS232 (or custom RS485) port, and output current.

(2)“遥控”方式。由外部0~10V（或定制0~5V）信号控制，输出电流。

"Remote control" mode. Controlled by the external 0~10V (or custom 0~5V) signal, and output current.

(3)“手动”方式。由“手动调节”电位器控制，输出电流。

"Manual" mode.Controlled by manual-control potentiometer ,and output current.

SC-1W 系列程控稳流电源与PLC控制器组成控制系统时，建议采用“通信”方式，这样可以省去PLC的D/A模块。

When SC-1W series programmable power supply and PLC controller composed of control system, suggest choosing "communication" mode, this can save D/A module of PLC.

Technical indicators 技术指标

(1) 输入电压：AC220V±20%　50Hz

Input voltage: AC220V ± 20% 50Hz

(2) 输出电流： DC0-5A（5A输出型）

Output current: DC0-5A (5A output type)

(3) 输出电压： DC0-90V（5A输出型）

Output voltage: DC0-90V (5A output type)

(4) 稳流精度：小于1%

Stabilizing current precision: less than 1%

(5) 响应时间：0.1s

Response time: 0.1s

(6) 绝缘阻抗：220V输入与输出端：>10MΩ

Insulation resistance: 220V input and output port: >10MΩ

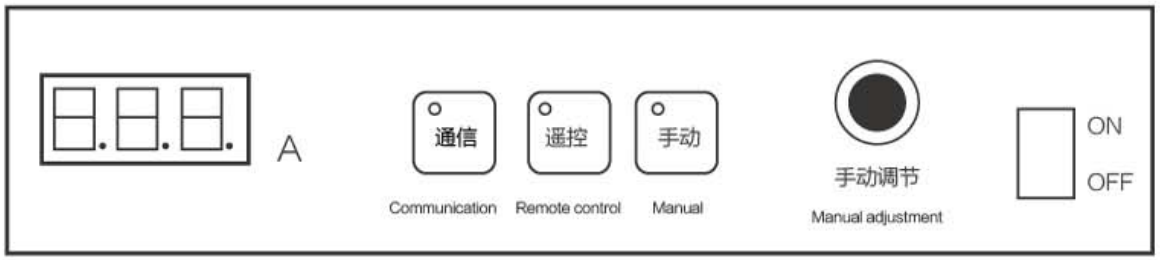
(7) 环境温度：50℃以下

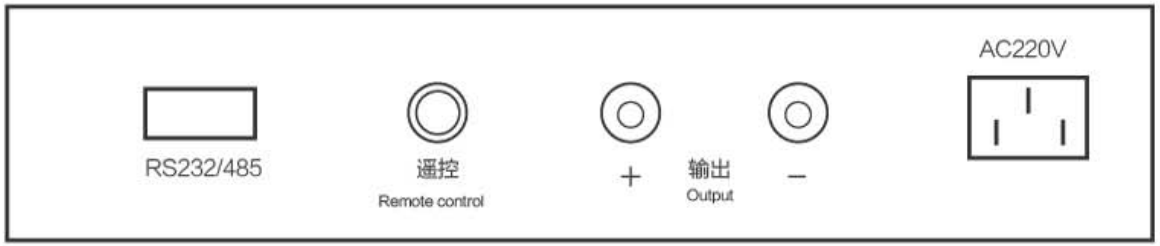
Ambient temperature: below 50℃

(8) 空气湿度：<85% (25℃)

Air humidity: <85% (25℃)

Instruction Of Front And Rear Panel 前后面板介绍





“RS232/485”端子说明： "RS232/485" terminal description:
RS232接口： 2脚：TXD 3脚：RXD 5脚：地
RS232 interface： 2 pin:TXD 3 pin:RXD 5 pin:ground
RS485接口： 2脚：A 3脚：B 5脚：地
RS485 interface: 2 pin:A 3 pin:B 5 pin:ground

“遥控”信号输入端：
"Remote control" signal input terminal:
1脚：遥控信号（0-10V）输入正端；
1 pin: remote control signal (0-10V) positive input terminal;
2脚：遥控信号（0-10V）输入负端；
2 pin: remote control signal (0-10V) negative input terminal;

Other acquisition instruments | 其余采集仪表一览

AMA-6 Electric parameters acquisition instrument
AMA-6 型 电参数采集仪

TEM-3 Temperature acquisition instrument
TEM-3型 温度采集仪

Test software(can generate curve and report form to save and print)
测试软件（可生成曲线、报表予以保存和打印）

Successful cases | 成功案例

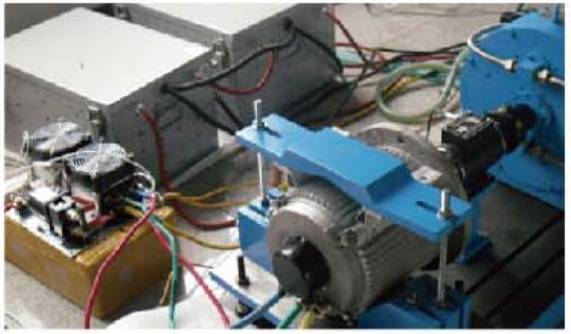
6 3KW eddy current dynamometer test bench
63KW电涡流测功机测试台

250KW, 40KW motor test bench
250KW、40KW电机测试台

200N.m eddy current / magnetic series test bench
200N.m电涡流/磁粉串联测试台

Hysteresis dynamometer
磁滞测功机

NAC electric car motor test site
南汽电动汽车电机测试现场

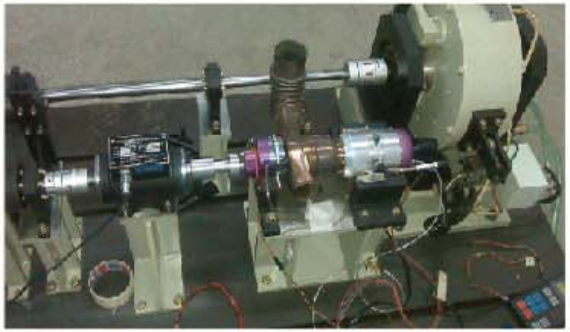


Permanent magnetic motor test
永磁电机测试

Tianjin Electromechanical 30000N.m motor test bench
天津机电30000N.m电机测试台

Wuxi Sunrise 400KW motor test bench
无锡尚瑞400KW电机测试台

Yangzhou Feichi company 250KW motor test bench
扬州飞驰250KW电机测试台



Engine test of unmanned air plane
无人飞机发动机测试

200N.m wheel drum motor test bench
200N.m轮毂电机测试台

2-100N.m differential motor loading station
2-100N.m差速电机加载台

Electric vehicle controller loading station
电动车控制器加载台

Changfa Group after bridge bench
常发集团 后桥磨合台

Shandong Zhongte tractor PTO test bench
山东中特拖拉机PTO测试台

Wuxi Yanmar tractor PTO test bench
无锡洋马拖拉机PTO测试台

Traction machine test bench
曳引机测试台

Yangzhou Hengchun 30W N.m electric actuator test bench
扬州恒春30W N.M电动执行器测试台

Successful cases | 成功案例

5000N.m IV reducer test bench
5000N.m IV减速机测试台

Jiangsu Sunshine TCW125A reducer test bench
江苏三上TCW125A减速机测试台

Commins 5000N.m reducer test bench
康明斯5000N.m减速机测试台

Shanghai Institute of physics reducer test bench
上海物理所减速机测试台

Italy Rossi 5000N.m reducer
意大利罗尔西5000N.m减速机

Jiangyin Zhongmei 400N.m drilling machine test bench
江阴中煤 400N.m钻机测试台

Nanjing Liuhe coal machine 5000N.m drilling machine test bench
南京六合煤机5000N.m钻机测试台

Pingdingshan 10000N.m drill stem test bench
平顶山10000N.m钻杆测试台

10000N.m drilling machine test bench
10000N.m钻机测试台

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We manufacture each of our products wholeheartedly...

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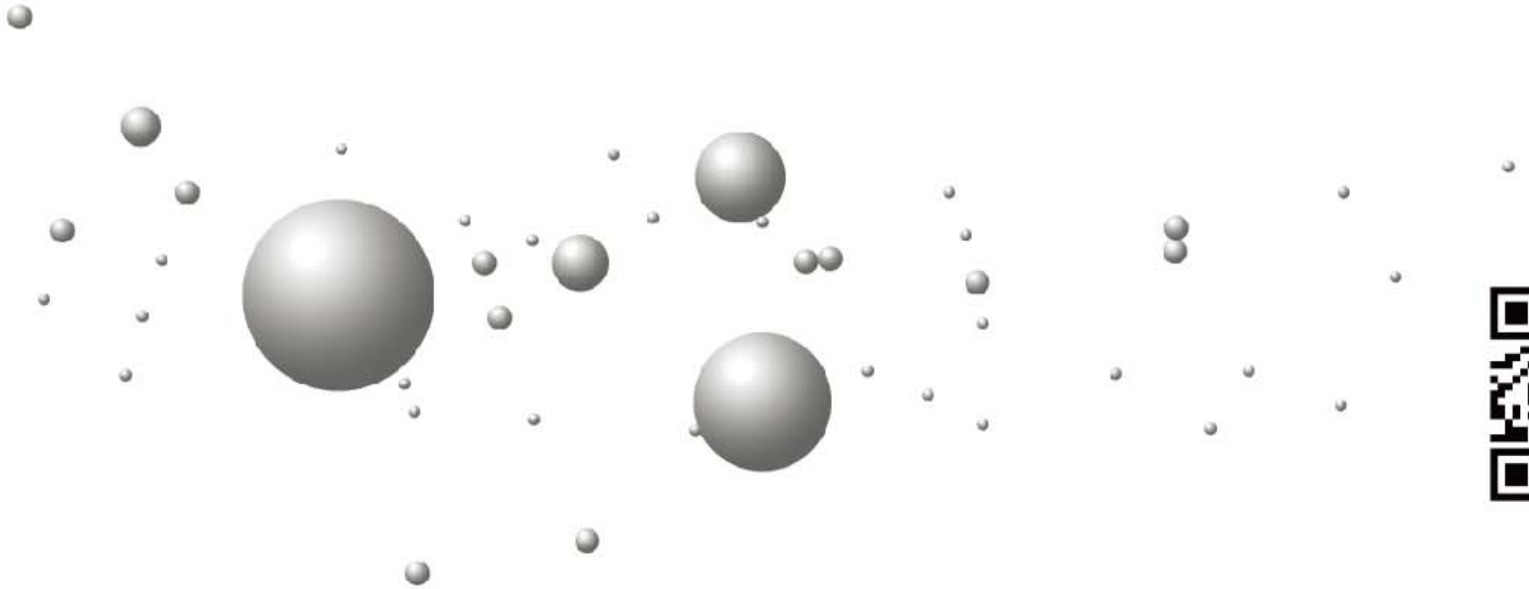

Our products

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