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杭州科德磁业有限公司

Hangzhou Kede Magnetic Components Co.,Ltd.

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磁联万物 · 驱动世界

KEDE

Connect & Drive with Magnetics

杭州科德磁业有限公司

Hangzhou Kede Magnetic Components Co.,Ltd.

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关于科德

杭州科德磁业有限公司，成立于2004年，国家级专精特新“小巨人”企业、国家级高新技术企业，专注于各类磁性材料及产品的设计、研发及制造，产品涵盖永磁、软磁、磁性组件、电机、旋转变压器、复杂磁性系统、充磁及测量系统等。

依托中国杭州、越南、墨西哥全球3大生产基地，在汽车工业、航空航天、轨道交通、清洁能源、机器人等领域，为客户提供优质产品和服务。

目前公司已通过ISO9001、AS9100D、IATF16949等体系认证，取得20项发明专利和49项实用新型专利，先后创建了磁性材料省级研究院、博士后科研工作站，并承担国家、省级重点研发计划项目，参与多项国家、行业标准起草与修订。

自成立以来，我们团队潜心于磁性材料技术与应用，致力于技术研发和创新，作为全球产品线最为丰富的磁性材料制造商之一，为客户提供模拟仿真、快速样品制作验证、专业检测分析、快速批量化生产等一站式磁性材料解决方案。

About Kede

As the worldwide magnet manufacturer with most comprehensive production lines, Kede focuses on the cutting edge of various magnetic products including Permanent Magnet, Soft Magnet, Magnetic Assembly, Motor, Resolver.

Based on 3 global manufacture bases in China, Vietnam and Mexico, our magnetic solutions are widely used in automotive industry, aerospace, power tools, rail transportation, clean energy, scientific and robot applications.

From simulation and pilot production to mass production, we aim to work with our customers to maximize benefit from our refined&integrated solution as we continuously contributing to the saving of resource for better environment.

里程碑
Milestones

2004
- 公司成立，生产烧结铝镍钴和粘结钕铁硼
- Kede established with sintered AlNiCo and bonded NdFeB.

2006
- Certified by TS16949 system and started long-term cooperation with many German automotive customers.
- 科德开始运行TS16949体系，并且和众多德国汽车零部件厂商建立了长期合作关系

2007
- 建立烧结钕铁硼产线
- Started sintered NdFeB line.

2008
- Started rotor&stator assembly lines.
- 建立电机定转子组装线

2009
- 建立器件组装线
- Started magnetic assembly lines.

2013
- Grain boundary diffusion process applied in NdFeB production.
- 烧结钕铁硼晶界扩散工艺应用与生产

2014
- 杭州2号厂区投入使用
- 科德通过国家级高新技术企业的认定
- 2# plant in Hangzhou started running;
- Passed the certification of national high-tech enterprises.

2015
- Mass production of the magnetron sputtering project.
- 磁控溅射项目量产

2016
- SmCo (BH)max exceeded 32MGOe.
- 钐钴磁能积突破32MGOe

2017
- 电机转子自动化产线投入使用
- 无人驾驶雷达电机项目小批量试产
- 通过杭州市专利试点企业的认定
- The rotor automation production line started running;
- Pilot production of driverless radar motor projects;
- Passed the identification of Hangzhou Patent Pilot Enterprises.

2018
- Passed the certification of Zhejiang Provincial Enterprise R&D Center;
- SmCo (BH)max exceeded 33MGOe.
- 通过浙江省省级企业研究开发中心的认定
- 钐钴磁能积突破33MGOe

2019
- 设立博士后工作站
- Set up a postdoctoral workstation.

2020
- Passed the certification of Zhejiang Enterprise Research Institute;
- Established Vietnam Plant
- 通过浙江省企业研究院的认定
- 越南工厂投产

2021
- 杭州3号厂区投入使用
- 建立冲压产线
- 旋变智能化产线投产
- 3# plant in Hangzhou;
- Started running;
- Started stamping lines; Intelligent automation line of Resolver started running.

2023
- 筹建墨西哥工厂
- 越南工厂扩产，新增电镀线
- Constructing Mexico Plant;
- Expand capacity in Vietnam and start a new platling line.

目录
CATALOGUE

永磁系列
Permanent Magnet

■ 烧结钕铁硼
Sintered NdFeB

公司具备烧结钕铁硼全流程生产能力，包含前期研发、模具开发与制造、坯料生产、成品加工、表面处理等各环节，并对各工艺流程进行精细化管理。基于市场对高剩磁、高矫顽力牌号的需求，公司从2013年起进行晶界扩散工艺的研发，历时10年的发展，目前已具备N54SH、N52UH、N50EH的生产能力。同时拥有完善的加工体系，从多线切割、切片、磨加工到表面处理，都具备高精度过程能力，最小尺寸可达到0.2mm。

我们为客户提供制定化解决方案，可根据客户需求定制充磁方式，除了传统的径向、轴向充磁外，亦可进行多极编程充磁。

We have the whole process capacity of sintered NdFeB, including the R&D stage, tooling designing and manufacturing, workblank production, machining, surface treatment and other processes. As the demand of high remanence and high coercivity increasing rapidly, we have researched in grain boundary diffusion process since 2013. After the development of 10 years, we are capable to manufacture grade N54SH, N52UH and N50EH.

We have a precise machining system, e.g. multi-line cutting, slicing, grinding and surface treatment. The precision process can make minimum size product as 0.2mm.

The magnetization can also be customized individually. In addition to the traditional radial and axial magnetization, we can also carry out multi-pole programming magnetization, providing customized solutions to clients.

科德拥有自己的表面处理产线，可以提供电镀、化学镀、电泳、喷涂等表面处理服务。涂层包括镍、锌、铜、锡及贵金属镀层、环氧树脂等。

We have our own surface treatment production line which can provide electroplating, chemical plating, electrophoresis, spraying and other surface treatment services.

Our coatings include: nickel, zinc, copper, tin, precious metal coating and epoxy etc.

烧结钕铁硼
Sintered NdFeB

- 烧结钕铁硼磁体的磁性能（室温）
  Datasheet of Sintered NdFeB at Room Temperature

类别 Item	牌号 Grade	剩磁 Remanence induction		矫顽力 Coercive force		内禀矫顽力 Intrinsic Coercive force		最大磁能积 Maximum Energy product		工作温度 Working Temperature	剩磁温度系数 Temperature Coefficient of Br	内禀矫顽力温度系数 Temperature Coefficient of Hcj
		B_r		H_{cB}		H_{cJ}		$(BH)_{max}$		Tw	α(B_r)	α(H_{cJ})
		T	KGs	KA/m	KOe	KA/m	KOe	KJ/m³	MGOe	°C(L/D=0.7)	%/°C	%/°C
		常规工艺 Conventional Process										
N	N35	1.17-1.22	11.7-12.2	≥868	≥10.9	≥955	≥12	263-287	33-36	80	-0.12	-0.60
	N38	1.22-1.26	12.2-12.6	≥899	≥11.3	≥955	≥12	287-310	36-39	80	-0.12	-0.60
	N40	1.26-1.29	12.6-12.9	≥907	≥11.4	≥955	≥12	302-326	38-41	80	-0.12	-0.60
	N42	1.29-1.33	12.9-13.3	≥915	≥11.5	≥955	≥12	318-342	40-43	80	-0.12	-0.60
	N45	1.32-1.38	13.2-13.8	≥915	≥11.5	≥955	≥12	342-366	43-46	80	-0.12	-0.60
	N48	1.37-1.42	13.7-14.2	≥876	≥11.0	≥955	≥12	358-390	45-49	80	-0.12	-0.60
	N50	1.40-1.45	14.0-14.5	≥836	≥10.5	≥955	≥12	374-406	47-51	80	-0.12	-0.60
	N52	1.42-1.48	14.2-14.8	≥836	≥10.5	≥955	≥12	390-422	49-53	80	-0.12	-0.60
	N54	1.44-1.50	14.4-15.0	≥796	≥10.0	≥875	≥11	406-438	51-55	60	-0.12	-0.60
	N56	1.46-1.52	14.6-15.2	≥796	≥10.0	≥875	≥11	414-446	52-56	60	-0.12	-0.60
M	N33M	1.13-1.17	11.3-11.7	≥836	≥10.5	≥1114	≥14	247-271	31-34	100	-0.11	-0.60
	N35M	1.17-1.22	11.7-12.2	≥868	≥10.9	≥1114	≥14	263-287	33-36	100	-0.11	-0.60
	N38M	1.22-1.26	12.2-12.6	≥899	≥11.3	≥1114	≥14	287-310	36-39	100	-0.11	-0.60
	N40M	1.26-1.29	12.6-12.9	≥923	≥11.6	≥1114	≥14	302-326	38-41	100	-0.11	-0.60
	N42M	1.29-1.33	12.9-13.3	≥955	≥12.0	≥1114	≥14	318-342	40-43	100	-0.11	-0.60
	N45M	1.32-1.38	13.2-13.8	≥971	≥12.2	≥1114	≥14	342-366	43-46	100	-0.11	-0.60
	N48M	1.37-1.42	13.7-14.2	≥995	≥12.5	≥1114	≥14	358-390	45-49	100	-0.11	-0.60
	N50M	1.40-1.45	14.0-14.5	≥1035	≥13.0	≥1114	≥14	374-406	47-51	100	-0.11	-0.60
	N52M	1.42-1.48	14.2-14.8	≥1035	≥13.0	≥1114	≥14	390-422	49-53	100	-0.11	-0.60
	N54M	1.44-1.50	14.4-15.0	≥1035	≥13.0	≥1114	≥14	406-438	51-55	100	-0.11	-0.60
	N56M	1.46-1.52	14.6-15.2	≥995	≥12.5	≥1035	≥13	414-446	52-56	100	-0.11	-0.60
H	N33H	1.13-1.17	11.3-11.7	≥836	≥10.5	≥1353	≥17	247-271	31-34	120	-0.11	-0.58
	N35H	1.17-1.22	11.7-12.2	≥868	≥10.9	≥1353	≥17	263-287	33-36	120	-0.11	-0.58
	N38H	1.22-1.26	12.2-12.6	≥915	≥11.5	≥1353	≥17	287-310	36-39	120	-0.11	-0.58
	N40H	1.26-1.29	12.6-12.9	≥939	≥11.8	≥1353	≥17	302-326	38-41	120	-0.11	-0.58
	N42H	1.29-1.33	12.9-13.3	≥955	≥12.0	≥1353	≥17	318-342	40-43	120	-0.11	-0.58
	N45H	1.32-1.38	13.2-13.8	≥995	≥12.5	≥1353	≥17	342-366	43-46	120	-0.11	-0.58
	N48H	1.37-1.42	13.7-14.2	≥995	≥12.5	≥1353	≥17	358-390	45-49	120	-0.11	-0.58
	N50H	1.40-1.45	14.0-14.5	≥1035	≥13.0	≥1353	≥17	374-406	47-51	120	-0.11	-0.58
	N52H	1.42-1.48	14.2-14.8	≥1035	≥13.0	≥1353	≥17	390-422	49-53	120	-0.11	-0.58
SH	N33SH	1.13-1.17	11.3-11.7	≥844	≥10.6	≥1592	≥20	247-271	31-34	150	-0.11	-0.55
	N35SH	1.17-1.22	11.7-12.2	≥876	≥11.0	≥1592	≥20	263-287	33-36	150	-0.11	-0.55
	N38SH	1.22-1.26	12.2-12.6	≥915	≥11.5	≥1592	≥20	287-310	36-39	150	-0.11	-0.55
	N40SH	1.26-1.29	12.6-12.9	≥939	≥11.8	≥1592	≥20	302-326	38-41	150	-0.11	-0.55
	N42SH	1.29-1.33	12.9-13.3	≥955	≥12.0	≥1592	≥20	318-342	40-43	150	-0.11	-0.55
	N45SH	1.32-1.38	13.2-13.8	≥995	≥12.5	≥1592	≥20	342-366	43-46	150	-0.11	-0.55
	N48SH	1.37-1.42	13.7-14.2	≥995	≥12.5	≥1592	≥20	358-390	45-49	150	-0.11	-0.55
	N50SH	1.40-1.45	14.0-14.5	≥1035	≥13.0	≥1592	≥20	374-406	47-51	150	-0.11	-0.55
	N52SH	1.42-1.48	14.2-14.8	≥1035	≥13.0	≥1592	≥20	390-422	49-53	150	-0.11	-0.55

- 烧结钕铁硼磁体的磁性能（室温）
  Datasheet of Sintered NdFeB at Room Temperature

类别 Item	牌号 Grade	剩磁 Remanence induction		矫顽力 Coercive force		内禀矫顽力 Intrinsic Coercive force		最大磁能积 Maximum Energy product		工作温度 Working Temperature	剩磁温度系数 Temperature Coefficient of Br	内禀矫顽力温度系数 Temperature Coefficient of Hcj
		B_r		H_{cB}		H_{cJ}		$(BH)_{max}$		Tw	α(B_r)	α(H_{cJ})
		T	KGs	KA/m	KOe	KA/m	KOe	KJ/m³	MGOe	°C(L/D=0.7)	%/°C	%/°C
UH	N28UH	1.04-1.08	10.4-10.8	≥764	≥9.6	≥1990	≥25	207-231	26-29	180	-0.10	-0.50
	N30UH	1.08-1.13	10.8-11.3	≥812	≥10.2	≥1990	≥25	223-247	28-31	180	-0.10	-0.50
	N33UH	1.13-1.17	11.3-11.7	≥852	≥10.7	≥1990	≥25	247-271	31-34	180	-0.10	-0.50
	N35UH	1.17-1.22	11.7-12.2	≥876	≥11.0	≥1990	≥25	263-287	33-36	180	-0.10	-0.50
	N38UH	1.22-1.26	12.2-12.6	≥915	≥11.5	≥1990	≥25	287-310	36-39	180	-0.10	-0.50
	N40UH	1.26-1.29	12.6-12.9	≥939	≥11.8	≥1990	≥25	302-326	38-41	180	-0.10	-0.50
	N42UH	1.29-1.33	12.9-13.3	≥955	≥12.0	≥1990	≥25	318-342	40-43	180	-0.10	-0.50
	N45UH	1.32-1.38	13.2-13.8	≥995	≥12.5	≥1990	≥25	342-366	43-46	180	-0.10	-0.50
EH	N28EH	1.04-1.08	10.4-10.8	≥764	≥9.6	≥2388	≥30	207-231	26-29	200	-0.10	-0.50
	N30EH	1.08-1.13	10.8-11.3	≥812	≥10.2	≥2388	≥30	223-247	28-31	200	-0.10	-0.50
	N33EH	1.13-1.17	11.3-11.7	≥852	≥10.7	≥2388	≥30	247-271	31-34	200	-0.10	-0.50
	N35EH	1.17-1.22	11.7-12.2	≥876	≥11.0	≥2388	≥30	263-287	33-36	200	-0.10	-0.50
	N38EH	1.22-1.26	12.2-12.6	≥915	≥11.5	≥2388	≥30	287-310	36-39	200	-0.10	-0.50
	N40EH	1.26-1.29	12.6-12.9	≥939	≥11.8	≥2388	≥30	302-326	38-41	200	-0.10	-0.50
	N42EH	1.29-1.33	12.9-13.3	≥955	≥12.0	≥2388	≥30	318-342	40-43	200	-0.10	-0.50
	N45EH	1.32-1.38	13.2-13.8	≥995	≥12.5	≥2308	≥29	342-366	43-46	200	-0.10	-0.50
AH	N28AH	1.04-1.08	10.4-10.8	≥764	≥9.6	≥2786	≥35	207-231	26-29	220	-0.10	-0.50
	N30AH	1.08-1.13	10.8-11.3	≥812	≥10.2	≥2786	≥35	223-247	28-31	220	-0.10	-0.50
	N33AH	1.13-1.17	11.3-11.7	≥852	≥10.7	≥2786	≥35	247-271	31-34	220	-0.10	-0.50
	N35AH	1.17-1.22	11.7-12.2	≥876	≥11.0	≥2786	≥35	263-287	33-36	220	-0.10	-0.50
	N38AH	1.22-1.26	12.2-12.6	≥923	≥11.6	≥2786	≥35	287-310	36-39	220	-0.10	-0.50
	N40AH	1.26-1.29	12.6-12.9	≥939	≥11.8	≥2786	≥35	302-326	38-41	220	-0.10	-0.50
	N42AH	1.29-1.33	12.9-13.3	≥955	≥12.0	≥2707	≥34	318-342	40-43	220	-0.10	-0.50
						扩散工艺 Diffusion Process						
H	N54H	1.44-1.50	14.4-15.0	≥1035	≥13.0	≥1353	≥17	406-438	51-55	120	-0.11	-0.58
SH	N48SH	1.37-1.42	13.7-14.2	≥995	≥12.5	≥1592	≥20	358-390	45-49	150	-0.11	-0.55
	N50SH	1.40-1.45	14.0-14.5	≥1035	≥13.0	≥1592	≥20	374-406	47-51	150	-0.11	-0.55
	N52SH	1.42-1.48	14.2-14.8	≥1035	≥13.0	≥1592	≥20	390-422	49-53	150	-0.11	-0.55
	N54SH	1.44-1.50	14.4-15.0	≥1035	≥13.0	≥1512	≥19	406-438	51-55	150	-0.11	-0.55
UH	N45UH	1.32-1.38	13.2-13.8	≥995	≥12.5	≥1990	≥25	342-366	43-46	180	-0.10	-0.50
	N48UH	1.37-1.42	13.7-14.2	≥995	≥12.5	≥1990	≥25	358-390	45-49	180	-0.10	-0.50
	N50UH	1.40-1.45	14.0-14.5	≥1035	≥13.0	≥1990	≥25	374-406	47-51	180	-0.10	-0.50
	N52UH	1.42-1.48	14.2-14.8	≥1035	≥13.0	≥1910	≥24	390-422	49-53	180	-0.10	-0.50
	N54UH	1.44-1.50	14.4-15.0	≥1035	≥13.0	≥1910	≥24	406-438	51-55	180	-0.10	-0.50
EH	N40EH	1.26-1.29	12.6-12.9	≥939	≥11.8	≥2388	≥30	302-326	38-41	200	-0.10	-0.50
	N42EH	1.29-1.33	12.9-13.3	≥955	≥12.0	≥2388	≥30	318-342	40-43	200	-0.10	-0.50
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AH	N40AH	1.26-1.29	12.6-12.9	≥939	≥11.8	≥2786	≥35	302-326	38-41	220	-0.10	-0.50
	N42AH	1.29-1.33	12.9-13.3	≥955	≥12.0	≥2707	≥34	318-342	40-43	220	-0.10	-0.50

烧结钐钴
Sintered SmCo

烧结钐钴是由稀土金属钐、钴、铜、铁和锆等元素通过粉末冶金工艺制成的一种永磁材料。从材料结构来讲,科德钐钴永磁可分为2:17型和1:5型；而从性能特征而言可,分为高磁能积钐钴永磁、低温度系数钐钴永磁和耐高温钐钴永磁三种类型。

Sintered SmCo is a permanent magnet made of rare earth metal Samarium , Cobalt , Copper Iron and Zirconium by powder metallurgy.

The SmCo magnet from KEDE includes 2:17 and 1:5 according to material structure . In terms of properties , they can be divided into three types: high magnetic energy SmCo, low temperature coefficient SmCo and high - temperature resistant SmCo permanent magnet .

SmCo 1 : 5

SmCo 2 : 17

公司2012年建立烧结钐钴生产产线，2018年，经过不断地技术突破，2018年烧结钐钴的性能，已提高到(BH)max:33MGOe。由于钐钴具有磁性能高、温度稳定性好等特点被广泛应用于汽车工业、节能电器、通讯、航空航天等领域。

KEDE has established the production line of sintered SmCo since 2012. With the continuous R&D in the material improvement, our (BH)max of SmCo reached 33MGOe in 2018 . Our SmCo is widely used in automotive, energy-saving , communications, aerospace and other industries because of its high magnetic properties and good temperature stability.

烧结钐钴
Sintered SmCo

- 烧结钐钴磁体的磁性能（室温）
  Datasheet of Sintered SmCo at Room Temperature

类别 Item	牌号 Grade	GBT 4180-2012 稀土钴永磁材料	剩磁 Remanence induction		矫顽力 Coercivity	
			Br		Hcb	
			T	KGs	KA/m	KOe
Sm_1Co_5	Sm_1Co_5-16	XG1S135/96	0.79-0.84	7.9-8.4	620-660	7.8-8.3
	Sm_1Co_5-18	XG1S 143/160	0.84-0.89	8.4-8.9	660-700	8.3-8.8
	Sm_1Co_5-20	XG1S 159/140	0.89-0.93	8.9-9.3	684-732	8.6-9.2
	Sm_1Co_5-22	XG1S 175/140	0.92-0.96	9.2-9.6	710-756	8.9-9.5
	Sm_1Co_5-24	/	0.96-1.00	9.6-10.0	740-788	9.3-9.9
Sm_2Co_{17}	Sm_2Co_{17}-24L	/	0.95-1.02	9.5-10.2	541-716	6.8-9.0
	Sm_2Co_{17}-26L	XGS 207/50	1.02-1.05	10.2-10.5	541-784	6.8-9.4
	Sm_2Co_{17}-28L	XGS 223/50	1.05-1.08	10.5-10.8	541-764	6.8-9.6
	Sm_2Co_{17}-30L	/	1.08-1.15	10.8-11.5	541-796	6.8-10.0
	Sm_2Co_{17}-32L	/	1.10-1.15	11.0-11.5	541-812	6.8-10.2
	Sm_2Co_{17}-26M	XGS 207/80	1.02-1.05	10.2-10.5	676-780	8.5-9.8
	Sm_2Co_{17}-28M	XGS 223/80	1.05-1.08	10.5-10.8	676-796	8.5-10.0
	Sm_2Co_{17}-30M	XGS 239/80	1.08-1.1	10.8-11.0	676-835	8.5-10.5
	Sm_2Co_{17}-32M	/	1.10-1.13	11.0-11.3	676-852	8.5-10.7
	Sm_2Co_{17}-33M	/	1.13-1.15	11.3-11.5	820-870	10.3-10.9
	Sm_2Co_{17}-22	/	0.93-0.97	9.3-9.7	676-740	8.5-9.3
	Sm_2Co_{17}-24	/	0.95-1.02	9.5-10.2	692-764	8.7-9.6
	Sm_2Co_{17}-26	XGS 207/160	1.02-1.05	10.2-10.5	748-796	9.4-10.0
	Sm_2Co_{17}-28	XGS 223/160	1.05-1.08	10.5-10.8	756-812	9.5-10.2
	Sm_2Co_{17}-30	XGS 223/247	1.08-1.10	10.8-11.0	788-835	9.9-10.5
	Sm_2Co_{17}-32	/	1.10-1.13	11.0-11.3	812-860	10.2-10.8
	Sm_2Co_{17}-33	/	1.13-1.15	11.3-11.5	820-870	10.3-10.9
	Sm_2Co_{17}-24H	XGS 191/200	0.95-1.02	9.5-10.2	692-764	8.7-9.6
	Sm_2Co_{17}-26H	XGS 207/200	1.02-1.05	10.2-10.5	748-796	9.4-10.0
	Sm_2Co_{17}-28H	XGS 223/200	1.05-1.08	10.5-10.8	756-812	9.5-10.2
	Sm_2Co_{17}-30H	XGS 239/160	1.08-1.10	10.8-11.0	788-835	9.9-10.5
	Sm_2Co_{17}-32H	/	1.10-1.13	11.0-11.3	812-860	10.2-10.8
	Sm_2Co_{17}-33H	/	1.13-1.15	11.3-11.5	830-880	10.4-11
Sm_2Co_{17}-TR	Sm_2Co_{17}-20TR	/	0.9-0.94	9.0-9.4	661-732	8.3-9.2
Sm_2Co_{17}-LT	Sm_2Co_{17}-16LT	/	0.80-0.84	8.0-8.4	605-669	7.6-8.4
	Sm_2Co_{17}-18LT	/	0.84-0.89	8.4-8.9	629-708	7.9-8.9
	Sm_2Co_{17}-20LT	/	0.89-0.94	8.9-9.4	661-732	8.3-9.2
	Sm_2Co_{17}-22LT	/	0.94-0.97	9.4-9.7	685-740	8.6-9.3

内禀矫顽力 Intrinsic Coercive force		最大磁能积 Maximum Energy product		工作温度 Working Temperature	密度 Density	剩磁温度系数 Temperature Coefficient of Br	内禀矫顽力温度系数 Temperature Coefficient of Hcj
Hcj		(BH)max		Tw	ρ	α (Br)	α (Hcj)
KA/m	KOe	KJ/m^3	MGOe	℃	g/cm^3	%/℃	%/℃
≥1830	≥23	118-135	15-17	≤250	8.3	-0.035	-0.28
≥1830	≥23	135-151	17-19	≤250	8.3	-0.040	-0.28
≥1830	≥23	150-167	19-21	≤250	8.3	-0.045	-0.28
≥1830	≥23	167-183	21-23	≤250	8.3	-0.045	-0.28
≥1830	≥23	183-199	23-25	≤250	8.3	-0.045	-0.28
636-955	8-12	175-191	22-24	≤250	8.4	-0.025	-0.20
636-955	8-12	191-207	24-26	≤250	8.4	-0.035	-0.20
636-955	8-12	207-220	26-28	≤250	8.4	-0.035	-0.20
636-955	8-12	220-240	28-30	≤250	8.4	-0.035	-0.20
636-955	8-12	230-255	29-32	≤250	8.4	-0.035	-0.20
955-1433	12-18	191-207	24-26	≤300	8.4	-0.035	-0.20
955-1433	12-18	207-220	26-28	≤300	8.4	-0.035	-0.20
955-1433	12-18	220-240	28-30	≤300	8.4	-0.035	-0.20
955-1433	12-18	230-255	29-32	≤300	8.4	-0.035	-0.20
955-1433	12-18	246-262	31-32	≤300	8.4	-0.039	-0.22
≥1433	≥18	160-183	20-23	≤300	8.4	-0.020	-0.20
≥1433	≥18	175-191	22-24	≤300	8.4	-0.025	-0.20
≥1433	≥18	191-207	24-26	≤300	8.4	-0.030	-0.20
≥1433	≥18	207-220	26-28	≤300	8.4	-0.035	-0.20
≥1433	≥18	220-240	28-30	≤300	8.4	-0.035	-0.20
≥1433	≥18	230-255	29-32	≤300	8.4	-0.035	-0.20
≥1433	≥18	246-262	31-32	≤300	8.4	-0.039	-0.22
≥1990	≥25	175-191	22-24	≤350	8.4	-0.025	-0.20
≥1990	≥25	191-207	24-26	≤350	8.4	-0.030	-0.20
≥1990	≥25	207-220	26-28	≤350	8.4	-0.035	-0.20
≥1990	≥25	220-240	28-30	≤350	8.4	-0.035	-0.20
≥1990	≥25	230-255	29-32	≤350	8.4	-0.035	-0.20
≥1990	≥25	246-262	31-32	≤350	8.4	-0.039	-0.22
≥1592	≥20	143-159	19-21	≤500	8.4	-0.035	-0.15
≥1592	≥20	111-127	15-17	≤300	8.4		
≥1592	≥20	127-143	17-19	≤300	8.4		
≥1592	≥20	143-159	19-21	≤300	8.4		
≥1592	≥20	159-175	21-23	≤300	8.4		

温度范围	剩磁温度系数
-50℃-20℃	±0.005%/℃
20℃-200℃	-0.008%/℃
200℃-300℃	-0.011%/℃

铝镍钴
AlNiCo

铝镍钴永磁材料按照生产工艺分为铸造铝镍钴和烧结铝镍钴两大系列。铝镍钴永磁材料是最早工业化生产的磁性材料，凭借良好的温度稳定性，面对低价的铁氧体永磁和高性能的钕铁硼永磁材料，仍然拥有很重要的应用领域。铝镍钴永磁材料优点是剩磁高、温度系数低，最高工作温度可以达到550度，产品广泛应用于各种仪器仪表、机电传感、电机电声等领域。

公司铝镍钴产品包括铸造、烧结、定向铸造三大类，材料牌号齐全，性能优良，其中烧结五类磁的(BH)max可以达到5MGOe，烧结八类的(BH)max可以达到6MGOe，烧结八类高矫顽力牌号大于2.1KOe，定向八类的(BH)max可以达到13MGOe，具备复杂形状和高尺寸形位精度产品的加工能力，可以实现产品热处理多极取向和环形取向的特殊要求，特定产品的平面、内圆、外圆多极充磁和辐射充磁等。

AlNiCo is the earliest industrially produced permanent magnet. They are divided into two types as cast AlNiCo and sintered AlNiCo according to the production process. Excelled in temperature stability, they have very important applications which cheap sintered ferrite and high-performance NdFeB permanent magnet cannot compete with. AlNiCo has the advantages of high remanence, low temperature coefficient and the maximum operating temperature of 550 °C. The products are widely used in various fields such as instruments and meters, electromechanical sensing, electroacoustics etc.

AlNiCo products of KEDE, include three categories of casting, sintering and directional casting. Sintering AlNiCo5 with 5 MGOe (BH)max, sintering AlNiCo8 with 6 MGOe (BH)max, sintering AlNiCo8 with more than 2.1KOe Hcj, and directional casting AlNiCo8 with 13 MGOe (BH)max are among the excellent features. We are capable of processing AlNiCo products with complex shapes and high dimension precision special requirements such as heat treatment of multipolar orientation, circular orientation, plane, inner circle, outer circle multipole magnetization and radiation magnetization of specific products.

■ 铝镍钴
AlNiCo

Casted AlNiCo

铸造铝镍钴

Sintered AlNiCo

烧结铝镍钴

Octupole Orientation

八极取向

Circular Orientation

环形取向

■ 烧结铝镍钴
Sintered AlNiCo

- 烧结铝镍钴磁体的磁性能（室温）
  Datasheet of Sintered AlNiCo at Room Temperature

类别 Item	牌号 Grade	剩磁 Remanence induction		矫顽力 Coercive force		内禀矫顽力 Intrinsic Coercive force		最大磁能积 Maximum Energy product		工作温度 Working Temperature	密度 Density	剩磁温度系数 Temperature Coefficient of Br	内禀矫顽力温度系数 Temperature Coefficient of Hcj	备注 Remark
		B_r		H_{cb}		H_{cJ}		$(BH)_{max}$		Tw	ρ	α(B_r)	α(H_{cJ})	
		T	KGs	KA/m	KOe	KA/m	KOe	KJ/m³	MGOe	°C	g/cm³	%/°C	%/°C	
烧结铝镍钴 Sintered AlNiCo	PAlNiCo10/5	0.60-0.63	6.0-6.3	48-52	0.60-0.65	52-56	0.65-0.7	8-10	1.00-1.25	≤450	6.8	-0.02	-0.03 ~ -0.07	各向同性 Isotropic
	PAlNiCo12/5	0.70-0.75	7.0-7.5	48-56	0.60-0.70	52-58	0.65-0.73	11-13	1.4-1.6	≤450	7.0			
	PAlNiCo14/8	0.55-0.60	5.5-6.0	75-91	0.95-1.15	80-95	1.0-1.2	14.0-16.0	1.75-2.0	≤550	7.0			
	PAlNiCo20/10	0.60-0.64	6.0-6.4	93-110	1.16-1.38	100-118	1.25-1.4	18.0-22.4	2.25-2.8	≤550	7.0			
	PAlNiCo28/6	1.0-1.12	10.0-11.2	56-64	0.70-0.80	58-66	0.73-0.83	28-32	3.5-4.0	≤550	7.2			各向异性 Anisotropic
	PAlNiCo34/5	1.15-1.23	11.5-12.3	48-56	0.60-0.70	49-57	0.62-0.72	32-36	4.0-4.5	≤550	7.2			
	PAlNiCo37/5	1.19-1.27	11.9-12.7	48-56	0.60-0.70	49-57	0.62-0.72	36-38	4.5-4.8	≤550	7.2			
	PAlNiCo40/5	1.22-1.27	12.2-12.7	48-56	0.60-0.70	49-57	0.62-0.72	38-40	4.8-5.0	≤550	7.2			
	PAlNiCo40/10	0.95-1.0	9.5-10.0	100-110	1.25-1.38	104-114	1.30-1.43	40-44	5.0-5.5	≤550	7.1			
	PAlNiCo38/11	0.80-0.85	8.0-8.5	111-121	1.40-1.52	114-125	1.43-1.57	38-40	4.8-5.0	≤550	7.1			
	PAlNiCo36/15	0.70-0.75	7.0-7.5	140-168	1.75-2.11	144-172	1.80-2.16	36-45	4.5-5.6	≤550	7.0			
	PAlNiCo40/16	0.70-0.75	7.0-7.5	151-175	1.90-2.20	166-189	2.08-2.37	40-48	5.0-6.0	≤550	7.0			
	PAlNiCo40/12	0.83-0.90	8.3-9.0	120-132	1.50-1.65	124-136	1.56-1.71	40-44	5.0-5.5	≤550	7.1			
	PAlNiCo45/13	0.89-0.91	8.9-9.1	120-132	1.50-1.65	126-138	1.58-1.73	44-50	5.5-6.2	≤550	7.1			
	PAlNiCo47/14	0.82-0.88	8.2-8.8	136-152	1.70-1.91	140-152	1.75-1.91	45-50	5.6-6.25	≤550	7.1			

■ 铸造铝镍钴
Cast AlNiCo

- 铸造铝镍钴磁体的磁性能（室温）
  Datasheet of Cast AlNiCo at Room Temperature

类别 Item	牌号 Grade	剩磁 Remanence induction		矫顽力 Coercive force		内禀矫顽力 Intrinsic Coercive force		最大磁能积 Maximum Energy product		工作温度 Working Temperature	密度 Density	剩磁温度系数 Temperature Coefficient of Br	内禀矫顽力 温度系数 Temperature Coefficient of Hcj	备注 Remark	
		B_r		H_{cb}		H_{cj}		$(BH)_{max}$		Tw	p	α(B_r)	α(H_{cj})		
		T	KGs	KA/m	KOe	KA/m	KOe	KJ/m³	MGOe	°C	g/cm³	%/°C	%/°C		
铸造铝镍钴 Cast AlNiCo	CAlNiCo12/5	0.70-0.75	7.0-7.5	48-56	0.6-0.7	52-58	0.65-0.73	11-13	1.4-1.6	≤450	6.8	-0.02	-0.03 ~ -0.07	等轴晶 Isometric crystal	各向同性 isotropic
	CAlNiCo38/5	1.20-1.25	12.0-12.5	48-56	0.6-0.7	49-57	0.61-0.72	37-40	4.7-5.0	≤550	7.3				各向异性 Anisotropic
	CAlNiCo40/5	1.22-1.26	12.2-12.6	48-56	0.6-0.7	49-57	0.61-0.72	40-44	5.0-5.5	≤550	7.3				
	CAlNiCo44/5	1.24-1.28	12.4-12.8	50-56	0.63-0.7	51-57	0.64-0.71	44-48	5.5-6.0	≤550	7.3				
	CAlNiCo28/6	1.1-1.2	11.0-12.0	56-64	0.7-0.8	58-66	0.73-0.83	28-32	3.5-4.0	≤550	7.3				
	CAlNiCo38/11	0.80-0.85	8.0-8.5	111-121	1.40-1.52	114-125	1.43-1.57	38-42	4.8-5.3	≤550	7.3				
	CAlNiCo40/12	0.83-0.90	8.3-9.0	120-127	1.50-1.60	124-136	1.56-1.71	40-44	5.0-5.5	≤550	7.3				
	CAlNiCo45/13	0.89-0.91	8.9-9.1	122-132	1.53-1.65	126-138	1.58-1.73	44-50	5.5-6.2	≤550	7.3				
	CAlNiCo36/15	0.70-0.75	7.0-7.5	140-160	1.75-2.0	154-172	1.93-2.16	36-45	4.5-5.6	≤550	7.3				
	CAlNiCo46/15	0.75-0.82	7.5-8.2	152-168	1.91-2.10	160-176	2.0-2.2	44-50	5.5-6.2	≤550	7.3				
	CAlNiCo48/13	0.89-0.93	8.9-9.3	128-136	1.60-1.70	136-144	1.7-1.8	46-53	5.8-6.7	≤550	7.3				
	CAlNiCo52/6	1.30-1.33	13.0-13.3	56-64	0.7-0.8	57-65	0.75-0.82	52-56	6.5-7.0	≤550	7.3			柱状晶 Columnar crystal	
	CAlNiCo60/6	1.33-1.37	13.3-13.7	56-64	0.7-0.8	60-68	0.75-0.85	58-62	7.3-7.8	≤550	7.3				
	CAlNiCo72/12	1.05-1.1	10.5-11.0	116-124	1.45-1.55	124-132	1.55-1.65	72-80	9.0-10.0	≤550	7.3				
	CAlNiCo80/12	1.10-1.16	11.0-11.6	120-128	1.5-1.6	128-136	1.6-1.7	80-100	10.0-12.5	≤550	7.3				

粘结磁体
Bonded Magnet

粘结磁体
Bonded Magnet

粘结磁体是指将具有特定粒度分布的永磁磁粉与不同类型树脂粉末及助剂按一定比例混合、造粒经压制或注射成型工艺制成的一种磁体。公司自2004年开始致力于粘结磁体的生产、研发制造，目前已形成关键生产工序大批量全自动化作业模式，年生产能力300T，涉及粘结磁体主要产品有各向同性压制/注射钕铁硼磁体、 各向异性注射铁氧体/钐铁氮磁体/钐钴等，粘结磁体广泛应用于汽车工业（传感器、电机）、智能办公设备、 消费电子、仪器仪表等领域。

Bonded magnet is made by mixing and granulating permanent magnetic powder with a specific particle size distribution, different types of resin powder and additives in a certain proportion. And then manufactured by compression or injection. KEDE has been committed to the R&D and manufacturing of bonded magnets since 2004. And now we have formed a large-scale and fully automated lines for key processes. The annual capacity of bonded magnet has achieved 300 ton, and the main products include isotropic compressed / injected NdFeB magnets, anisotropic injection ferrite / SmFeN/SmCo etc, which are widely used in automotive industry (sensors, motors), smart office equipment, consumer electronics,instrument and other fields.

粘结磁体-注塑
Bonded Magnet-Injection Moulding

Injected NdFeB
注塑钕铁硼

Injected SmCo
注塑钐钴

Injected Ferrite
注塑铁氧体

Injected SmFeN
注塑钐铁氮

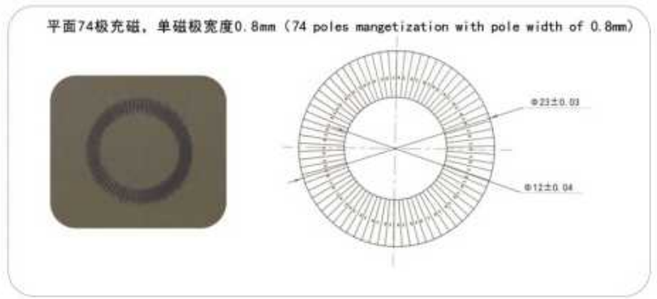
粘结磁体
Bonded Magnet

注射磁体因形状自由度大，尺寸稳定性好，可与塑料/金属嵌件一体化注塑成型，机械特性好，磁体材料最大磁能积（BH）max可达8MGOe,最高工作温度可达180°C;
压制磁体可实现复杂形状、成型过程精度高，磁体可实现多种表面处理方式和颜色(电泳、电镀、喷漆、派瑞林等)，盐雾试验最高可达1200h;磁体材料最大磁能积（BH）max可达12MGOe。

Due to its shaping flexibility and good dimensional stability, the injection magnet has good mechanical properties and can be integrated with plastic/metal inserts. The (BH)max can reach 8MGOe and the maximum working temperature can be 180 °C; It can be made into complex shapes with high precisions. The magnet can achieve a variety of surface treatment methods and colors (electrophoresis,electroplating, painting, Parylene etc.) with good corrosion resistance. The Compression magnet (BH)max can reach 12MGOe. The magnet can be magnetized in customized ways with complex poles.

粘结磁体-压制
Bonded Magnet-Compression Moulding

压制成型 Compression Moulding



■粘结磁体
Bonded Magnet

- 注射成型钕铁硼的磁性能（室温）
  Datasheet of Injection Molding NdFeB at Room Temperature

类别 Item	牌号 Grade	剩磁 Remanence induction		矫顽力 Coercive force		内禀矫顽力 Intrinsic Coercive force		最大磁能积 Maximum Energy product		工作温度 Working Temperature	密度 Density	平均可逆温度系数 temperature coefficient of Br
		B_r		H_{cB}		H_{cJ}		$(BH)_{max}$		Tw	ρ	α
		T	KGs	KA/m	KOe	KA/m	KOe	KJ/m³	MGOe	°C	g/cm³	%/°C
注射成型钕铁硼 Injection Molding NdFeB Magnet	KBI-3	0.25~0.35	2.5~3.5	160~240	2.0~3.0	480~640	6.0~8.0	12~24	1.5~3.0	≤120	3.9~4.4	-0.12
	KBI-4	0.35~0.45	3.5~4.5	240~320	3.0~4.0	560~720	7.0~9.0	24~36	3.0~4.5	≤120	4.2~4.9	-0.11
	KBI-5	0.45~0.52	4.5~5.2	320~360	4.0~4.5	560~720	7.0~9.0	36~44	4.5~5.5	≤120	4.5~5.0	-0.11
	KBI-5H(PPS)	0.48~0.52	4.8~5.2	400~480	5.0~6.0	880~1040	11.0~13.0	36~44	4.5~5.5	≤180	4.9~5.4	-0.10
	KBI-6	0.50~0.55	5.0~5.5	320~440	4.0~5.5	640~800	8.0~10.0	44~52	5.5~6.5	≤120	4.7~5.1	-0.11
	KBI-6H(PPS)	0.52~0.56	5.2~5.6	350~400	4.4~5.0	950~1000	11.0~13.0	45~52	5.6~6.5	≤180	4.9~5.4	-0.10
	KBI-7	0.58~0.64	5.8~6.4	320~400	4.0~5.0	640~800	8.0~10.0	52~60	6.5~7.5	≤120	5.0~5.5	-0.11
	KBI-8	0.61~0.66	6.1~6.6	320~400	4.0~5.0	640~800	8.0~10.0	62~70	7.8~8.8	≤120	5.4~5.9	-0.11

- 注射成型钐铁氮的磁性能（室温）
  Datasheet of Injection Molding SmFeN at Room Temperature

材料 Material	牌号 Grade	剩磁 Remanence induction		矫顽力 Coercive force		内禀矫顽力 Intrinsic Coercive force		最大磁能积 Maximum Energy product		剩磁温度系数 Temperature Coefficient of Br	内禀矫顽力温度系数 Temperature Coefficient of Hcj	密度 Density
		Br		Hcb		Hcj		(BH)max		α(B_r)	α(H_{ci})	ρ
		T	KGs	KA/m	KOe	KA/m	KOe	KJ/m³	MGOe	%/K	%/K	g/cm³
SmFeN+Ferrite	KSFB30a	0.37	3.73	204	2.56	384	4.83	26.4	3.30	-0.10	-0.38	3.80
	KSFB40a	0.44	4.40	243	3.05	500	6.28	34.4	4.30	-0.09	-0.40	3.90
	KSFB50a	0.49	4.90	282	3.54	521	6.55	42.0	5.25	-0.09	-0.43	4.00
	KSFB60a	0.54	5.39	321	4.03	541	6.80	51.0	6.37	-0.08	-0.45	4.05
	KSFB70a	0.57	5.69	349	4.39	551	6.93	58.4	7.30	-0.07	-0.47	4.10
SmFeN	KSB80a	0.60	6.03	403	5.07	621	7.80	67.1	8.39	-0.07	-0.50	4.15
	KSB90a	0.64	6.39	406	5.10	613	7.70	72.8	9.15	-0.07	-0.50	4.27
	KSB100a	0.65	6.53	407	5.12	589	7.40	78.5	9.81	-0.07	-0.50	4.35
	KSB110a	0.69	6.85	426	5.35	569	7.15	86.8	10.85	-0.07	-0.50	4.53
	KSB120a	0.73	7.30	438	5.50	631	7.93	92.8	11.65	-0.07	-0.50	4.60
NdFeB+SmFeN	KSNB100a	0.69	6.89	408	5.12	701	8.81	82.0	10.30	-0.10	-0.57	4.45
	KSNB120a	0.78	7.81	454	5.70	812	10.20	99.3	12.47	-0.10	-0.57	4.95
	KSNB140a	0.82	8.20	496	6.23	876	11.00	110.7	13.90	-0.10	-0.57	5.15
	KSNB150a	0.84	8.40	501	6.30	836	10.50	118.3	14.85	-0.10	-0.57	5.28
SmCo	KBI-ASmCo-32M	0.60	5.98	437	5.49	1108	13.92	65.4	8.22	-0.035	-0.20	5.20

- 注射成型铁氧体的磁性能（室温）
  Datasheet of Injection Molding Ferrite at Room Temperature

类别 Item	牌号 Grade	剩磁 Remanence induction		矫顽力 Coercive force		内禀矫顽力 Intrinsic Coercive force		最大磁能积 Maximum Energy product		工作温度 Working Temperature	密度 Density	平均可逆温度系数 temperature coefficient of Br
		B_r		H_{cB}		H_{cJ}		$(BH)_{max}$		Tw	ρ	α
		T	KGs	KA/m	KOe	KA/m	KOe	KJ/m³	MGOe	°C	g/cm³	%/°C
注射成型铁氧体 Injection Molding Ferrite Magnet	KBI-F0.5	0.142~0.152	1.42~1.52	≥96	≥1.20	≥175	≥2.20	3.82~4.62	0.48~0.58	≤150	2.63	-0.19
	KBI-F0.7	0.174~0.184	1.74~1.84	≥127	≥1.60	≥239	≥3.00	5.89~6.69	0.74~0.84	≤150	2.7	-0.19
	KBI-F1.0	0.198~0.210	1.98~2.10	≥151	≥1.90	≥239	≥3.00	7.56~8.60	0.95~1.08	≤150	2.95	-0.19
	KBI-F1.1	0.208~0.220	2.08~2.20	≥159	≥2.00	≥239	≥3.00	8.36~9.39	1.05~1.18	≤150	3.03	-0.19
	KBI-F1.2	0.222~0.232	2.22~2.32	≥167	≥2.10	≥239	≥3.00	9.71~10.67	1.22~1.34	≤150	3.1	-0.19
	KBI-F1.5	0.240~0.250	2.40~2.50	≥159	≥2.00	≥239	≥3.00	11.54~12.34	1.45~1.55	≤150	3.3	-0.19
	KBI-F1.6	0.255~0.264	2.55~2.64	≥175	≥2.20	≥227	≥2.85	12.34~13.14	1.55~1.65	≤150	3.3	-0.19
	KBI-F1.8	0.272~0.282	2.72~2.82	≥175	≥2.20	≥215	≥2.70	14.49~15.29	1.82~1.92	≤150	3.5	-0.19
	KBI-F2.0	0.287~0.297	2.87~2.97	≥183	≥2.30	≥211	≥2.65	16.32~17.12	2.05~2.15	≤150	3.7	-0.19
	KBI-F2.3	0.300~0.310	3.00~3.10	≥183	≥2.30	≥223	≥2.80	17.52~18.31	2.20~2.30	≤120	3.83	-0.19
	KBI-F1.7(PPS)	0.263~0.273	2.63~2.73	≥151	≥1.90	≥199	≥2.50	13.14~13.93	1.65~1.75	≤180	3.61	-0.19

- 压制成型钕铁硼的磁性能（室温）
  Datasheet of Compression Molding NdFeB at Room Temperature

类别 Item	牌号 Grade	剩磁 Remanence induction		矫顽力 Coercive force		内禀矫顽力 Intrinsic Coercive force		最大磁能积 Maximum Energy product		工作温度 Working Temperature	密度 Density	平均可逆温度系数 temperature coefficient of Br
		B_r		H_{cB}		H_{cJ}		$(BH)_{max}$		Tw	ρ	α
		T	KGs	KA/m	KOe	KA/m	KOe	KJ/m³	MGOe	°C	g/cm³	%/°C
压制成型钕铁硼 Compression Molding NdFeB Magnet	KBM-2	0.30~0.40	3.0-4.0	160~240	2.0~3.0	480~640	6.0~8.0	16~24	2.0~3.0	≤120	4.5~6.0	-0.12
	KBM-4	0.40~0.50	4.0~5.0	240~320	3.0~4.0	560~720	7.0~9.0	32~44	4.0~5.5	≤120	5.2~6.0	-0.11
	KBM-6	0.55~0.63	5.5~6.3	320~400	4.0~5.0	480~640	6.0~8.0	48~60	6.0~7.5	≤120	5.5~6.0	-0.11
	KBM-8	0.65~0.68	6.5~6.8	360~440	4.5~5.5	640~800	8.0~10.0	64~72	8.0~9.0	≤150	5.8~6.1	-0.10
	KBM-8H	0.60~0.65	6.0~6.5	400~480	5.0~6.0	1120~1280	14.0~16.0	60~68	7.5~8.5	≤160	5.8~6.2	-0.10
	KBM-8L	0.65~0.68	6.5~6.8	400~480	5.0~6.0	900~1120	11.0~14.0	64~72	8.0~9.0	≤160	5.8~6.2	-0.10
	KBM-9	0.60~0.68	6.0~6.8	400~480	5.0~6.0	640~800	8.0~10.0	68~72	8.5~9.0	≤150	5.8~6.2	-0.10
	KBM-10	0.68~0.73	6.8~7.3	400~480	5.0~6.0	640~800	8.0~10.0	76~84	9.5~10.5	≤150	5.8~6.2	-0.10
	KBM-12	0.71~0.75	7.1~7.5	440~520	5.5~6.5	720~800	9.0~10.0	84~96	10.5~12.0	≤150	6.0~6.2	-0.10
	KBM-12L	0.72~0.76	7.2~7.6	400~480	5.0~6.0	480~640	6.0~8.0	84~96	10.5~12.0	≤140	6.0~6.2	-0.12

■ 铁铬钴/特殊永磁材料
FeCrCo/Special Permanent Magnet

铁铬钴永磁材料，磁性能相当于中等性能的铝镍钴永磁合金。铁铬钴永磁有其它永磁材料无可比拟的可加工优势，具备优良的机械加工性能，有永磁中的“变型金刚”之称，可以进行车铣、冲压、拉伸、拉丝、拉管等加工，也可以加工成特殊用途的半硬磁材料。铁铬钴永磁居里温度较高(T~680℃)使用温度较高(可达400°C)，可逆温度系数小。特别适宜制作尺寸要求高、形状复杂的细小、微薄的永磁元件。磁体可用于电话机、转速仪、微电机、微型继电器、扬声器等。

公司的铁铬钴产线，包括合金熔炼、锻打、轧制、拉拔、产品加工、热处理等完整的生产工序，可以生产线材、带材等各种型材和复杂形状、高尺寸精度的产品，除常规热处理获得良好的磁性能外，还具备变形时效性获得良好磁性能的技术，可以实现产品热处理多极取向和环形取向等特殊要求，实现特定产品的平面、内圆、外圆多极充磁和辐射充磁。

铁铬钴
FeCrCo

The FeCrCo production line of KEDE, including the complete production process of melting, forging, rolling, drawing, machining, heat treatment and other procedures. We can produce products with various profiles such as wires and strips, and other complex shapes with high dimensional precision. Besides conventional heat treatment, those magnets also show good performance in various shapes after aging treatment, which can meet the special requirements of multipole orientation and radial orientation. We can make the magnetization of plane, inner circle, outer circle multipole magnetization and radiation magnetization.

各向同性
Isotropy

各向异性
Anisotropy

特殊永磁材料
Special Magnets

FeCoNi
铁钴镍

Br: 1300~1500mT
Hcb:2.0~3.2KA/m
(BH)max: 2.5J/m³

FeCow
铁钴钨

Br > 1000mT
Hcb > 16KA/m
(BH)max > 5.6J/m³

铁铬钴/特殊永磁材料
FeCrCo Magnetic/Special Magnets

- 铁铬钴磁体的磁性能（室温）
  Datasheet of FeCrCo at Room Temperature

牌号 Grade	剩磁 Remanence induction		矫顽力 Coercive force		内禀矫顽力 Intrinsic Coercive force		最大磁能积 Maximum Energy product		工作温度 Working Temperature	密度 Density	剩磁温度系数 Temperature Coefficient of Br	内禀矫顽力温度系数 Temperature Coefficient of Hcj	备注 Remark
	B_r		H_{cB}		H_{cJ}		$(BH)_{max}$		Tw	ρ	α（Br）	α（Hcj）	
	T	KGs	KA/m	KOe	KA/m	KOe	KJ/m^3	MGOe	℃	g/cm^3	%/℃	%/℃	
FeCrCo10/3	0.82	8.2	27	0.34	29	0.36	10	1.25	≤400	7.6	-0.03		各向同性 Isotropic
FeCrCo12/4	0.8	8	40	0.5	42	0.53	12	1.5	≤400	7.6	-0.05		
FeCrCo16/2	1.3	13	20	0.25	22	0.275	16	2	≤400	7.6	-0.03		各向异性 Anisotropic
FeCrCo28/5	1	10	45	0.57	46	0.58	28	3.5	≤400	7.6	-0.03		
FeCrCo30/4	1.15	11.5	40	0.5	41	0.51	30	3.8	≤400	7.6	-0.03	-0.04	
FeCrCo35/5	1.05	10.5	50	0.63	51	0.64	35	4.4	≤400	7.6	-0.03		
FeCrCo36/5	1.2	12	52	0.66	54	0.68	36	4.5	≤400	7.8	-0.03		
FeCrCo44/4	1.3	13	44	0.56	45	0.57	44	5.5	≤400	7.7	-0.03		
FeCrCo52/5	1.35	13.5	48	0.6	49	0.62	52	6.5	≤400	7.7	-0.03		

- 特殊永磁体材料的磁性能（室温）
  Datasheet of Special Permanent Magnet at Room Temperature

类别 Item	剩磁 Remanence induction		矫顽力 Coercive force		内禀矫顽力 Intrinsic Coercive force		最大磁能积 Maximum Energy product		工作温度 Working Temperature	密度 Density	剩磁温度系数 Temperature Coefficient of Br	内禀矫顽力温度系数 Temperature Coefficient of Hcj
	B_r		H_{cB}		H_{cJ}		$(BH)_{max}$		Tw	ρ	α（Br）	α（Hcj）
	T	KGs	KA/m	KOe	KA/m	KOe	KJ/m^3	MGOe	℃	g/cm^3	%/K	%/K
FeCoW	1.0	10	16	0.2	17	0.21	5.6	0.7	300	8.2	-0.02	-0.1
CoFeNi	1.3	13	2	0.025	2.5	0.031	2.5	0.3	/	8.1	/	/

软磁材料
Soft Magnet

公司生产的软磁材料和产品有：纯铁、硅钢片、铁镍、铁钴、铁铝等合金；

加工能力：精雕、车铣、冲压、喷涂、叠压、平面磨、内外圆磨；

热处理能力：真空热处理。

Our soft magnetic materials and products include: pure iron, silicon steel sheet, iron nickel, iron cobalt, iron aluminum alloy, etc;

Processing capacity: fine carving,turning milling, stamping,spraying, laminating plane grinding, internal and external round grinding;

Heat treatment capacity: vacuum heat treatment.

Silicon steel Lamination
硅钢片

FeCo alloy
铁钴合金

Fe-based amorphous alloy
铁基非晶合金

FeNi alloy
铁镍合金

软磁材料
Soft Magnet

- 软磁材料磁性能（室温）
  Datasheet of Soft Magnetic Materials at Room Temperature

铁钴钒软磁合金FeCoV Soft Magnetic Alloy

牌号 Grade	半成品种类 Intermediate species	磁感应强度Magnetic induction						矫顽力Coercivity
		B400	B800	B1600	B2400	B4000	B8000	Hc
		T(Min)						A/m(Max)
1J21	冷轧带材 Cold rolled strip	1.85	2.10	2.20	2.23	2.25	2.30	60
1J22	冷轧带材 Cold rolled strip	1.70	2.00	2.10	2.15	2.20	2.25	110
	冷拉丝材 Cold draw wire	1.60	1.70	1.90	2.05	2.15	2.20	140
	热轧扁材 Hot rolled bar							
	热轧(锻)棒材 Hot rolled rod							

铁钴镍钒磁滞合金FeCoNiV Magnetic Hysteresis Alloy

牌号 Grade	最大磁导率点对应的磁场强度/Hμ	最大磁导率点对应的磁通密度/Bμ	比磁滞损耗Pμ	凸起系数Kμ
	(kA/m)	T	(kJ/m^3)	——
2J4	3.98~5.17	1.3~1.6	≥15.0	≥0.62

耐蚀软磁合金Anti-corrosion Soft Magnetic Alloy

牌号 Grade	磁感应强度Magnetic induction					剩余磁感应强度Remanence induction			Um	Hc
	B240	B400	B800	B2400	B3200	Br240	Br2400	Br3200	mH/m(Min)	A/m(Max)
	T(Min)					T(Min)				
1J117	0.9	–	1	–	1.25	–	–	–	–	80
Cr17NiTi	–	0.9	1	1.2	–	–	0.95	–	3.75	80

高导磁软磁合金High Permeability Soft Magnetic Alloy

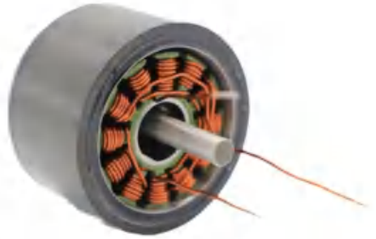
牌号 Grade	半成品种类 Intermediate species	级别 Level	厚度或直径(mm) Thickness/Diameter (mm)	$U_{0.001}$	Um	Hc	Br
				mH/m(Min)		A/m(Max)	T(Max)
S1J81A	冷轧带材 Cold rolled strip	— —	——	50	150	1	0.4
	热轧(锻)棒材 Hot rolled rod	— —	——	40	150	1	0.4

铁基非晶合金Fe-based Amorphous Alloy

牌号 Grade	半成品种类 Intermediate species	级别Level	厚度或直径 Thickness/Diameter	Bs	HC	Uo	Um
			mm	T(typical)	A/m (typical)	mH/m (typical)	mH/m (typical)
1K101	非晶带材 Amorphous strip	—	0.025	1.6	1.55	8.2	948

铁镍软磁合金FeNi soft Magnetic Alloy

牌号 Grade	半成品种类 Intermediate species	级别Level	厚度或直径 Thickness/Diameter	$U_{0.4}$	Um	Hc	Bs
			mm	mH/m(Min)		A/m(Max)	T(Min)
1J50	冷轧带材 Cold rolled strip	I	0.040~0.049	2.2	30.0	25.0	1.5
			0.05~0.09	2.5	38.0	16.0	
			0.10~0.19	2.9	40.0	14.4	
			0.20~0.34	3.5	50.0	11.2	
			0.35~0.50	4.0	62.5	9.6	
			0.51~1.00	3.8	62.5	9.6	
			1.10~2.00	3.6	56.3	9.6	
			2.10~3.00	3.5	56.3	9.6	
		II	0.10~0.19	3.8	43.8	12.0	1.5
			0.20~0.34	4.4	56.3	10.4	
			0.35~0.50	5.0	65.0	8.8	
			0.51~1.00	5.0	55.0	9.0	
			1.10~2.00	4.0	48.0	9.2	
			2.10~3.00	3.8	45.0	9.2	
1J79	冷轧板材 Cold rolled sheet	—	0.5~1.0	31.0	190.0	1.6	0.75
			1.1~2.0	28.0	160.0	1.6	0.75
	热轧(锻)扁材 Hot rolled bar	—	3~30	25.0	125.0	2.4	0.75
	热轧(锻)棒材 Hot rolled rod	—	8~120	25.0	125.0	2.4	0.75
1J79C	冷轧带材 Cold rolled strip	—	—	37.5	125	1.6	0.75
1J85	冷轧带材 Cold rolled strip	I	0.20-0.34	50	225	1.2	0.7
			0.35-1.00	62.5	312.5	0.8	
			1.10-2.50	50	187.5	1.2	
			2.51-3.00	43.8	150	1.4	
	热轧(锻)扁材 Hot rolled bar	—	3~22	37.5	125	1.6	
	热轧(锻)棒材 Hot rolled rod	—	8~100	37.5	125	1.6	
1J85C	冷轧带材 Cold rolled strip	—	—	50	125	1.6	0.68
1J95	冷轧带材 Cold rolled strip	—	—	50	125	1.6	0.55



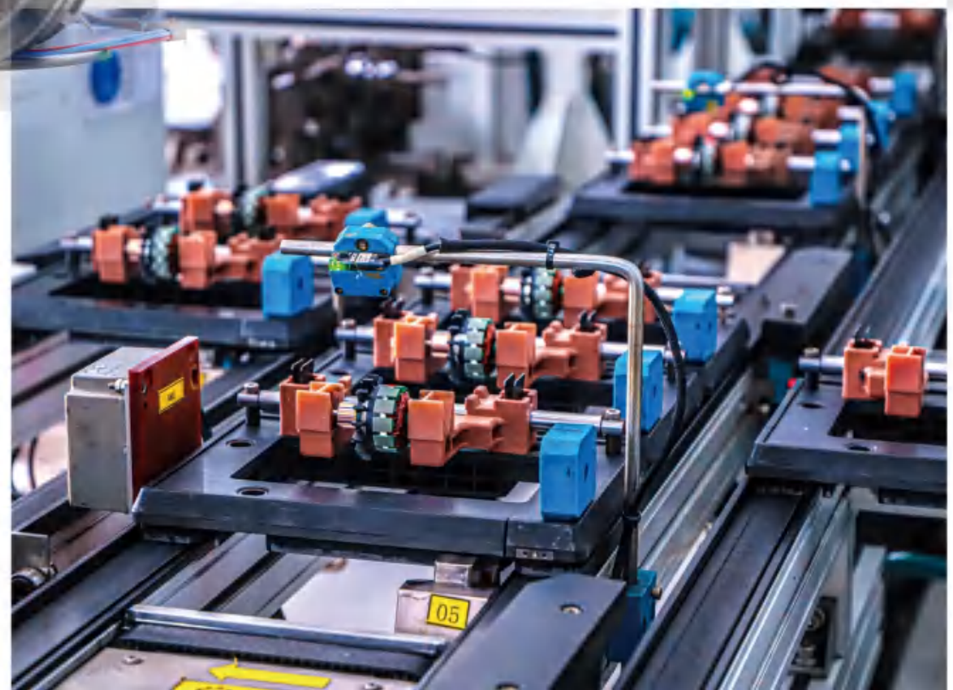
电机
Motors

无刷电机

Brushless Motor

有刷电机转子

Brush Motor Rotor



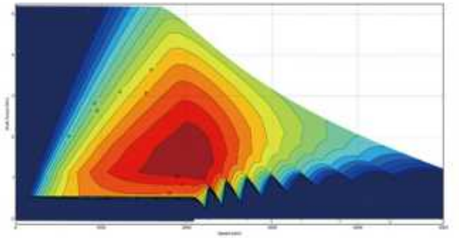
游艇电机

Yacht Motor Rotor

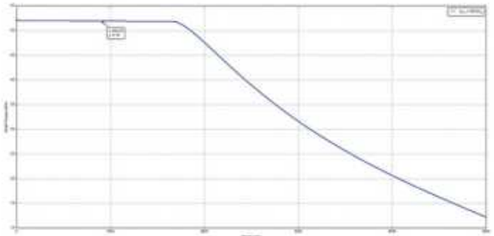
科德磁业从2008年开始生产电机产品，包括电机定子和转子，十几年来积累了丰富的电机相关产品的生产经验，产品种类包含电机定转子、EPS电机、空心杯电机及客户定制电机。目前在中国拥有2条自动化生产线，在越南拥有2条产线并且正在不断新增产线。公司一直以来为客户提供从新产品开发到批量投产的完整产品周期的支持，以高可靠性和稳定的供货保证，成为客户的安全选择。

KEDE has been producing motor products since 2008, including stator and rotor. After developing for dozen years, our motor products includes rotor&stator, EPS motor, Coreless motor and customized motor. We have two automatic production lines in China and two in Vietnam. We keen to provide customers with complete product cycle support from prototyping to serial production by high reliability and stable supply.

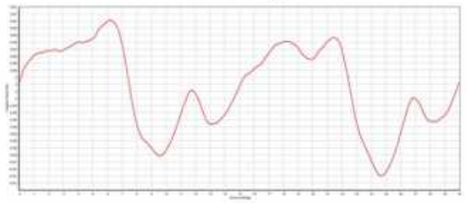
■ EPS电机
EPS Motor



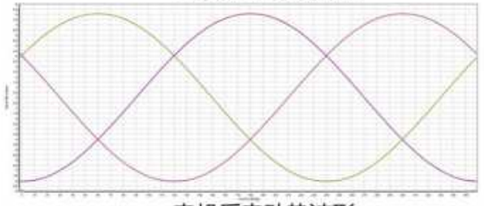
效率
Efficiency



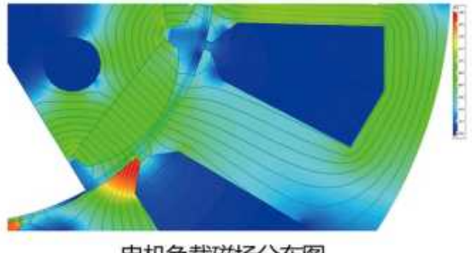
电机TN图
Motor TN diagram



电机超低的齿槽转矩
Ultra-low cogging torque of motor



电机反电动势波形
Motor back electormotive force waveform



电机负载磁场分布图
Motor load magnetic field distribution diagram

■ 空心杯电机
Coreless motor

产品介绍
Product introduction

空心杯电机
高扭矩 - 惯量比定子
高效率、低惯量无铁芯
空心杯电动机重量轻，体积小，能耗低

Coreless motor
High torque-inertia ratio stator
High efficiency, low inertia, no iron core
The Coreless motor is light in weight, small in size and low in energy consumption

性能参数
performance parameter

主尺寸D30*68mm/D26*57mm/D25*54mm
额定电压：12-48V
空载转速：5000-15000RPM
堵转扭力：100mN.m-1000mN.m

Main dimension D30 * 68mm/D26 * 57mm/D25 * 54mm
Rated voltage: 12-48V
No-load speed: 5000-15000RPM
Locked torque: 100mN. m-1000mN. m

特殊工艺
Special process

高效率高强度稀土磁体
自持式高密度封装转子线圈
滑动轴承或滚珠轴承
金属合金电刷换向系统

High efficiency and high strength rare earth magnet
Self-contained high-density packaged rotor coil
Sliding bearing or ball bearing
Metal alloy brush commutation system

应用环境
application environment

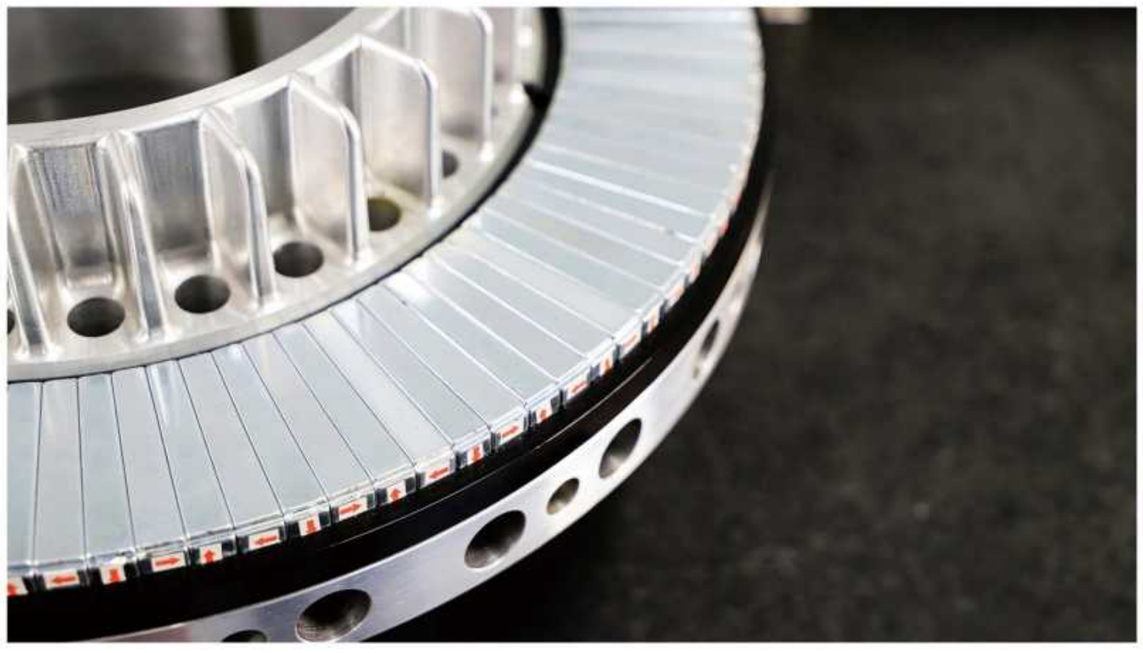
医疗
安防与门禁
机器人和工厂自动化
电动手持工具

Medical care
Aviation and Defense
Robots and factory automation
Power tools

磁性组件
Magnetic Assemblies

公司拥有十多年的磁性器件产品生产经验，可提供公差要求严格和几何形状复杂的磁组件，无论是海尔贝克阵列组件还是其他定制的复杂组件，我们均可从前期的仿真设计开始为客户提供最优质的方案，目前为多家国际知名企业提供全套的磁应用解决方案。公司拥有数名博士组成的研发团队能为客户提供快速精准的磁场仿真，以专业的角度确保设计的最优化。

KEDE has more than ten years of experience in the production of magnetic assembly with strict tolerance and complex geometry requirements . We provide final magnetic application solutions for no matter Halbach array or other complicated customized assembly. We have a R&D team with several doctors who can carry out fast and accurate magnetic simulation analysis to ensure an optimized designing.



旋变器
Resolver

耐高温油/Heat and oil resistant

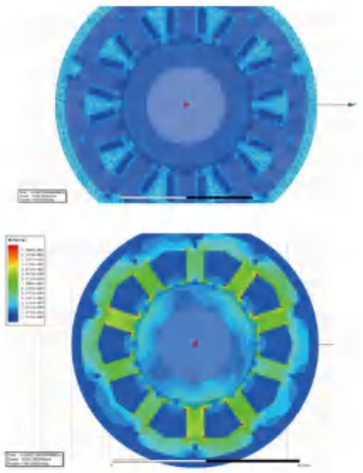
输出稳定/Stable output

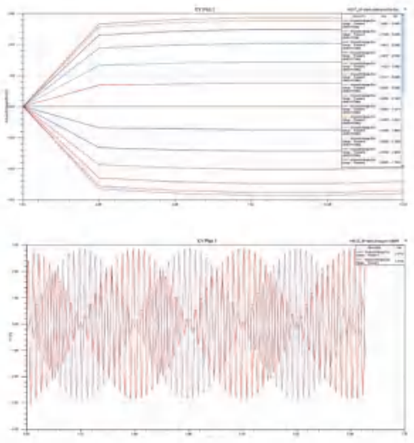
高精准度/High accuracy

抗强干扰/Strong Interfernce

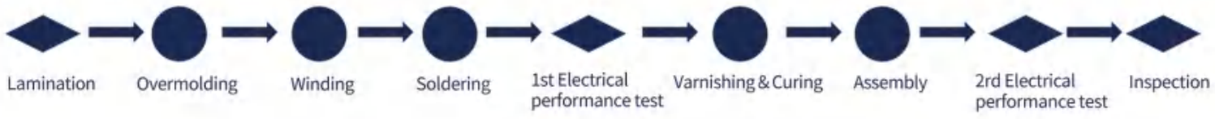
工作可靠/Raliable Working

卓越品质/Excellent Quality





仿真分析Simulation



工艺流程图

旋转变压器（通常简称旋变）是用于测量旋转物体的角度、位置、速度的一种精密检测装置，适用于所有用旋转编码器的场合，特别旋转编码器无法正常工作的场合，例如高温、高寒、潮湿、高速、高震动等恶劣环境。广泛应用在伺服控制系统、机器人系统、电动工具、汽车、航空航天、轨道交通等领域的角度、位置检测系统。

科德的旋转变压器主要分为磁阻式与绕线式两大类型，其外径规格覆盖1cm至1m范围，产品大量应用于新能源汽车中。我们拥有旋变全流程的生产制造能力，包含冲压、包塑、绕线、焊接、浸漆、组装、检测等。为客户提供一站式解决方案。

Resolver is used for testing the mechanical angular displacement and speed of rotating device which can work in tough environment like ultimate temperature and humidity, high vibration etc. It is widely used in servo control system, robot system, power tools, automotive, aerospace, rail transportation and other fields.

KEDE offers two primary types of resolvers : reluctance type and winding type, with sizes ranging from a minimum outer diameter of 1cm to a maximum outer diameter of 1m. KEDE's resolver is widely used in EV industry with many OEM and Tier1. We are capable to conduct all the processes including stamping, overmolding, winding, soldering, painting, assembly, testing etc. We aim to provide a one-stop final solution for our customers.

性能参数/Performance parameter

极对数Pole-pairs	2对极/3对极/4对极/5对极/6对极（Pole Pairs）						
尺寸Size	φ37	φ52	φ66	φ74	φ89	φ101	φ117
输入电压Input Voltage	AC7Vrms 10KHz（可定制can be Customizable）						
变压比Transformation Ratio	0.286~0.5(可定制can be Customizable)						
工作温度Working Temperature	-40℃~+150℃						
电气误差Acuuracy	2X: ±60'	3X: ±45'		4X: ±30'	5X: ±25'	6X: ±20'	
相位移Phase Shift	0°±15°						
输入阻抗Input Impedance	75~150Ω（可定制can be Customizable）						

■ 测量分析
Measurement Analysis

1.理化: ICP、能谱、氧氮氢等
Physicochemical: ICP, energy spectrum, Hydrogen, oxygen and nitrogen analysis etc.

2.结构: 金相组织微观形貌、镀层厚度等
Microstructure :Metallographical study,Coating thickness etc.

3.磁性能: 磁矩、磁感应强度、磁偏角、磁滞回线、磁路模拟等
Magnetic Property : Magnetic Moment, Magnetic field, Angle deviation, BH curve, simulation etc.

4.电性能: 绝缘性、耐压性、电阻等
Electrical Property :insulation and voltage resistance etc.

5.尺寸形位: 同轴度、轮廓度、位置度、跳动等
Dimension tolerance: Concentricity,Profile,position accuracy, Runout etc.

6.力学: 抗压/拉强度、硬度、扭矩、冲击强度等
Mechanics : Compressive/tensile Strength,Hardness,Torque etc.

7.环境:盐雾、高低温冷热冲击、耐酸碱等
Environment : Salt Spray Test, Thermal shock etc.

8.缺陷分析:着色探伤、X-射线探伤、超声波无损探伤、磁粉探伤等
Defect Analysis : Dye Penetrant Inspection，X-ray Detection，Ultrasonic nondestructive testing，Magnetic powder detection etc.

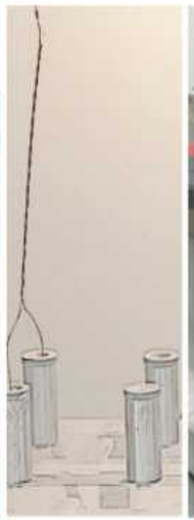
■ 测量分析
Measurement Analysis

镀层检测
Coating Thickness test

三坐标测量
CMM

漆包线电压检测
Voltage Detection of Enamelled Wire

盐雾测试
Salt Spray Test



电力测功
Power Detection

X射线探伤
X-Ray Crack Detection

ICP光谱检测
ICP Spectrum Detection

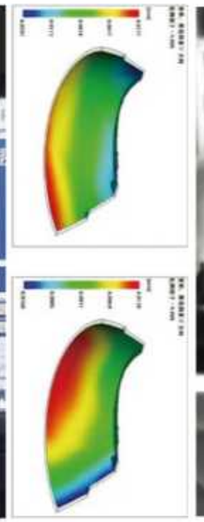
能谱分析
Energy Spectrum Analysis

着色探伤
Dye Detection

CCD自动全检
CCD

高低温试验
High and Low Temperature Test

FEA有限元分析
FEA Review (Finite Element Analysis)



微观形貌
Micro-morphology

专利证书/体系证书
Patent /Qualifications

20 **国家发明专利**
National invention patent

49 **实用新型专利**
Utility model patent

IATF 16949

ISO 14001

ISO 45001

ISO 13485

ISO 9001

AS9100D