

翠鸟系列

新一代无骨架 自动化制造 变压器/互感器

A new generation of skeletonless
automated manufacturing
Transformer, transformer



- 超薄设计、智能自动化生产
Ultra-thin design, intelligent automated production

- 性能稳定、质量可靠
Stable performance and reliable quality

- 高效率、低功耗、低成本
High efficiency, low power consumption, low cost

唐山尚新融大电子产品有限公司

TANGSHAN CREATIVEMIX ELECTRONICS CO.LTD



公司简介

COMPANY INTRODUCTION

唐山尚新融大电子产品有限公司成立于2008年，是一家专注于磁性元器件开发、生产和销售的民营高新技术企业。尚新融大致力于为特种电源电路、智能电网、新能源汽车、轨道交通、云计算AI、石油勘探、5G通信等行业提供磁性元器件系统化解决方案及高可靠性、高品质产品。公司具备金属磁粉心、非晶纳米晶磁芯、平面变压器、电感器、高频电抗器、MIL-STD-1553B总线变压器、网络变压器、平面磁集成滤波器的研制、生产能力。公司通过ISO9001:2015标准质量管理体系认证及GJB9001C-2017武器装备质量管理体系认证等资质。

公司总部位于唐山市滦南县，具备两个自有土地加工基地、两个市级研发中心，拥有满足国军标要求的可靠性实验中心，先进的磁性元器件自动化设备、SMT电装生产线。公司在北京、天津、合肥设有研发中心及客户服务中心，以便于为不同地域的客户就近提供高效、优质服务！



生产环境、设备

PRODUCTION ENVIRONMENT, EQUIPMENT



SMT生产线



生产车间



自动化车间



扁平线圈绕线机



套管机



全自动套管机



多轴绕线机



环形自动绕线机

试验设备

TEST EQUIPMENT



温度冲击箱



稳态湿热箱



盐雾试验箱



高低温老化箱



拉力试验机



机械冲击台



机械振动台



低气压试验箱

翠鸟系列反激变压器与传统反激变压器对比表

Kingfisher series flyback transformer and traditional flyback transformer comparison table

对比项目 Contrast items	翠鸟系列变压器 Kingfisher series transformer	传统系列变压器 Traditional series transformer
图片 Picture		
骨架 bobbin	无 None	有 Yes
产品高度 Product height	7mm	7.2mm
横向尺寸 Horizontal dimension	14mm	20mm
EMI	绕制结构紧凑，分布参数小 抗电磁干扰性强 The winding system has compact structure, small distribution parameters and strong anti-electromagnetic interference	分布参数大， 抗电磁干扰性弱 The distribution parameter is large and the anti-electromagnetic interference is weak
管脚平整度 PIN flatness	无需修整管脚 No need to trim pin	人工修整管脚 Artificial trimming pin
客户后续安装 Customer follow-up installation	顶部平整，更适合SMT自动化 Flat Top for SMT automation	需人工上料 Manual feeding is required
产品一致性 Product consistency	产品一致性高 High product consistency	产品一致性低 High product consistency
自动化 automation	适合全自动化生产 所用人工工时少 Suitable for fully automated production of less manual hours	半自动化生产 所用人工工时多 Semi-automatic production uses more man-hours
成本 Cost	无骨架成本，无需修整管脚 所用人工工时少，成本低 The cost has no skeleton cost, no need to repair the foot manual hours less, the cost is low	有骨架成本，人工修整管脚 所用人工工时多，成本高 Has the skeleton cost, the artificial repair pin uses the artificial labor hour to be many, the cost is high

■ 特点

Characteristics

□超薄设计、重量轻、抗干扰能力强

Ultra-thin design, light weight and strong anti-interference ability

□高效率、低功耗、低成本

High efficiency, low power consumption and low cost

□自身散热效果良好, 不会因为额外的损耗而产生过多的热量

Its own heat dissipation effect is good, will not produce too much heat because of additional loss

□工作温度: $-25^{\circ}\text{C}\sim 125^{\circ}\text{C}$

Working temperature: $-25^{\circ}\text{C}\sim 125^{\circ}\text{C}$



■ 系列产品参数

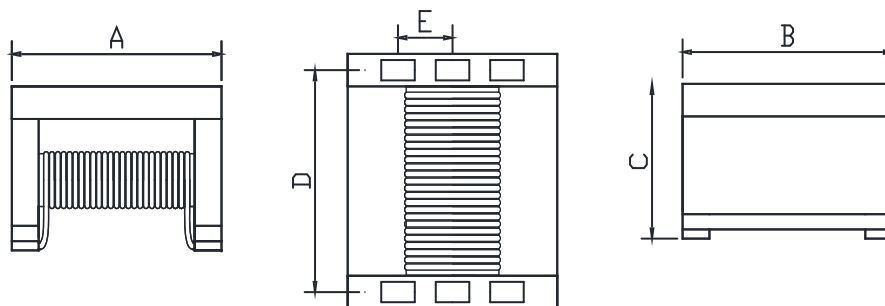
Series product parameters

序号	型号	封装尺寸						电参数			
		A(mm)	B (mm)	C (mm)	D(mm)	E(mm)	封装	工作频率(KHZ)	功率 (W)	匝比 (TS)	初级电感量
1	RDCNG8.1-001	8.1	10.2	7.5	8	2.5	B	100-500	10	5:5:4:2	20 $\mu\text{H}\pm 2\mu\text{H}$
2	RDCNG8.1-002	8.1	10.2	7.5	8	2.5	A	100-500	10	6:08:08	45.8 $\mu\text{H}\pm 2\mu\text{H}$
3	RDCNG11.6-001	11.6	13.3	8.5	10	3.5	B	100-500	10	5:5:11:4	20 $\mu\text{H}\pm 2\mu\text{H}$
4	RDCNG11.6-002	11.6	13.3	8.5	10	3.5	A	100-500	12	6:05:11	4.5 $\mu\text{H}\sim 5\mu\text{H}$
5	RDCNG11.6-003	11.6	13.3	8.5	10	2.5	B	100-500	30	19:20:31:19	100 $\mu\text{H}\pm 5\mu\text{H}$
6	RDCNG11.6-004	11.6	13.3	8.5	10	2	B	100-500	20	20:19:18:29	100 $\pm 5\mu\text{H}$ uH
7	RDCNG12-001	12	15	10	10	4.5	B	100-500	30	241:27:14	2.3 $\pm 3\%$ mH
8	RDCNG12-002	12	15	10	10	4	B	100-500	12	52:20:20	160 $\mu\text{H}\pm 10\mu\text{H}$
9	RDCNG13-001	13	13	12.6	11	4	B	100-500	12	5:9:7:11	10 $\mu\text{H}\pm 0.5\mu\text{H}$
10	RDCNG20-001	20	20	13	17.5	5	B	100-500	12	20:19:18:29	100 $\mu\text{H}\pm 5\mu\text{H}$
11	RDCNG19.5-001	19	19.5	12.5	17	4.5	B	100-500	10	37:15:15:15	840 $\pm 10\%$ uH
12	RDCNG25-001	25	25	16	22	6.5	B	100-500	10	37:22:22:28	600 $\pm 10\%$ uH

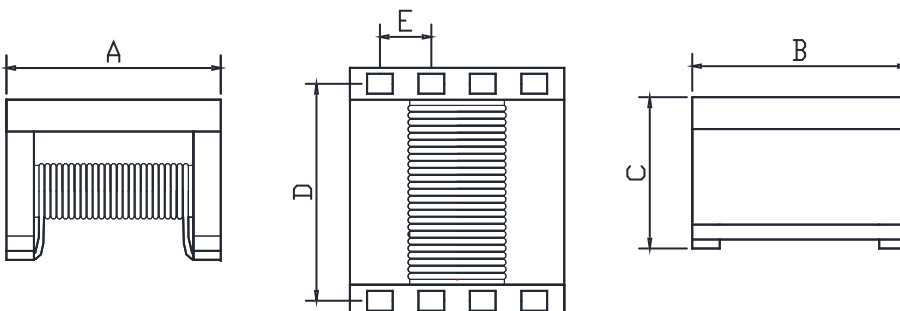
■ 封装图

Package drawing

产品封装A



产品封装B



■ 产品特性

Product characteristics

(1) 电流密度高 High current density

变压器有极好的温升特性设计。因为这些特性，所以它能在很小的封装体积内达到很高的电流密度，由于它的结构特点，完全满足高频电流的工作特性，所以适合在高频率的场合使用。

The transformer has an excellent temperature rise characteristic design. Because of these characteristics, it can achieve a very high current density in a very small packaging volume. Due to its structural characteristics, it fully meets the working characteristics of high frequency current, so it is suitable for use in high frequency occasions.

(2) 高效率 High efficiency

低漏电感，使它能具有很快的开关时间，很低的交叉损耗，就能使它达到很高的效率。这种变压器副边绕组和原边绕组间因为接触非常紧密，就具有很高的耦合系数，所以它的效率高、损耗很小。

Low leakage sense, so that it can have a very fast switching time, very low cross loss, it can make it to achieve a very high efficiency. The contact between the transformer secondary side winding and the original side winding is very close, so it has a very high coupling coefficient, so it has high efficiency and very small loss.

(3) 功率密度高 High power density

因为变压器元件的尺寸很小，它具有极好的温度耗散特性，所以能和有关半导体器件和电感紧密地封装在一起，实现的电流密度可做到 $30\text{A}/\text{mm}^2$

Because of the small size of the transformer element, it has excellent temperature dissipation characteristics, so it can be closely packaged together with the relevant semiconductor devices and inductors, and the realized current density can achieve $30\text{A}/\text{mm}^2$.

(4) 热耗散特性好 Good heat dissipation characteristics

变压器是具有很高的表体面积比、很短的热通道的元器件。这种结构有利于散热。原边和副边绕组之间的匝间损耗很小，磁芯的功率损耗较小，所以它能做到高磁通密度。它可在 $-55^{\circ}\text{C} \sim 125^{\circ}\text{C}$ 之间工作。

Transformer is a component with a very high surface area ratio and a very short thermal channel. This structure is favorable for the heat dissipation. The inter-turn loss between the original side and the secondary side winding is very small, and the power loss of the magnetic core is relatively small, so it can achieve high magnetic flux density. It works between -55°C and 125°C .

(5) 漏感小 The leakage inductance is low

绕组和绕组之间的良好耦合，就能使绕组匝间的漏电感保持在最小值。输出端到辅助部件的连线很短而且是紧配合，所以绕组上的漏电感最小。漏电感小意味着变压器的EMI指标更好，对开关功率器件的损害最小。

The good coupling between the winding and the winding can keep the leakage sense between the winding turns at a minimum value. The connection between the output to the auxiliary parts is short and tight, so the leakage sense on the winding is minimal. Small leakage sense means that the transformer EMI index is better, and the damage to the switching power devices is minimal.

(6) 结构简单适宜表贴 Simple structure is suitable for table stickers

变压器是由少量部件和最少的绕组构成的，这种模块在自动化装配中特别适用，而且它的外形天生就注定它适合表面贴装及大规模的流水线生产。

The transformer is made up of a small number of components and the least windings. This module is particularly suitable in automatic assembly, and its shape is naturally destined to be suitable for surface mounting and large-scale pipeline production.

（7）外形低宜于整机小型化 The appearance should be low for the whole machine miniaturization

产品呈平板状、体积小、厚度小,符合电源的模块化发展趋势,每一磁芯单元外形在 8mm ~ 32mm 范围内,这就使得它具有了很多独有的优点。

The product is flat-shaped, small in size and small in thickness, which is in line with the modular development trend of power supply. The shape of each magnetic core unit is within the range of 8mm ~ 32mm, which makes it has many unique advantages.

针对客户不同需求进行配套研制,主要产品有二次通信电源DC-DC 50W、100W、150W、200W、等产品,开关频率一般为200kHz-300kHz, 500kHz产品也已经开始应用, 1MHz工作频率产品正在开发, 系列已经较全。

According to the different needs of customers, the main products are secondary communication power DC-DC 50W, 100W, 150W, 200W, and other products, the switch frequency is generally 200 kHz-300 kHz, 500 kHz products have also begun to apply, 1 MHz working frequency products are under development, the series has been relatively complete.

翠鸟驱动变压器系列与传统驱动变压器对比表

Comparison table of kingfisher drive transformer series and traditional drive transformer

对比项目Contrast items	翠鸟系列变压器 Kingfisher series transformer	传统系列变压器 Traditional series transformer
Picture		
骨架 bobbin	无 None	有 Yes
产品高度 Product height	13mm	13.5mm
横向尺寸 Horizontal dimension	20mm	30mm
EMI	绕制结构紧凑，分布参数小 抗电磁干扰性强 The winding system has compact structure, small distribution parameters and strong anti-electromagnetic interference	分布参数大， 抗电磁干扰性弱 The distribution parameter is large and the anti-electromagnetic interference is weak
管脚平整度 PIN flatness	无需修整管脚 No need to trim pin	人工修整管脚 Artificial trimming pin
客户后续安装 Customer follow-up installation	顶部平整，更适合SMT自动化 Flat Top for SMT automation	需人工上料 Manual feeding is required
产品一致性 Product consistency	产品一致性高 High product consistency	产品一致性低 High product consistency
自动化 automation	适合全自动化生产 所用人工工时少 Suitable for fully automated production of less manual hours	半自动化生产 所用人工工时多 Semi-automatic production uses more man-hours
成本 Cost	无骨架成本，无需修整管脚 所用人工工时少，成本低 The cost has no skeleton cost, no need to repair the foot manual hours less, the cost is low	有骨架成本，人工修整管脚 所用人工工时多，成本高 Has the skeleton cost, the artificial repair pin uses the artificial labor hour to be many, the cost is high

■ 特点

Characteristics

□产品小巧、精致、高效、智能

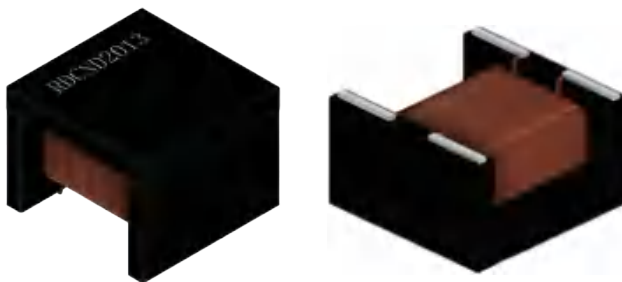
Products are small, delicate, efficient and intelligent

□噪声低、稳定性高

Low noise, high stability

□系统性能优化

Optimize system performance



■ 系列产品参数

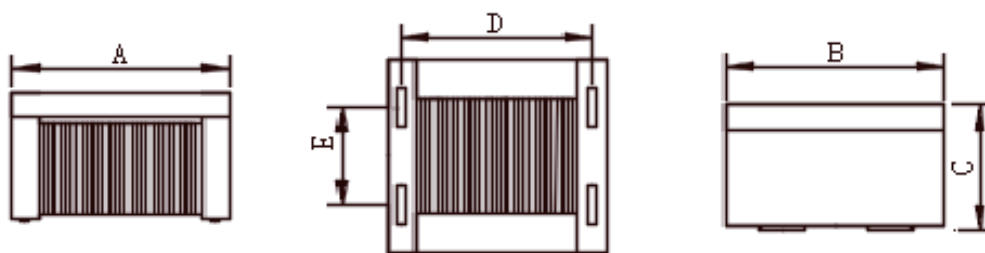
Series product parameters

序号	型号	封装尺寸						电参数			
		A(mm)	B (mm)	C (mm)	D(mm)	E(mm)	封装	工作频率(KHz)	匝比 (TS)	电感量	介质耐压
1	RDCND6505	6.5	5.5	5	5	1.5	A	400	27:27	180uH min	绕组间, 绕组与磁材 DC2KV,5mA 5Sec
2	RDCND8507	8.5	10	7	7	5	A	100-400	44:44	1.42mH min	
3	RDCND8507-1	8.5	10	7	7	2.5	B	200-400	28:28:28	585uH min	
4	RDCND13509	13.5	13	9	11	4	B	200-400	20:20:20	330uH min	
5	RDCND13125	13	13	12.5	11.5	3	A	300-400	25:25	510uH min	
6	RDCND13125-1	13	13	12.5	11.5	5	B	400	18:18:18	270uH min	
7	RDCND1385	13	15	8.5	11	8	A	100-400	35:35	1.12mH min	
8	RDCND1385-1	13	15	8.5	11	5	B	200-400	23:23:23	470uH min	
9	RDCND2013	20	20	13	18	9	A	100-400	42:42	1.87mH min	
10	RDCND2013-1	20	20	13	18	6	B	200-400	26:26:26	670uH min	

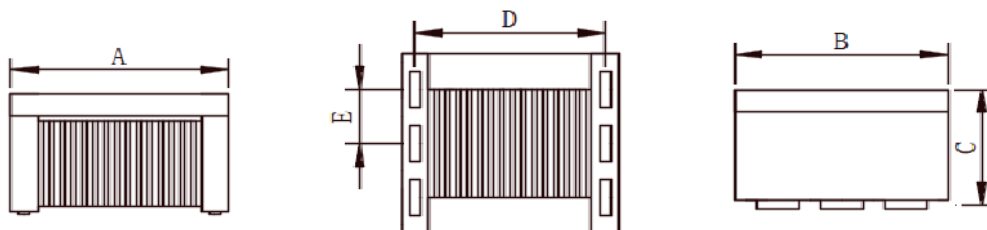
■ 封装图

Package drawing

产品封装A



产品封装B



■ 产品特性

Product characteristics

一、驱动变压器的基本概念和应用场景

Basic concepts and application scenarios of the drive transformer

驱动变压器是一种常用于电力电子转换器中的电子元器件，用于隔离、升降压和普通变压器相同的功能，同时还具有能够承受高频脉冲的特点。驱动变压器主要应用于开关电源、DC/AC逆变器、磁化逆变器、电池充电器等电源设备中。

Drive transformer is a kind of electronic components commonly used in power electronic converter, which is used for isolation, lifting and lowering of the same function as ordinary transformer, but also can withstand high frequency pulse characteristics. Drive transformer is mainly used in switching power supply, DC / AC inverter, magnetized inverter, battery charger and other power supply equipment.

二、驱动变压器的设计要点和流程

Design points and process of drive transformer

1. 确定驱动变压器的额定电压

Determine the rated voltage of the drive transformer

驱动变压器的额定电压是参考转换器中MOS管的最大电源电压和保证输出电流正常工作的最小开关周期计算得到的。通常，驱动变压器的额定电压要比MOS管的电源电压略高一些，这可以保证驱动电路的工作稳定性。

The rated voltage of the drive transformer is calculated with reference to the maximum power supply voltage of the MOS tube in the converter and the minimum switching cycle guaranteeing the normal operation of the output current. Generally, the rated voltage of the drive transformer is slightly higher than the power supply voltage of the MOS tube, which ensures the working stability of the drive circuit.

2. 计算驱动变压器的变比

Calculate the transformer ratio of the drive transformer

在确定驱动变压器的变比时，需要考虑转换器中MOS管的开关频率和电路负载的变化范围。一般而言，驱动变压器的变比应该设为MOS管和输出端之间的最大电压之比。

When determining the variable ratio of the drive transformer, the switching frequency of the MOS tube and the variation range of the circuit load. Generally speaking, the transformer ratio of the drive transformer should be set as the maximum voltage ratio between the MOS tube and the output end.

3. 设计驱动变压器的尺寸和磁芯材料

Design the size and magnetic core material of the drive transformer

驱动变压器的尺寸和磁芯材料的选择根据其输出功率和电路的频率范围而定。通常，高频驱动变压器的磁芯材料要选择高导磁性和高品质的磁材料，以保证输出功率和电路的稳定性。

The size of the drive transformer and the selection of the core material are based on their output power and the frequency range of the circuit. Usually, the magnetic core material of high frequency drive transformer should choose high magnetic conductivity and high quality magnetic material to ensure the output power and circuit stability.

三、驱动变压器的作用

The role of the drive transformer

驱动变压器是一种特殊的变压器，它的主要作用是将较大的电流转化成较小的电流，在通信、自动化、电力控制系统等领域中得到广泛应用。驱动变压器可以将输入信号转换成输出信号，它对信号进行隔离，并可以通过信号负载的变化来实现一些特殊控制。

Drive transformer is a special transformer, its main function is to convert a large current into a small current, which is widely used in communication, automation, power control system and other fields. The drive transformer can convert the input signal into the output signal, which isolates the signal and can realize some special control through the change of signal load.

四、驱动变压器的应用场景 Application scenarios of the drive transformer

1. 电力系统

Electric Power system

驱动变压器是电力系统中的重要部件之一，它常被用于输电线路和变电站的保护与控制。例如，在超高压输电线路路上，保护系统需要对线路上的故障进行监测，在这个过程中需要使用驱动变压器来进行信号的传递和转换，从而实现对故障的检测和定位。

Drive transformer is one of the important components in the power system, which is often used in the protection and control of transmission lines and substations. For example, on the ultra-high voltage transmission line, the protection system needs to monitor the faults on the line, and in this process, the drive transformer is used to conduct signal transmission and conversion, so as to realize the detection and positioning of the faults.

2. 工业自动化领域

Industrial automation field

在工业自动化控制系统中，驱动变压器同样扮演着重要的角色。例如，在PLC控制系统中，驱动变压器一般被用来将输入信号转换成PLC能够读取的信号，同时还可以将PLC的输出信号进行放大，以实现对一些重要设备的精确控制。

In the industrial automation control system, the drive transformer also plays an important role. For example, in a PLC control system, the drive transformer is generally used to convert the input signal into a signal that the PLC can read, while the PLC output signal can also be amplified to achieve precise control of some important equipment.

3. 通信系统

Communication system

在通信系统中，驱动变压器可以用来隔离输入和输出信号，防止噪声和干扰影响通信质量。它可以把低电平信号转化成高电平信号，从而提高信号质量和传输效率。

In a communication system, drive transformers can be used to isolate input and output signals to prevent noise and interference from affecting the communication quality. It can convert the low level signal into the high level signal, thus improving the signal quality and transmission efficiency.

综上所述，驱动变压器在现代工业中得到广泛应用，它的功能和应用场景非常多样化，在电力、工业自动化和通信系统等领域都具有非常重要的作用。

To sum up, the drive transformer has been widely used in modern industry, and its functions and application scenarios are very diversified, and it plays a very important role in the fields of electric power, industrial automation and communication systems.

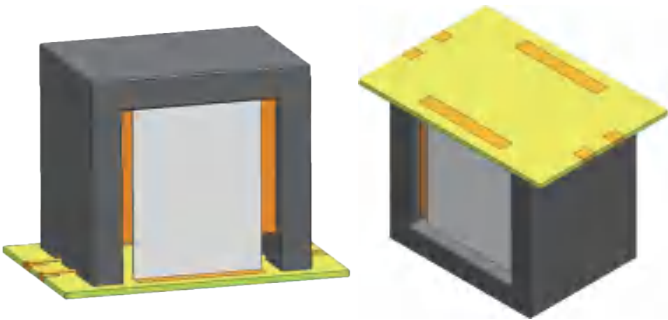
翠鸟系列电流互感器与传统电流互感器对比表

Comparison table of traditional and kingfisher

对比项目 Contrast items	翠鸟系列电流互感器 Kingfisher current transformer	传统系列电流互感器 Traditional current transformer
图片 Picture		
骨架 bobbin	无 None	有 Yes
产品高度 Product height	4.8mm	5mm
横向尺寸 Horizontal dimension	5.1mm	6.5mm
EMI	绕制结构紧凑，分布参数小 抗电磁干扰性强 The winding system has compact structure, small distribution parameters and strong anti-electromagnetic interference	分布参数大， 抗电磁干扰性弱 The distribution parameter is large and the anti-electromagnetic interference is weak
管脚平整度 PIN flatness	无需修整管脚 No need to trim pin	人工修整管脚 Artificial trimming pin
客户后续安装 Customer follow-up installation	顶部平整，更适合SMT自动化 Flat Top for SMT automation	需人工上料 Manual feeding is required
产品一致性 Product consistency	产品一致性高 High product consistency	产品一致性低 High product consistency
自动化 automation	适合全自动化生产 所用人工工时少 Suitable for fully automated production of less manual hours	半自动化生产 所用人工工时多 Semi-automatic production uses more man-hours
成本 Cost	无骨架成本，无需修整管脚 所用人工工时少，成本低 The cost has no skeleton cost, no need to repair the foot manual hours less, the cost is low	有骨架成本，人工修整管脚 所用人工工时多，成本高 Has the skeleton cost, the artificial repair pin uses the artificial labor hour to be many, the cost is high

特点
Characteristics

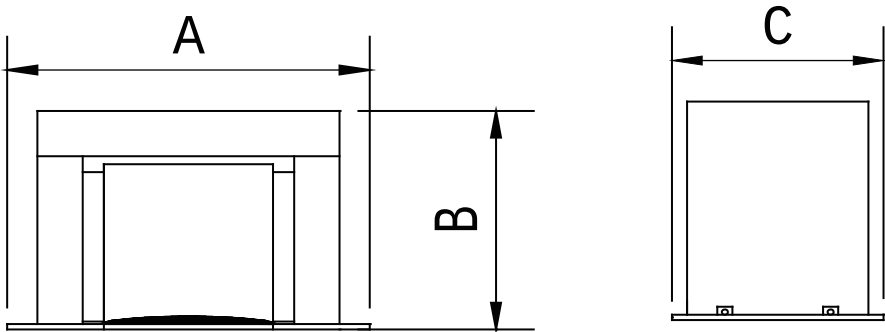
- 智能化、自动化批量生产
Intelligent, automated mass production
- 轻量化、小体积、高效率
Lightweight, small size, high efficiency
- 性能稳定、质量可靠
Stable performance and reliable quality



系列产品参数
Series product parameters

序号	型号	封装尺寸 (mm)			电参数		介质耐压
		A(mm)	B (mm)	C (mm)	匝比	电流 (A)	
1	RDCNW4.4-20/1/20	7.5	5.1	4.8	1:20	20	绕组间, 绕组与磁材 DC1KV,1mA 10Sec
2	RDCNW4.4-20/1/30	7.5	5.1	4.8	1:30	20	
3	RDCNW4.4-20/1/40	7.5	5.1	4.8	1:40	20	
4	RDCNW4.4-20/1/50	7.5	5.1	4.8	1:50	20	
5	RDCNW4.4-20/1/60	7.5	5.1	4.8	1:60	20	
6	RDCNW4.4-20/1/70	7.5	5.1	4.8	1:70	20	
7	RDCNW7.2-10/1/100	10.5	7	8.2	1:100	10	
8	RDCNW7.2-20/1/150	10.5	7	8.2	1:150	20	
9	RDCNW7.2-20/1/180	10.5	7	8.2	1:180	20	
10	RDCNW7.2-20/1/200	10.5	7	8.2	1:200	20	
11	RDCNW7.2-20/1/300	10.5	7	8.2	1:300	20	
12	RDCNW14.2-50/1/100	18.5	13.3	12.5	1:100	50	
13	RDCNW14.2-40/1/500	18.5	13.3	12.5	1:500	40	
14	RDCNW14.2-40/1/600	18.5	13.3	12.5	1:600	40	
15	RDCNW14.2-40/1/800	18.5	13.3	12.5	1:800	40	

封装图
Package drawing



■ 产品特性

Product characteristics

一、电流互感器的概念以及应用领域

The concept and application field of the current transformer

1. 概念： 电流互感器是一种电流变换装置，主要用于将大电流转换成小电流，以便于测量和监测。

Concept: The current transformer is a current conversion device, mainly used to convert large current into small current to facilitate measurement and monitoring.

2. 应用领域： 电流互感器的应用领域包括电力系统、工业生产、精密电子仪器测试。

Application areas: Application areas of current transformers include power system, industrial production, and precision electronic instrument testing.

2. 1在电力系统中，电流互感器用于测量高电压和大电流，以及监测电网的稳定性。它们通常安装在变电站和配电室中，将大电流转换为低电流，以便于测量和监测。此外，电流互感器还可以用于检测电流泄漏和地线故障，从而避免电力系统中的安全事故。

In power systems, current transformers are used to measure high voltage and large currents, as well as to monitor the stability of the grid. They are usually installed in substations and distribution rooms to convert high current to low current for easy measurement and monitoring. In addition, the current transformer can also be used to detect current leakage and ground wire faults, so as to avoid safety accidents in the power system.

2. 2在工业生产中，电流互感器可以用于测量电动机、变压器和电子设备等的电流。通过监测电流，可以实现对相关设备的负载和功率的监测，从而实现对设备的运行状态进行监测和控制，以及保护等。

In industrial production, current transformers can be used to measure the current of electric motors, transformers, and electronic equipment, etc. By monitoring the current, the load and power of the relevant equipment can be monitored, so as to realize the monitoring and control of the operating state of the equipment, and protection.

2. 3在精密电子仪器的测试中，电流互感器可以用于检测和测量微弱的电流信号。通过使用电流互感器，可以实现对电流信号的高精度从而保证测试结果的准确性。

In the testing of precision electronic instruments, current transformers can be used to detect and measure weak current signals. By using the current transformer, the high accuracy of the current signal can be realized to ensure the accuracy of the test results.

二、翠鸟无骨架电流互感器的设计理念

Design concept of no-skeleton current transformer

1. 为客户争取更大的使用空间，产品同等电压、电流的环境下减小互感器体积。

For customers to use more space, the same voltage, current environment to reduce the volume of the transformer.

2. 可以根据客户板子空间需求进行私人定制减少了骨架的开模费用。

It can be customized according to the customer's board space needs to reduce the cost of the skeleton.

3. 磁芯采用菱角倒钝和表面喷涂工艺保证客户的耐压需求。

The magnetic core adopts water chestnut and surface spraying process to ensure the customer's pressure demand.

4. 自动化可操作性强、生产效率高降低产品成本。

Automation is strong operability, high production efficiency to reduce product costs.

5. 本产品底板焊盘采用的是金属包边工艺，有利于焊接时爬锡保障了产品的焊接牢固性。

The bottom plate welding pad of this product adopts the metal wrapping process, which is conducive to the welding tin climbing to ensure the welding firmness of the product.



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