

干式牵引整流变压器 24脉波

ZQSC series dry-type 24 pulse traction rectifier transformer



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产品介绍及特点 Product Feature and Characteristics

ZQSC 系列干式牵引整流变压器（24 脉波）是在引进国际先进变压器设计技术及制作工艺的基础上，研发的新一代节能型特种变压器。该变压器主要用于轨道交通机车供电系统，我公司产品已在上海地铁 1 号线、2 号线、10 号线、11 号线、13 号线等供电系统中投入运行。

铁心采用先进的全斜四阶梯步进叠积结构，大大地改善了接缝处的磁通分布，有效地降低了空载损耗、空载电流及噪声。

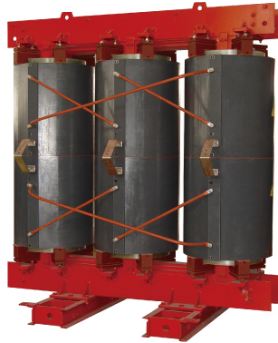
绕组采用先进的“气道棒”技术，按设计需要在绕组的发热中心设置一层或多层轴向气道，使整机的散热达到最佳效果，并在气道中生成多根支撑筋，有效的增强了绕组的机械强度。

高低压绕组为薄绝缘、少填料全浇注型，防潮能力极强，为立即上电型变压器。产品浇注采用最新一代德国 HEDRICH 真空浇注设备。具有真空薄膜脱气、计量泵、静态混料等先进技术，保证环氧混合料的配比精度和浇注质量。绕组的局部放电量小于 10PC。

高压绕组的延边绕组与主绕组段均设分接接头，可确保调节电压时移相角度不变。

产品在设计 and 制造工艺上确保变压器技术参数上和结构上的对称性，消除了非特征谐波电流，有效改善了牵引整流站网侧高次谐波对电网的影响。同时保证了阀侧输出电压和换向阻抗的平衡度，使变压器的阀侧绕组负荷尽可能平衡，从而充分并联运行，整流输出波形平滑。

变压器的负载标准工作制为 VI 级（100% 额定负荷连续运行，150% 额定负荷 2 小时，300% 额定负荷 1 分钟），高低压绕组温升 <70K（耐热等级 F）或 85K（耐热等级 H），满足轨道交通负载变化频繁、变化幅度大及负载陡变的特点要求。



The ZQSC series dry-type 24 pulse traction rectifier transformer is a kind of newly-developed generation of dry-type special transformer which is produced with introduced advanced international technology and manufacturing procedures. The products are mainly used for subway and traction traffic power supply system. Our products have been applied to Shanghai Metro Line 1, Line 2, Line 10, Line 11, Line 13 power supply system.

With the oblique four-ladder stepping piling structure, the iron core improves efficiently the flux distribution at the seam; reduces the no-load loss, empty current and noise.

Introducing the advanced "gas channel stick" technology, the product is free from the limitation of winding radius of curvature. According to the design requirement, one layer or multilayer of gas channels are required to be installed in the heating center, so that the heat loss can be optimized, in the meantime, the brace rods formed in the gas channel effectively reinforces the mechanical strength of the winding.

The high and low voltage windings are of thinly insulated fully cast type, they are damp proof, belong to step-up transformer. The product casting equipment is Germany HEDRICH vacuum casting equipment with advanced technology such as vacuum film degassing, metering pump, static materials mixing. The mixing accuracy and casting quality of epoxy materials can be ensured. And the discharge of local of the winding is less than 10PC.

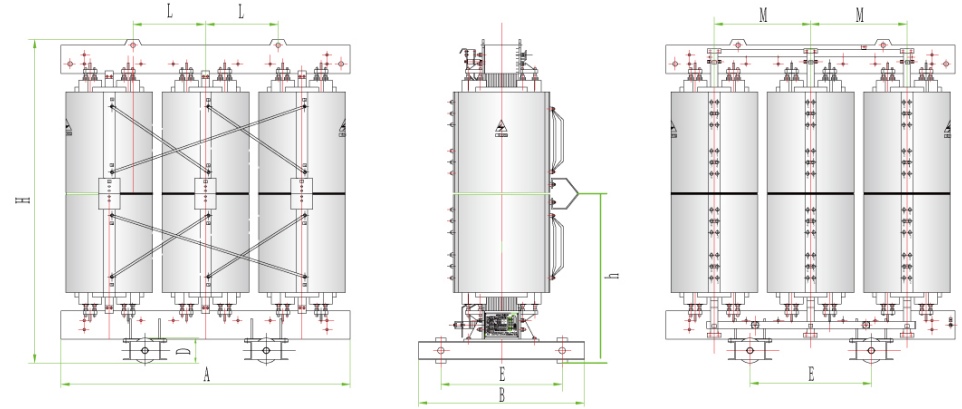
Taps are designed on the windings of the extended delta as well as on the main sections of the HV windings to ensure unchanged phase angle on different voltage tapings.

Design and technology of the transformer guarantee the symmetry of technical performance and structure which eliminates the featureless harmonic current and improves the effects of high frequency harmonic within traction net side to the power net. Balance of output voltage and phase change impedance on valve-side is ensured. Thus windings on valve-side work in parallel with load as equal as possible and rectified waveform appears smooth.

Standard of transformer load duration is VI class (100% rated load for continuity, 150% rated load for 2h, 300% rated load for 1 min). Temperature rise of HV and LV windings is less than 70°C (temp. class of insulation F) or 80°C (temp. class of insulation H). The property conforms to the frequent, steep and great variation of the load on traction traffic.

ZQSC系列(35kV)牵引整流变压器(24脉波)性能参数及外形尺寸

Technical Characteristics and Overall Dimensions of ZQSC series (35kV) dry-type 24 pulse traction rectifier transformer



高压(kV):35.33

低压(kV):1.2,1.22

联接组标号:Dy5d0或Dy7d2

绝缘水平:LI170AC70/LI20AC10

HV(kV): 35,33

LV(kV): 1.2,1.22

Connection Symbol: Dy5d0 or Dy7d2

Insulation Level: LI170AC70/LI20AC10

型号 TYPE	P0 W	PK (75°C) W	I0 %	UK %	Lpa AN dB	外形尺寸 Overall Dimension (mm)								重量 Weight (kg)
						A	B	H	E	M	D	L	h	
ZQSC9-1600/35	3800	11000	0.7	8	55	2400	1460	2510	1070	800	220	600	1320	7600
ZQSC9-2200/35	4700	12000	0.7	8	55	2460	1460	2580	1070	820	220	620	1360	9000
ZQSC9-3300/35	6500	15000	0.6	8	56	2580	1460	2780	1070	860	220	650	1460	11500
ZQSC9-4000/35	7400	17000	0.5	8	57	2730	1460	2810	1070	910	220	680	1490	13100
ZQSC9-4400/35	8000	19000	0.5	8	58	2760	1460	2910	1070	920	220	690	1540	14800

引用标准: GB1094.1~2; GB1094.3, 5; GB1094.11; GB/T3859.1~3; GB/T10228; GB10411;

GB/T17211; GB/T18494; IEC146; IEC905

表中列负载损耗为75℃参考温度时的值，120℃参考温度时的值比表中数据增加14.5%。

表中所提尺寸仅供参考，实际安装尺寸按订货时提供的总装外形图。

根据客户要求我们还可以设计各种电车整流变及变频调速整流变等。

如客户须进一步了解牵引整流变压器的原理、结构特点、运行等，请参考本公司历年来发表在《变压器》杂志上的系列论文。

Application standards: GB1094.1~2; GB1094.3,5; GB1094.11; GB/T3859.1~3; GB/T10228; GB10411;

GB/T17211; GB/T18494; IEC146; IEC905.

Compared with the value in this table (75°C), the on-load loss in 120°C will be increased 14.5%.

The dimensions in the table are only for reference, and the actual mounting dimensions are according to the final assembly drawings supplied in the bargain.

In compliance with customers, we can design various kinds of rectifier transformers such as for tram and speed regulation with frequency conversion, etc.

If the customer needs further information of the rectification traction transformers such as the principle, the unique feature, operations and so on, please refer to series theses of the company published on magazine "Transformer" these years.