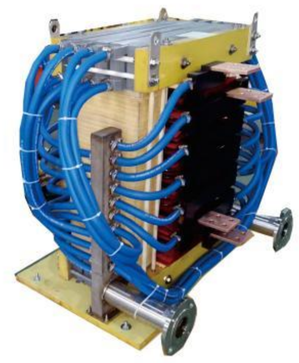
中频淬火水冷变压器

Water-cooled Transformer for Medium Frequency Quenching

■ 产品概述(Product Introduction)



中频淬火炉是一种工频50Hz交流电转变为中频（300Hz以上至8000Hz）的装置，经过中频水冷变压器降低电压，升高电流，在感应圈中产生高密度的磁力线，并切割感应圈里盛放的金属材料，在金属材料中产生很大的涡流，产生高热，完成工件淬火工艺。中频淬火炉广泛用于：

1.有色金属和黑色金属的熔炼：熔炼钢、合金钢、特种钢、铸铁等黑色金属材料以及不锈钢、锌等有色金属材料；铜、铝等有色金属的熔炼和升温，保温，并能和高炉进行双联运行。

2.锻造加热：用于棒料、圆钢，方钢，钢板的透热，补温，兰淬下料在线加热，局部加热，金属材料在线锻造（如齿轮、半轴连杆、轴承等精锻）、挤压、热轧、剪切前的加热、喷涂加热、热装配以及金属材料整体的调质、退火、回火等。

3.热处理调质生产线：主要供轴类；齿轮类；套、圈、盘类；机床丝杠；导轨；平面；球头；五金工具等多种机械（汽车、摩托车）零件的表面热处理及金属材料整体的调质、退火、回火等。

4.淬火变压器作为可控硅中频电源与感应加热负载电路的阻抗匹配装置，可应用于金属材料的透热、淬火、等各种场合。与其他铸造设备相比较,中频淬火炉具有热效率高、熔炼时间短、合金元素烧损少、熔炼材质广、对环境污染小、能精确控制金属液的温度和成分等优点。

5.我公司最新研发生产的该类变压器，工作频率2500Hz,采用23JGH90材质硅钢片，考虑铁芯中频发热，铁芯内置铁芯水冷换热器，考虑用户现场阻抗匹配，设计具有匝比调节灵活、结构紧凑合理的特点。采用双匝并绕，原边串联实现8-12匝可调，副边并联，实现大电流输出，原副边交错布置，整体漏感小，使用方便。

The medium frequency quenching furnace is a device that converts the industrial frequency AC 50Hz into an medium frequency (above 300Hz to 8000Hz). It reduces the voltage and increases the current through the medium frequency water-cooled transformer to generate high-density magnetic lines in the induction coil and cut the metal material in the induction coil. The metal material produces a large eddy current, generates high heat, and completes the quenching process of the workpiece. Medium frequency quenching furnace is widely used for:

1.Smelting of non-ferrous metals and ferrous metals: smelting of steel, alloy steel, special steel, cast iron and other ferrous metal materials, as well as stainless steel, zinc and other non-ferrous metal materials; smelting and heating and insulation of non-ferrous metals such as copper and aluminum, and can be combined with blast furnaces Perform tandem operation.

2.Forging heating: used for heat penetration and temperature replenishment of bars, round steel, square steel, steel plates, online heating of blue quenching blanks, local heating, and online forging of metal materials (such as gears, half-shaft connecting rods, bearings, etc.), extrusion, hot rolling, heating before shearing, spray heating, hot assembly, and overall quenching and tempering, annealing, and tempering of metal materials.

3.Heat treatment and tempering production line: mainly provides surface heat treatment of shafts, gears, sleeves, rings, discs, machine tool screws, guide rails, planes, ball heads, hardware tools and other mechanical (automobile, motorcycle) parts, and overall quenching and tempering, annealing, tempering of metal materials.

4.The quenching transformer is used as an impedance matching device for the thyristor medium frequency power supply and the induction heating load circuit. It can be used for heat penetration, quenching, etc. of metal materials on various occasions. Compared with other casting equipment, the medium frequency quenching furnace has high thermal efficiency, short melting time, less burning loss of alloy elements, a wide range of melting materials, less pollution and the ability to accurately control the temperature and composition of molten metal.

5.Our company's latest transformer of this type has an operating frequency of 2500Hz and uses 23JGH90 silicon steel sheets. Taking into account the core's medium-frequency heating, the core has a built-in core water-cooling heat exchanger. Taking into account the user's on-site impedance matching, the design has flexible turns ratio adjustment and compact structure. Using double turns in parallel, the primary side is connected in series to achieve 8-12 adjustable turns, and the secondary side is connected in parallel to achieve large current output. The primary and secondary sides are staggered. The overall leakage inductance is small. And it is easy to use.

■ 产品特点(Product Feature)

1.考虑中频频率下邻近效应和集肤效应的影响，电流更集中于交错部分导体，采用热成型法工艺，保证线圈平整，原副边线圈贴合紧密，降低邻近效应和集肤效应的影响

2.考虑用户现场阻抗匹配，设计具有匝比调节灵活、结构紧凑合理的特点。采用双匝并绕，原边串联实现8-12匝可调，副边并联，实现大电流输出

3.线圈采用交叠式，匝比变化多，原副边可根据需要任意组合成奇偶数匝比，以适用不同用户不同负载匹配，线圈采用工装定位整形，保证尺寸精度，满足设计要求

4.铜工作频率2500Hz,采用23JGH90材质硅钢片，考虑铁芯中频发热，铁芯内置铁芯水冷换热器

5.使用场合必须有供冷却的水源，冷却水的水压要求为0.25MPa-0.4MPa,冷却水中不得有机械杂质，硬度不得超过10个单位。变压器投入运行时，不断进水，进水温度不得超过33℃，出水温度不得超过45℃

1.Considering the influence of proximity effect and skin effect at intermediate frequency, the current is more concentrated in the staggered part of the conductor. The thermoforming process is used to ensure that the coil is flat and the primary and secondary coils are closely adhered to reduce the influence of proximity effect and skin effect

2.Considering the on-site impedance matching, the design has the characteristics of flexible turns ratio adjustment and compact and reasonable structure. Using double-turn parallel winding, the primary side is connected in series to achieve 8-12 adjustable turns, and the secondary side is connected in parallel to achieve large current output

3.The coil adopts an overlapping type with many changes in turns ratio. The primary and secondary sides can be arbitrarily combined into odd and even turns ratios as needed to suit different users and different load matching. The coil is positioned and shaped by tooling to ensure dimensional accuracy and meet design requirements

4.The working frequency of copper is 2500Hz. The silicon steel sheet is made of 23JGH90 material. Considering the medium frequency heating of the iron core, the iron core has a built-in iron core water-cooling heat exchanger

5.There must be a water source for cooling in the use site. The water pressure of the cooling water is required to be 0.25MPa-0.4MPa. There must be no mechanical impurities in the cooling water and the hardness must not exceed 10 units. When the transformer is put into operation, water will continue to enter. The inlet water temperature shall not exceed 33℃, and the outlet water temperature shall not exceed 45℃