# 可编程控制器在声能吹灰控制中的应用

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[摘要] 介绍了利用可编程控制器控制声能吹尘并节能的工艺过程及控制方法。可编程控制器在该领域的应用不但恰当而且有效益。

关键词 可编程控制器 声能 除灰 控制
中图分类法 TP342.3; TK223.3 TP39; TK229

## 0 概述

利用超声波的能量,对锅炉壁及管壁进行吹尘除灰是新兴起的高科技领域。生产运行中的某些燃油锅炉、燃煤锅炉等,经过长期运行后锅炉壁及管壁开始积灰,而且运行时间长,积灰严重,导致锅炉热效率大幅度下降,影响锅炉的正常运行。声能除尘吹灰的利用,就是要将锅炉壁,管壁沉积灰除掉,以提高锅炉的热效率。由于锅炉的结构各异,燃烧的介质不同,因此,各处积灰也不尽相同。并且,随着吹灰的时间长短,各处除灰的效果也不尽相同,因此,在除灰的控制时间上也有区别,在这种情况下采用可编程控制器控制吹灰过程是最理想的选择。

## 1 控制运行方式

如图 1所示 $M_1$~ $M_{20}$是声能除灰设备,这些设备通过可编程控制器控制运行状态及变频调速器的触点,以使该设备在所要求的频率下运行。由于各处积灰不同,因此,$M_1$~ $M_{20}$的运行时间根据积灰多少而定,并且经过一段除灰后一些地方积灰已不很严重,而一些地方还很严重,为了达到节能的目的,积灰轻的地方,设备运行时间短些,积灰重的地方,设备运行时间长些,因此在系统中除“运行控制按钮”外,还有“运行方式选择按钮”,通过选择按钮可有几种方式供选择。(见图 2)

该系统中还没有运行状态指示,音响闪光报警指示等。

## 2 控制系统图

## 3 结束语

由于采用可编程控制器不但使系统可靠运行,而且通过选择按钮的控制,随时调整运行方式,这样既达到除灰,使锅炉运行效率提高,同时也使系统在合理的节能的状态下运行。该系统在广东大亚湾核电站锅炉,兰州热电厂锅炉除尘运行中效果良好。

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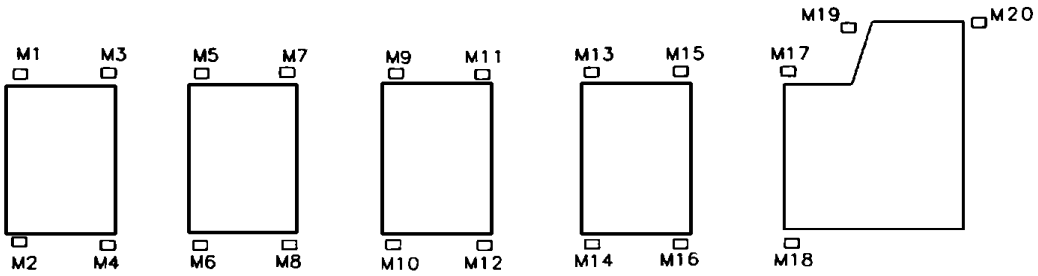


图 1

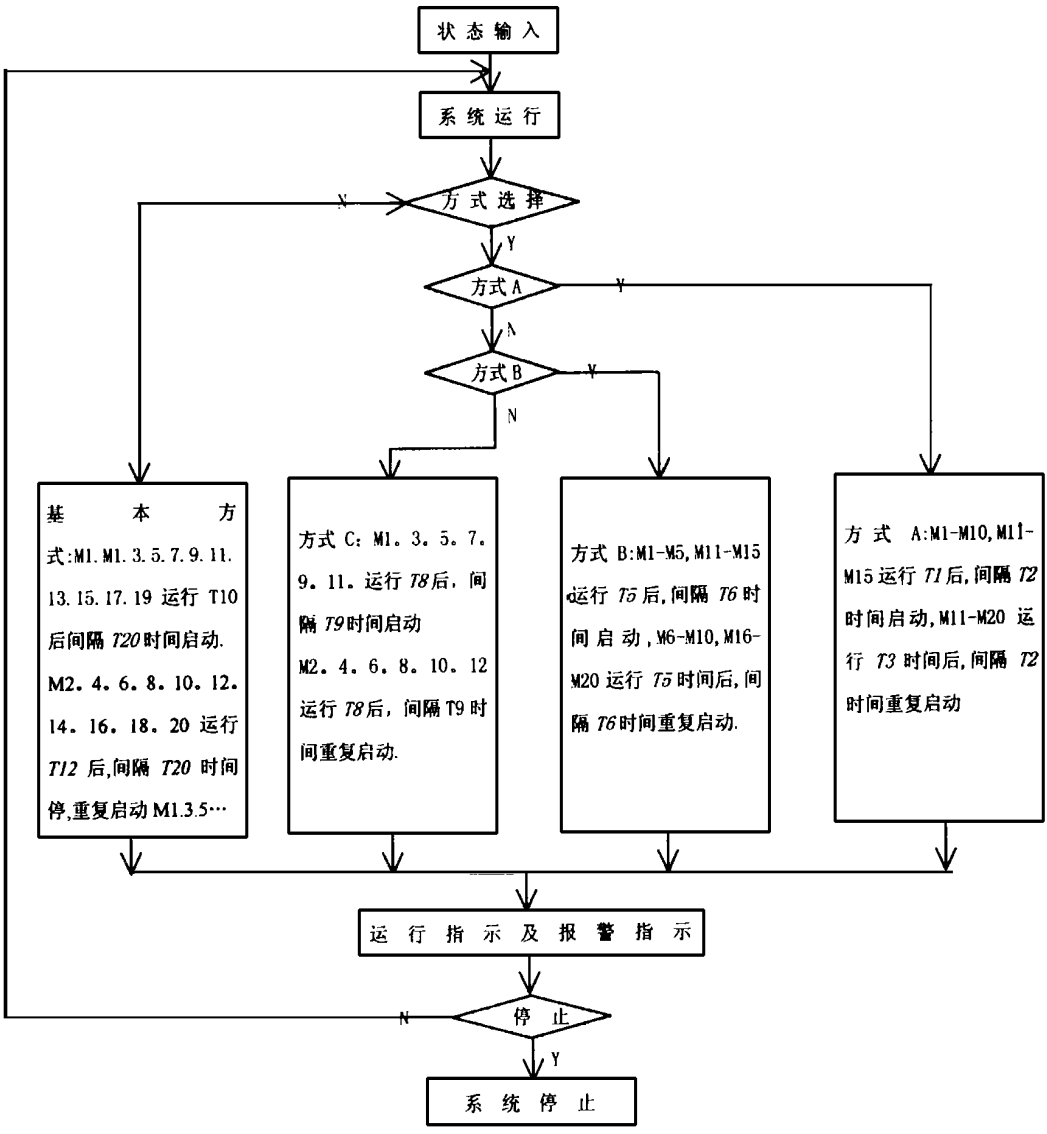


图 2　控制程序流程图

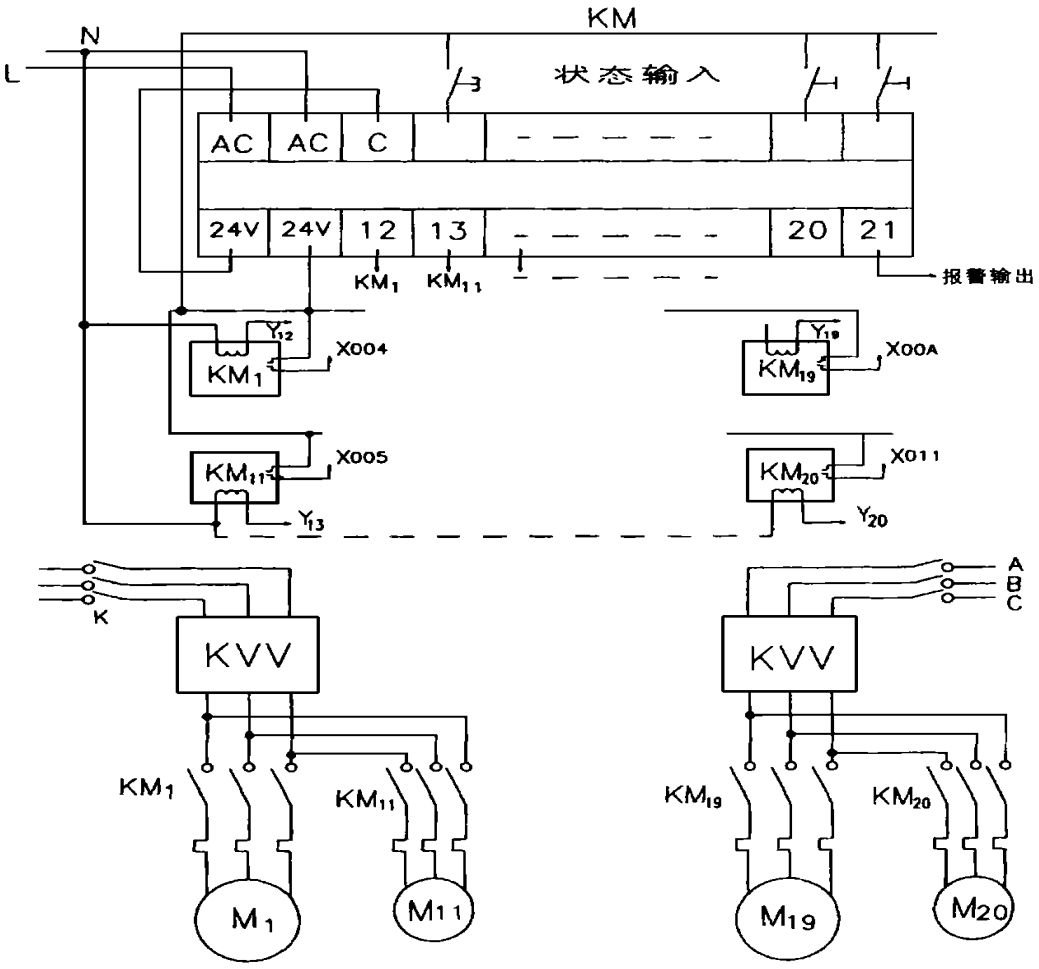


图 3 控制系统框图

(渠源 编辑)

# 核 电 生 产

据“Power Engineering”1997年 7月号报道,1996年有 5台总装机容量为 5717 MW的新的核电机组投入商业运行,使目前世界上核电机组总数达到 443台。

正在建造三个新的反应堆,中国 2个,日本 1个,使得在建反应堆的总数为 14个国家达到 36个。美国运行着最多的核电机组,达到 110台,法国其次有 57台,日本第 3为 53台。

国际原子能机构(IAEA)指出,有 17个国家靠核电站供应至少 25%该国电力。立陶宛最高,核电份额高达 83.64%,法国其次为 77.4%。比利时为 57.2%,瑞典为 52.4%,瑞士和斯洛伐克为 44.5%,乌克兰为 43.8%。

世界核电总的发电量在 1996年增加到 2300TWh,约为世界总发电量的 17%。

(思娟 供稿)

cessively low thermal efficiency of the boiler. Relevant modification measures are proposed, with the help of which anticipated improvements have been attained. **Key words**: energy saving, fly ash, combustible

小型燃煤锅炉改烧天然气的措施及效果= **Measures and Effectiveness of Switch-over to Natural Gas Firing by a Small-sized Coal-fired Boiler** [刊,中]/Guo Jianqiang, Han Hongjia, et al (Harbin No. 703 Research Institute)// Journal of Engineering for Thermal Energy & Power. -1998, 13(3). -200~203

Specific measures are described regarding the change-over to burning natural gas by a small-sized coal-fired boiler. In this connection some valuable experiences are provided for coal-fired boilers to switch over to firing natural gas. **Key words**: boiler, natural gas, modification

论折合㶲的概念及其应用= **On the Concept of Reduced Exergy and Its Application** [刊,中] Han Xueting, Zhang Jie (Hebei Institute of Architectural Science & Technology)// Journal of Engineering for Thermal Energy & Power. -1998, 13(3). -204~207

On the basis of the assumption that factor $K$ of the ratio of use value of non-usable energy and exergy is equal to energy level $\Omega$, deducted is a universally applicable formula for calculating reduced exergy. From this one can perceive the variation relationship of reduced exergy with energy level, thereby proving that the reduced exergy is a status function. The analysis of the reduced exergy can lead to a more comprehensive and accurate evaluation of the use conditions of various energy quantities. Moreover, the determination of the price of heat, electricity and cold products by the reduced exergy method is more scientific and rational. **Key words**: reduced exergy, usable non-usable energy, unusable energy level, practical exergy, avergae thermodynamic temperature

一种新型的电站热力系统矩阵模型及其应用= **A New Type of Power Station Thermodynamic System Matrix Model and Its Application** [刊,中]/Si Fengqi, Hu Huajin, Xu Zhigao (Southeastern University)// Journal of Engineering for Thermal Energy & Power. -1998, 13(3). -208~212

The authors have come up with a new type of power station thermodynamic system matrix model. It takes into consideration in a comprehensive way the object characteristics of a regenerative system and various auxiliary systems and features a simple and easy-to-understand physical concept. By the use of a heat balance method the algorithm of the model is reliable and universally applicable. Through the implementation of a computer software it is possible to make use of the idea of configuration. This outstanding merit can enhance the robustness and transplantability of the power plant performance monitoring software, creating wide application prospects in the area of power station performance analysis. **Key words**: thermodynamic system, matrix, mathematical model, power station, configuration, software

**Windows**平台上锅炉微机监控系统的开发应用= **Development and Application of a Microcomputer-based Boiler Monitoring System on a Windows Platform** [刊,中]/Wan Jingyi, Liu Qingge (Harbin No. 703 Research Institute), Zhao Xia, Jin Hongda (Suibin County Television Station)// Journal of Engineering for Thermal Energy & Power. -1998, 13(3). -213~217

The authors give a brief description of the hardware structure and regulating principle of a Yanhua industrial control model PC486 boiler microcomputer-based monitoring system, detailing the development of microcomputer-based boiler monitoring system and software design method on a Windows platform as well as the important role played by dynamic data exchange (DDE) and dynamic chain connection function base on a Windows platform. **Key words**: windows, boiler, microcomputer monitoring

可编程控制器在声能吹灰控制中的应用= **The Use of Programmable Controllers in Sonic-Energy Soot Blowing Control** [刊,中]/Zhang Rui, Jin Haifeng (Harbin No. 703 Research Institute)// Journal of Engineering for Thermal Energy & Power. -1998, 13(3). -218~220

Described is the technological process and control method involved in the use of programmable controllers for controlling sonic-energy soot blowing and the resulting energy-saving. The application of such programmable controllers in the above-mentioned area is not only proper but also cost-effective. **Key words**: programmable controllers, sonicenergy, soot removal, control

JKTH-1000DEH系统在 50 MW 汽轮机组上的应用= **The Use of JKTH-1000DEH System in a 50 MW**