

# 全功能课题起停模件软件的研制

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**〔摘要〕** 燃气轮机全功能微机控制实现对燃气轮机的起动、运行、保护的全面自动化。起停模件作为燃机起动的顺序控制软件,可以在检查核对燃机起动先决条件后,按燃机起动程序实现燃机起动。本文论述了燃机起停模件的硬件基础及软件编制过程。

**关键词** 起停模件 全功能控制 燃气轮机

**分类号** TP31

## 1 引言

全功能课题起停模件是燃气轮机全功能微机控制课题三大组成部分之一,它实现了燃气轮机的全自动程序起动、全自动故障停机、以及全自动正常程序停机等多种功能。本软件的研制以系统专业提供的起停程序方框图为依据,采用了模块化设计,使每一起动或停机过程都自成一体,相互间有清晰的接口,可方便的按不同燃机的起停过程自由调整。

## 2 硬件基础及功能简述

本模件基于康拓 STD 总线微机研制。该机主 CPU 为 8086,配 EGA 彩显,物理盘和软驱,汉卡。因此,本模件人机界面采用了较简单的汉字提示操作,把研制的重点放在程序控制上,而且由于采用了 STD-PC 总线型式,软件具有一定的通用性,也适用于 PC 总线微机。该机采用带光隔离开关量板作为顺序起停控制继电器箱的驱动模件,并采用了热电阻、热电偶前置信号处理板,脉冲量信号处理板以及 A/D 板作为实时信号采集设备。

本模件在运行时,首先检验燃机及外围设备是否具备起动条件,并对起动过程实行联锁,防止非正常起动。在燃机起动或运行过程中,实时检测运行状态,并可随时唤醒停机程序,保证燃机安全。

## 3 显示图面的编制

本程序显示图面共分三幅:扉页,程序起停图面以及主要运行参数显示图面。

扉页为双线边框中写“燃气轮机起停模件”字样。

程序起停图面设计有时钟显示起停各步骤的时间,整个图面辅以简捷的中文实时显示起停各过程的名称,状态以及各过程执行情况。

主要运行参数显示图面在起动成功之后计算机自动转换至该图面,实时显示压力、温度、转速等 6 个主要运行参数。

显示图面在编制过程中注意以动态显示反映控制对象的状态、过程,使图面直观、实时,为操作人员提供一个明了的界面。

## 4 流程图

本程序由主程序(见图 1)、起停过程(逻辑)子程序(见图 2)、汉字界面模块三个部分组成。

## 5 结语

本模件在 512 试车中作为主要起动元件作验证试验,经多次使用,均正确无误地完成了各项功能。在研制过程中得到了系统专业的大力帮助,在硬件调试以及软硬件联调过程中,也得到了其它专业的密切配合,特表谢意。

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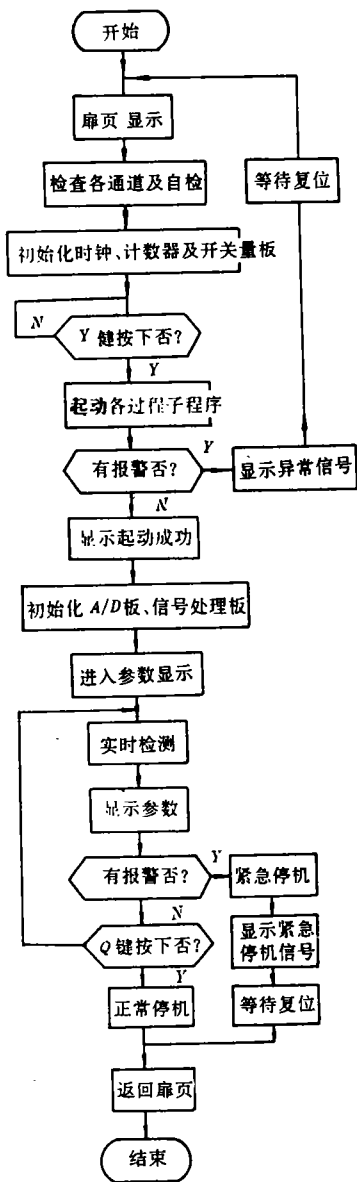


图 1 主程序的流程图

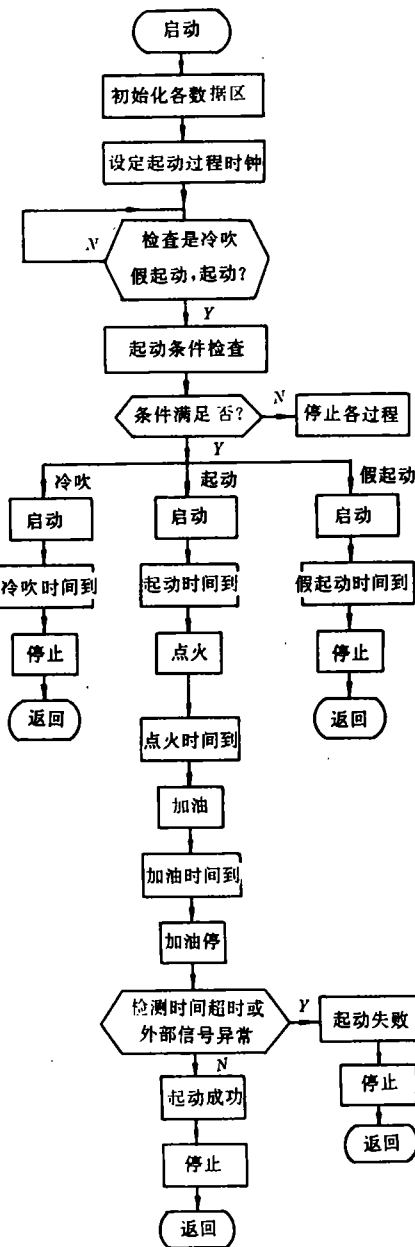


图 2 起停过程(逻辑)子程序的流程图

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ing mill, resistance characteristics

火焰中形成的二氧化氮和氧化亚氮=Nitrogen Dioxide and Nitrogen Monoxide Formed in a Combustion Flame[刊,中]/Zhong Beijing(Qinghua University), P. V. Rosliakov(Moscow Power Engineering Institute)//Journal of Engineering for Thermal Energy & Power, 1996, 11(3): 147~153

Studied in this paper is the process of formation in a boiler furnace of nitrogen dioxides and nitrogen monoxides and their emission levels resulting from the combustion of various fuels. Also discussed are the transformation relationship between various constituents of nitrogen oxides and the main factors influencing the formation and emission levels of nitrogen dioxides and nitrogen monoxides. Key words: boiler, combustion, nitrogen oxide, nitrogen dioxide

C语言在锅炉热力计算中的应用=The Use of C Language for a Boiler Thermodynamic Calculation[刊,中]/Zhao Guangbo, Lin Jincheng, Liu Wentie, Zhu Qunyi, Ruan Genjian(Harbin Institute of Technology)//Journal of Engineering for Thermal Energy & Power, 1996, 11(3): 154~157

This paper deals with the data structure of boiler thermodynamic calculation program prepared through the use of C language, the block diagram of the thermodynamic calculation program, the basis for the preparation of the thermodynamic calculation program, the thermodynamic calculation program screen menu and its use as well as the specific features of the thermodynamic calculation program, etc. The above-cited program can be more conveniently employed for the thermodynamic calculation of grate-fired and fluidized bed-fired industrial steam boilers and hot-water boilers. Key words: C language, boiler, thermodynamic calculation

全功能课题起停模块软件的研制=The Development of a Total-function Start/Stop Module Software[刊,中]/Sun Xidong(Harbin Marine Boiler & Turbine Research Institute)//Journal of Engineering for Thermal Energy & Power, 1996, 11(3): 158~159

With the help of gas turbine total-function computer-based controls realized is a comprehensive automation of the gas turbine start-up, operation and protection. As a sequential control software of the gas turbine start-up the start/stop module can after checking and verifying the preconditions of gas turbine start-up conduct the gas turbine start-up in accordance with the gas turbine start-up program. Also described are the hardware basis of the gas turbine start/stop module and the software preparation process. Key words: start/stop module, total-function control, gas turbine

420 t/h 同心正反切圆锅炉燃烧优化的数值计算=Numerical Calculation of the Optimization of a 420 t/h Boiler Combustion System with Concentric Tangential and Anti-tangential Air Feeding[刊,中]/Xu Minghou, Hu Tailai, Yuan Jianwei, Zeng Hancan(Huazhong University of Science & Technology)//Journal of Engineering for Thermal Energy & Power, 1996, 11(3): 160~164

With the 420 t/h boiler of a 125 MW unit, which features furnace concentric tangential and anti-tangential air feeding, serving an object of study a numerical computation was performed of the boiler in-furnace aerodynamic field, temperature field, pulverized coal particle trajectory under various operating conditions. The cause of the boiler slagging is analyzed with proper measures for reducing the slagging and attaining an efficient combustion process being proposed. Key words: pulverized coal combustion, slagging, numerical calculation