

智能型断路器通断检测的三维结构设计

摘要

自动化生产线技术是国家经济形势发展的需求,是国民经济高质量发展的基础保障,是工业 4.0 时代和中国制造 2025 的核心技术之一。因此,为了推进制造业自动化,研制完全具有自主知识产权的我国新一代的工业自动化系统,打破外国对我国的先进自动化技术的技术限制,是制造强国战略的基本方针。

近年来国内低压电器行业也相继采用自动化手段代替人工进行调试与检测作业,许多企业相继引入自动化生产线技术来加工产品。自动化产线技术不仅可以提高产品质量,提高生产效率,降低成本,缩短生产周期,提高经济效益,减轻工人的劳动强度而且对提高企业的知名度和创造良好的企业总体形象具有十分重要的意义。

本文设计的是智能型断路器通断检测系统的三维结构。随着电力行业的迅速发展,电路用电安全变得格外重要,因此在生产断路器时对断路器进行通断检测,确保产品的质量变得十分必要。产品传输至本工位,夹紧定位后,气动推动手柄,使断路器断开,另一步进电机带动转轴驱动手柄使断路器导通,在输入输出电极间检测通断,同时用码盘检测 N、L 极的合通顺序及角度和角度差值。

本文针对断路器通断检测的要求,采用 Solidworks 三维软件建立智能型断路器通断检测结构。从而实现自动化检测,使自动化手段代替人工进行调试和检测作业,提高产品的质量,提高生产率,降低成本,减轻工人的劳动强度。

关键词: 自动化生产线; 断路器; 结构设计; 通断检测; Solidworks

Abstract

Automated production line technology is the demand for the progress of the national economic case, the basic guarantee for the high-quality progress of the national economy, and is one of the core technologies of the Industry 4.0 era and China's manufacturing 2025. Therefore, promoting manufacturing automation, developing a new generation of industrial automation systems with independent property rights, and breaking the foreign monopoly on high-end automation technology are the basic principles of the manufacturing power strategy.

In recent years, the domestic low-voltage electrical appliance industry has also adopted automatic means to replace manual debugging and testing operations, and many enterprises have successively introduced automated production line technology. Automated production line technology can not only improve product quality, increase productivity, reduce costs, increase economic benefits, and reduce labor intensity of workers; it is also of great importance for increasing the visibility of the enterprise and becoming a great overall corporate image.

This article designs the three-dimensional structure of the intelligent circuit breaker on-off detection system. With the quick progress of the power industry, the security of circuit power has become extremely important, so it is necessary to ensure the quality of the product by conducting circuit breaker testing during the production of circuit breakers. The product is transferred to this station. After clamping and positioning, the handle is pneumatically pushed to disconnect the circuit breaker. Another stepper motor drives the shaft to drive the handle to make the circuit breaker conductive. The connection between the input and output electrodes is detected, and the code disk is used. Detect the N- and L-pole closing sequence and angle and angle difference.

According to the requirements of circuit breaker on-off detection, this article uses Solidworks 3D software to establish an intelligent circuit breaker on-off detection structure. In order to realize automatic detection, automatic ways are employed to take the place of manual debugging and detection operations, improve product quality, increase productivity, reduce costs, and reduce labor intensity of workers.

Keywords: automated production line; circuit breaker; structural design; on-off detection; Solidworks

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