

Tremendous Impact of R8 Control System with Robots

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Abstract

As with any business decision, there are pros and cons to integrating automated robotic systems into your workplace. It's important to take time to consider the facts and evaluate your needs. The paper points how control offers the user a comfortable graphical user interface via the touch screen "TeachBox " for direct selection of all functions. The IPC based R8 control with its functional range and numerous options has set a new bar. On the one hand, the R8 control is facilitating complex interactions between robot and injection molding machine. On the other hand, the control unit's elaborated functionalities are increasing the productivity of any work cell.

It has the ability to work at a constant speed without pausing for breaks, sleep, vacations; it has the potential to produce more than a human worker. It supports Unlimited program storage on USB ,Internal compact flash ,Online pos, vel, timer changes in auto mode ,16 part programs,256 palletizing programs,18 languages selectable at any time,Online Manual,Up to 16 vacuum circuits,Up to 16 gripper circuits,Up to 16 conveyors,Up to 256 PI,Up to 256 PO.

Such robots are ideally suited to control a wide variety of downstream automation systems. Over the years they have implemented thousand of demanding and complicated downstream applications, performing value adding operations and increasing consistency and part quality. As such we can say that they are the ideal partner for any automation project.

Keywords: Teach Box , Robot.

1. Introduction

"In world terms three to five million of jobs would not exist if automation and robotics had not been developed to enable cost effective production of millions of electronic products, from Phones to play stations." [1]

In addition to the million jobs expected to be directly created by the increased use of robotics, the "[2] report's authors says that saving manufacturing jobs also results in saving jobs throughout the community. This means that restaurants, shops and the service economy also benefit from this valuable ripple effect.

For Example removal robots for the plastics industry are autonomous and in themselves closed systems, which integrate all internal components, like decentralized control cards, servo modules, as well as teach-in user interfaces. Common removal robots simply provide digital in- and outputs for external communications. In the best case, flexible controls of connected automation systems can be realized. Today's common office automation visualizes the advantages of connectivity and free data exchange. This desire also came up for robot controls. Robot control refers to the way in which the sensing and action of a robot are coordinated. There are infinitely many possible robot programs, but they all fall along a well-defined spectrum of control [4].

This paper highlights development of high-performance R8 robot control, WITTMANN (The WITTMANN Group is one of the largest manufacturers of robots and automation systems for the plastics industry worldwide) who puts an emphasis to provide, as a standard, flexible interfaces for higher-level communication with computers or injection molding machines.

With the R8 control, an IPC based robot control was presented which offers besides the [3] specified EUROMAP 67 interface to molding machines, additional hardware based in-/outputs for the connection of automation systems, and additionally CanOpen real time interfaces, an Ethernet interface and USB port. From advanced control design and simulation to hard real-time deployment, you can use a single graphical and textual development environment for designing, prototyping, and deploying your autonomous robot device. Since its market introduction WITTMANN robot R8 control has excelled by way of its trend-setting design, ease of use and intuitiveness.

2. Features of R8 Controller



2.1 CanOpen-Interfaces

Via the CanOpen real time interfaces time critical information can be transferred, for instance the connection of incremental encoder inputs for the following of objects on moving conveyors. Or additional servo modules integrated into automation systems, which can be directly addressed and controlled from the WITTMANN R8 control. Up to 12 servo modules can distributed to various axis of robots and automations systems. Another typical application for real time signals is given through the signal and position exchange of robot and injection molding machine, as implemented with the BATTENFELD B6 control. This very direct and optimized integration provides numerous additional possibilities for the expedited removal of molded parts and thereby the increase of productivity between machine and robot.

2.2 Ethernet-Interface

The standardized Ethernet interface on the other side allows the transfer of larger, less time critical data and therefore makes for a flexible communication port for miscellaneous purposes. The open protocol VNC via Ethernet permits the transmission of entire screen contents of the WITTMANN R8 TeachBox to a remote PC or the user interface of a molding machine. Thereby the entire, non safety critical functions of the robot control are accessible on remote terminals and can be used.

2.3 Email transfer

The connection of the WITTMANN R8 control [6] to an optional email server enables the automated transfer of actual error messages, as well as the set up information about mode changes from the automatic mode of the robot. In addition users can send an email with the complete command buffer and the error list, as well as the current teach program. This information can be sent to up to 25 addressees at the same time.

2.4 Internet remote maintenance

The transfer of error messages via email presents the first step towards an automated remote monitoring system. A further and practical complete remote maintenance can be accomplished with the combination of the VNC viewer and the optional software module WITTMANN R8 CLI. Through the VNC viewer the entire TeachBox can be viewed and operated. The R8 CLI module permits the selective request for all system relevant parameters and conditions of the robots. In addition miscellaneous variables in the teach program can be edited.

In the conjunction with VNC the R8 CLI module is ideal for applications, in which an error analysis and correction needs to be done immediately or for the prompt support of users.

2.5 Connection to an ERP system

The R8 CLI module can furthermore be used for the automated connection to an ERP system. The WITTMANN R8 control offers users a multitude of advantages and highest flexibility for the long term usage of the robot. Through the intuitive

programming interface of the WITTMANN control all functions are immediately available and accessible and require minimum training requirement for familiarity.



2.6 Smart Removal

The smart removal function is monitoring all relevant processes in a parallel and anticipatory way – no matter whether the actions are performed by the robot or by the machine. The software is calculating the optimal removal process in communication with the machine control

The mold opening movement is used as the computation base for calculating the acceleration of the kick-stroke. This is leading to a shortening of the part removal times of up to 15%.

2.7 Eco Mode

Using the ecomode function leads to a reduction of the energy consumption as well as the noise level, and to alone long-term conversation of the robot mechanical operations

2.8 Automatic Collision Detection (ACD)

To provide increased safety for molding machine, robot and peripheral equipment, particularly during the robot programming, all robots equipped with the R8.2 control system will feature the ACD function. ACD ensures that during the manual programming and test phase [7] of the robot that the mechanical components are protected. This is achieved through monitoring motor torque levels while speeds are less than 250 mm/s. Should an unexpected increase of torque be detected, the robot stops, which serves for the protection of robot, end-of-arm tooling, machine and mold.

3. Advantages

- Shortest training time for personnel.
- Free programming of every robot operation.

- Infinite diagnostic possibilities of the robot functions.
- Integrated observation of maintenance intervals.
- Different programming levels for the respective user profile
- Total flexibility

4. Conclusion

The control system offers 2 levels of operator interface as standard. Tooling Editor for the modification of a few select commands and, Text Editor for ultimate programming freedom. [5] This allows any arbitrary robot sequence to be programmed via simple, intuitive menu navigation. Neither editor needs command codes; the designated functions are executed directly at the robot and are transferred via one keystroke into the program. The naming of the peripheral inputs and outputs, cylinders, grippers, and vacuum cycles facilitates the readability and allows for a clearly arranged program structure. As technology advances it enables more humans to survive, and as the population grows there is greater need for technology. That cycle feeds on itself. New applications for industrial robots are still to come by integrating measurements, vision, robot control, and human machine interfaces (HMIs) into one, easy-to-use environment. We can make our robotic system smarter without the need for complex robotics programming expertise. Integrate measurements and vision into robotic systems. Easily develop vision-guided robotic applications. No need to learn specialized robotic software. A smarter, safer new industrial robot could bring automation to new areas of manual work and help many manufacturers regain a competitive edge.

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