

Singular Control delivers machine collaboration

In a world where servo motors, VFDs and robots all need to work together, the role of the controller is changing. Yaskawa's Jacky Wong talks about their success in bringing those different control functions into one environment in their new Singular Control Concept:

Q: How have controllers changed and evolved in the last decade? What are some of the new ways they are being used?

WONG: In the past, there were dedicated controllers for different functions of a machine. There were PLCs for upper level processes as well as for capturing and transferring machine data. There were dedicated motion controllers that are responsible for the coordination of the axes on the machine. Then, there were dedicated robot controllers that are used specifically to control the robots in the system. Each of the controllers mentioned above have a specific function to perform in the system.

As controllers' processing power increases and as software becomes more powerful, we are seeing more and more functions rolled into a single controller. Today, it is not uncommon to see upper level processes, transfer of data, motion axes as well as robotic mechanisms all controlled by one single machine controller. Lastly, most controllers out in the market now have enough processing power and are "good enough" for the majority of applications out there. More and more, controller manufacturers are now competing on ease of use and convenience instead of performance.

This prompted trends like using IEC-61131-3 standardized programming languages instead of proprietary languages, using PLCOpen standardized application function blocks and consolidation of I/O networks like Ethernet and EtherCAT. New software features are also constantly being developed to help reduce development and troubleshooting time of applications.

Q: As we face the era of robotics, why is the development of a product such as the Singular Control Concept an important step forward?

WONG: More functions are being rolled under a single controller. As applications get more and more complicated, it is common to have a system that has both robot mechanisms and coordinated servo axes working together. It is important to have the robot mechanisms more tightly integrated with the servo axes. Therefore, it is crucial to have a controller that is capable of programming both robots and axes under the same programming environment and using the same programming language.

The Singular Control Concept allows robot mechanisms and servo axes to all be programmed using IEC 61131-3 programming languages and PLCOpen function blocks in the MotionWorks IEC programming environment.

Yaskawa is one of the few companies that have a Drives Division, Motion Division as well as a Robotic Division. We are in a unique position to be able to support the Singular Control Concept from one single source.

Q: It seems more manufacturers are looking for programming built into devices, thus minimizing the amount of programming to be done



on site. How does this product help with that?

WONG: Traditionally, robots and motion axes are programmed using different programming languages. The robot programs and motion axes also traditionally resided on different controllers. Most control systems that can operate both robots and servo axes use separate CPUs with completely separate programs.



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software. This means less training for staff and only one software required. With everything programmed under one environment, it also means shorter commissioning time. Ultimately, the Singular Control Concept helps save time and money.

Q: As the pace of manufacturing increases, what are some of the things manufacturers overlook when they are trying to use robotics to keep pace?

WONG: Many users believe that a robot arm is the best way to increase throughput of a manufacturing facility. The fact is, depending on the application, you can often build a custom gantry mechanism that can outperform a robot arm in terms of cycle. One of the key advantages of a robot arm, besides helping increase performance, is its flexibility. It is much easier to repurpose a robot arm for a different job than to repurpose a custom gantry mechanism. So depending on your requirement, a robot arm may not always be the best choice.

Servo axes and custom mechanisms generally are faster, while robots are more flexible. Blending the two in a single machine allows machine designers to optimize the process to suit the range products being produced.

YASKAWA