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FailSafe Servo Safety for All

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FailSafe Servo Safety for All

It's no secret that safety is paramount in automated systems. Without adequate safety measures in place, operators can be at significant physical risk. Fortunately, functional safety systems help mitigate or remove potential safety concerns. They keep the system safer by monitoring the components, controlling output, interrupting power in emergency situations, and much more. As industries become more automated, agile, and complex, safety systems must be kept in step.

Before the evolution of network-integrated safety, functional safety systems were hardwired, and typically made of non-OEM components. With safety signals traveling over a network, Fail Safe over EtherCAT (FSoE) eliminates wiring between sensors like door switches and light curtains to a safety relay, safety controller, or safety Programmable Logic Controller (PLC). Implementing functional safety with FSoE can simplify input wiring, eliminate output wiring to servo and variable-frequency drives, and reduce the number of safety controls needed on a large machine. Being easier to implement and more capable than hardwired functional safety systems, FSoE provides automation engineers with a wider array of methods to mitigate risks to people.

Now, with FSoE you can have safety and non-safety command traffic on a single network. There is no need for a secondary, hardwired system dedicated solely to safety sub-functions. Mitsubishi Electric's EtherCAT-compatible, next-generation, flagship servo platform does precisely that. MELSERVO-J5 servo amplifiers deliver functional safety capabilities over EtherCAT to support safety sub-functions at an even higher and more efficient level. With these amplifiers, you can achieve Performance Level d with standard servo motors and drives, and Performance Level e when combined with safety servo motors.

Better, Safer, More Capable

Quality, Performance, and Compatibility are the cornerstones of our design philosophy. This includes our approach to implementing FSoE in our servo amplifiers. Our goal was to design high-performing, less complex, next-gen servo amplifiers that are easy to implement, reliable as ever, and safer with FSoE functionality. Though our standard model drivers are FSoE-capable, the MELSERVO-J5 servo amplifiers greatly enhance that functionality to now offer 10 safety sub-functions (STO/SS1/SS2/SOS/SBC/SLS/SSM/SDI/SLI/SLT).

When triggered by ext[illegible]r light curtain sensors, the Safety CPU instantaneously utilizes the programm[illegible]sent to the servo amplifier, which executes the safety sub-function. Depend[illegible]ower to a component for an uncontrolled stop, slowing it down to a safe speed, or limiting the motion of the servo so it rests in a safe position. These immediate actions protect both the components and the operators.

Imagine an operator needing to get a closer view of part of the production line, but the nearest protective enclosure doesn't allow the sight line necessary to that assembly process. To address this sight-line issue, the production line was designed with a light curtain area so operators could gain access to a better vantage point. There the operator can safely approach the assembly line. When the light curtain sensors are tripped, FSoE responds automatically. It also recognizes the operator's proximity to the line. A hardwired system might execute a Safe Torque Off to cut power, bringing the line to a stop. Instead, FSoE sends a Safe Operating Stop command, slowing the motors in that area only.

As the operator gets even closer to the line, FSoE executes a Safe Stop, further slowing the motors to a halt. While the operator remains in the light curtain area, power still flows to the motor instead of being cut. When the operator exits, the motors come back up to speed much faster than if they had to power back from a dead stop. FSoE-compatible MELSERVO-J5 servo amplifiers protect machine operators. This gives machine builders the ability to increase the efficiency of a safety-enabled machine without compromising the overall desired safety level.

Evolution in Automated Safety

Sporting numerous innovative features and enhancements, MELSERVO-J5 servo amplifiers lead the factory automation industry when it comes to performance, reliability, and quality. They provide the enhanced safety measures Mitsubishi Electric is known for while sharing the same network used for your system's primary commands. These servos amplifiers do not require Mitsubishi Electric controllers. Plus, having eliminated the need for option units, they can be easily integrated into new or existing automated systems utilizing an approved EtherCAT Master.

Our MELSERVO-J5 servo amplifiers are IEC 61800-5-2 compliant. They now also contain the necessary electronics to implement a full suite of safety sub-functions. EtherCAT-enabled functional safety servos utilize the same encoder, power, and brake cables as standard motors. Safety devices, such as E-Stop buttons, safety sensors, light curtains, and more can be easily integrated.

MELSERVO-J5 Motion Modules can also communicate with servo amplifiers over the CC-Link IE TSN network to provide the greatest performance-to-cost ratio. The number of motion modules that can be configured on our iQ-R PLC rack is virtually limitless. Depending on their configuration, with inter-module synchronization servo systems, it's possible to achieve 768 synchronized axes. With such expansive capabilities, it's vital to build a network with integrated safety.

Discover More

MELSERVO-J5 servo amplifiers are designed with safety in mind. To learn more about boosting the functional safety and performance of your automated lines with our FSoE-enabled MELSERVO-J5 servo amplifiers, please visit https://us.mitsubishielectric.com/fa/en/products/drive-products/ac-servos-melservo/mrj5/amp/mr-j5-fsoe-overview/.

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page top

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