Networking I/O

Increases Reliability of Metal Forming Applications

The high shock and vibration of metal forming applications not only destroy sensors but also severely limit the reliability and expected service life of the cabling needed to bring them back to the PLC. The obvious solution to cable failure in high shock, vibration, and impact applications is intuitively simple: reduce the number of cables needed to run I/O. Fortunately, this is possible using open AS-Interface technology.

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Metal forming applications are among the toughest and most demanding on sensors and sensor wiring. High shock and vibration not only destroy sensors but also severely limit the reliability and expected service life of the cabling needed to bring them back to the PLC.

Many operators of stamping, machining and other metal forming equipment have simply learned to live with the shortcomings of their solutions. They implement a rigorous but expensive replace before failure system, or they just take their chances and run until a failed cable connection shuts them down. Obviously, neither method is ideal. Lowering operational costs and increasing the time between failures is not only desirable, but required to stay competitive.

What are the technological realities? The obvious solution to cable failure in high shock, vibration, and impact applications is intuitively simple: reduce the number of cables needed to run I/O. Fortunately, this is possible using open AS-Interface technology.

AS-Interface - why one cable is enough

AS-Interface is a simple yet flexible networking technology used in thousands of applications world wide. With nearly 13 million I/O devices installed, it is a true success story in a wide range of industrial applications ranging from automated high-speed bottling plants to automotive assembly. What makes AS-Interface ideal for the metal forming environment is the fact that a single two-conductor cable is able to connect hundreds of I/O points: power and communication! Getting rid of large bundles of cables alone does wonders for reliability. Not only will fewer cables reduce the opportunity for failures, but mechanically, the AS-Interface cable is significantly more forgiving than stiff cable bundles, dealing easily with shock and vibration.

AS-Interface cable in cable tray

Presses and dies can benefit from AS-Interface in another way. Most modern presses are designed for fast die change, improving machine availability and production flexibility. This means that in-die protection and general safety-related machine protection needs to support fast change over. In the past, sensors used for in-die protection required bulky multi-pin connectors that added additional failure points. Different dies, requiring different in-die protection setups, forced engineers to design solutions that would handle worst-case setups; a highly unpredictable approach that is bound to fail as new dies get more complex, demanding additional sensors. Because AS-Interface uses a single two-conductor cable, increasing I/O count on the die never changes the die-to-PLC interface: a single two conductor cable does the job. Always!

Outside of the die itself, presses demand CAT 4 safety by means of e-stops, light curtains and possibly door interlock switches. While not subjected to the same level of abuse as I/O placed directly on dies, these critical components are often in mechanical contact with the press and thus, also subject to significant shock and vibration.

Cable in cable tray

AS-Interface for press safety

Using traditional methods, wiring CAT 4 safety is cumbersome, time consuming, and expensive no matter what the application. Combined with the harsh environment of a press application, the problems increase significantly. A single failed wire connecting a light curtain to a safety relay will immediately shut down the press; just as demanded by code. So will a bad safety contact on a safety door interlock switch. The problem is finding where the flaw occurred — and finding it fast. Traditional hardwired safety is not concerned with trouble shooting and service personnel could easily spent hours locating a single lost contact on a safety device. Fortunately, a better solution exists and has been used successfully in countless safety installations. By implementing safety over AS-Interface – the base technology is called Safety at Work – machine operators not only see fewer failures due to significantly fewer wires needed -- just one two-conductor AS-Interface cable -- to reach CAT 4 safety, but also have the ability to easily detect those failures. Now service crews can be guided directly to the contact that caused the system to shut down. No more ringing out cables hoping to find the one responsible for the downtime.

With those advantages, and the promises to optimize changeover times and increase uptime in general, AS-Interface just may be the White-Knight of automation, saving press shops from costly downtime and from ultimately leaving for lower labor-cost locations.

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