

SCHMERSAL Tech Briefs: HIGH Level Coding to ISO 14119



Overview

The international safety standard of ISO 14119 focuses on the principles for design and selection of Interlocking devices associated with guards. One of the many objectives behind this standard is to provide guidance on preventing interlocking devices from being defeated (bypassed) in a reasonably foreseeable manner.

The standard distinguishes several different types of machine interlocking systems, mainly based on mechanical or non-contact systems, but also on the encoding of the actuator.

If the switch can be actuated by a commonly available item it is considered unencoded, like a limit switch or a magnetic sensor. A magnetic actuator element is classed as encoded as soon as a specific rather than a standard commercial magnet or simple metal flag is required for actuation. Similarly, if the mechanical switch requires an actuating element which has a specific shape it is then considered encoded.

Even if the actuator is manufactured in the thousands in the identical shape, is still classified as being encoded. However, since there are also ranges of actuating elements which are individually coded and offer several thousand variations, ISO 14119 defined various levels of encoding.

The levels of coding are specifically designated:

- LOW = 1 to 9 coding options
- MEDIUM = 10 to 1,000 coding options
- HIGH = 1,000 or more coding options

If the safety device is concealed within the framework of the equipment, LOW or MEDIUM level coding may be used for the safety system. If the device is not concealed and can be accessed, a HIGH level coding may be required. With 1,000+ coding options for switches to be matched with a unique actuator, the probability that an identically encoded actuating element is available and that the interlocking device can be circumvented with it is extremely small.

Individual coding of RFID

Individually Coded RFID devices require the actuator to be taught in. The I1 variant allows only one actuator to be assigned. The I2 version allow for the actuator to be replaced, overriding the previous actuator. There is a 10 minute delay after teaching a new actuator.



Various Models

Electromechanical

These are special versions of our traditional safety switches. They reach HIGH level coding by offering several separated internal cams which are individually set and will only actuate with the unique matching actuator key included.

Keyed interlocks:

- AZ16 Zi
- AZ17 Zi

Solenoid locks:

- AZM161 I
- AZM170 i

Electronic

The use of RFID allows for high level coding of non-contact switches because each actuator is assigned a unique number which is read by the sensor. Schmersal's RFID based electronic safety devices have I1 and I2 variants allowing only one actuator to be taught in and recognized by the safety sensor.

Electronic safety sensors:

- RSS36
- RSS16
- RSS260

Electronic keyed interlock:

- AZ201

Electronic locks:

- AZM201
- AZM300
- AZM400

Applications

- Material handling systems
- Chemical processing equipment
- Robot cells
- Folding or brake presses
- Filter presses
- Printing machines
- Injection molding
- Palletizers
- Packaging equipment
- Textile machines
- Stamping machines
- Metal working equipment
- Wood working
- Food processing machinery
- Pharmaceutical machinery

Available Literature



GK-1 Safety Products Catalog



Design of Safety Guards under observation of ISO 14119

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