

## INDUSTRIAL AND COLLABORATIVE ROBOT SAFETY

Today's rigorous demands in manufacturing call for precision, speed and at times the ability to move large loads, all at a high cycle rate. One possible solution to help ease this burden on the operator is the use of a robot.

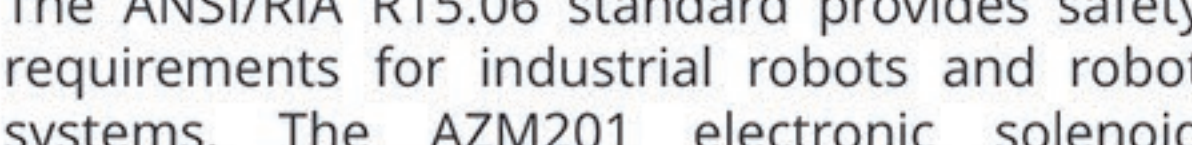
According to ANSI/RIA 15.06, an industrial robot is defined as “automatically controlled, reprogrammable multipurpose manipulator, programmable in three or more axes, which can be either fixed in place or mobile for use in industrial automation applications.” In other words, a machine which can be programmed to automatically perform more than one task and has movement in three or more planes. Typically, the industrial robot is used to move heavy loads or interact with machinery in processes that would otherwise be hazardous to an operator. Due to the common hazardous nature of these applications, we can see why the industrial robot is surrounded by hard guarding.

However, there are some applications where hazards may appear over time due to repetitive operations requiring meticulous and/or strenuous movement. For slow paced applications, where an industrial robot cannot interact in a process with great accuracy, a collaborative robot may be best suited. ANSI/RIA 15.06 defines a collaborative operation as a state in which “purposely designed robots work in direct cooperation with a human within a defined workspace.” It is important to note that just because a collaborative robot is being used, this does not automatically equate to a collaborative operation. Several factors must be examined to ensure the application is safe for the operator to interact with a collaborative robot such as the environment, scope of work defined for the robot and human operator, material being handled, etc.

Whether it is an industrial or collaborative robot, its use is meant to ease production demands and help keep the operator free from application hazards. Both have a unique position in the manufacturing industry, and both pose unique hazards. As with any machine and application, a risk assessment must be carried out to identify hazards and risks for the robot and robot use as considered in ISO10218 for the industrial robot and ISO/TS 15066 for the collaborative robot.

## SCHMERSAL PRODUCT SPOTLIGHT

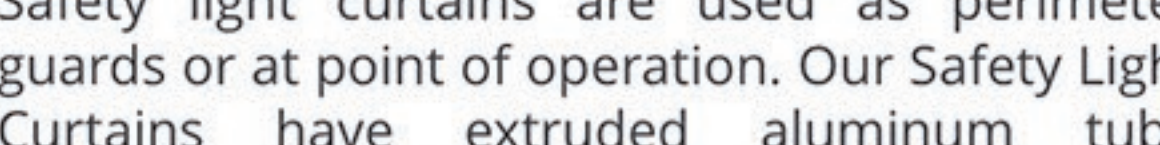
### Safety devices and machine controls for robotics applications



R15.06 compliant door lock and controls  
AZM201 and BDF200

The ANSI/RIA R15.06 standard provides safety requirements for industrial robots and robot systems. The AZM201 electronic solenoid interlock switch and BDF200 control station can be used together to fulfill the necessary ANSI/RIA R15.06 requirements for machine controls with E-Stop and emergency exit for guard locks. They are similar housings and can be mounted side by side.

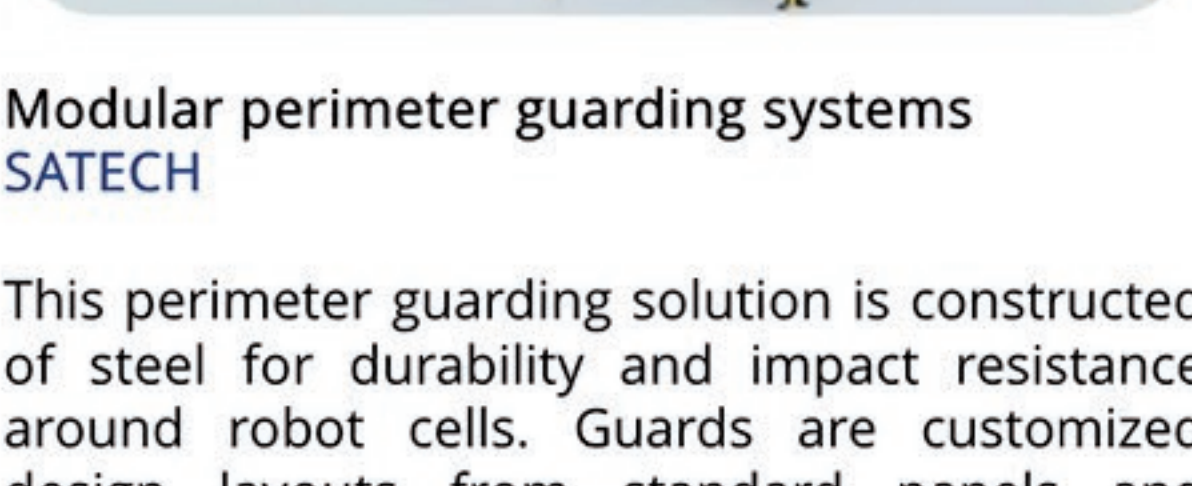
[Tech Brief](#)  
[Online product catalog: AZM201](#)  
[Online product catalog: BDF200](#)  
[Brochure: AZM201](#)



Safety Light Curtains  
SLC440COM, SLC440, SLC445

Safety light curtains are used as perimeter guards or at point of operation. Our Safety Light Curtains have extruded aluminum tube housings for durability and LED end caps provide visible operational status. SLC440COM and SLC440 also feature a Bluetooth interface to provide real time data transfer to smartphones or tablets. The SLC440 has multiple integrated functions such as blanking, beam coding and double reset. The SLC445 includes a muting function to allow materials to pass while still preventing workers access to the hazardous area.

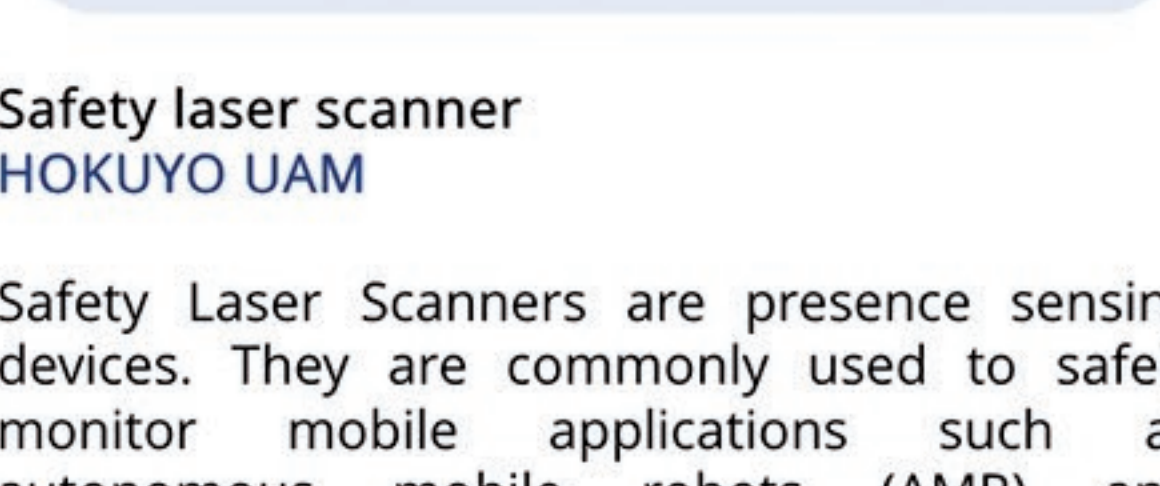
[Online product catalog](#)  
[Optoelectrical Brochure](#)  
[Tech Brief: SLC440COM / SLC440 / SLC445](#)  
[Video: Bluetooth interface](#)



Modular perimeter guarding systems  
SATECH

This perimeter guarding solution is constructed of steel for durability and impact resistance around robot cells. Guards are customized design layouts from standard panels and connection systems. The standard mesh panel is 3 mm steel wire in a 22 x 100 mm vertical grid, with 20 x 40 mm frame. Green Fast footers, Basic posts (40 x 40 mm) or Strong posts (60 x 60 mm) provide the connections and supports. This fencing system installs quickly and easily with bolts or captive fastening clips.

[For more information](#)  
[Tech Brief](#)  
[Brochure](#)  
[Video: Product animation](#)



Safety laser scanner  
HOKUYO UAM

Safety Laser Scanners are presence sensing devices. They are commonly used to safely monitor mobile applications such as autonomous mobile robots (AMR) and automated guided vehicles and carts (AGV, AGC). In stationary applications they can detect workers entering robot cells or unsafe areas around palletizers, or be set up for point of operation protection. The Hokuyo UAM scanner uses a 2D LiDAR system to monitor a 5 meter protection zone, with up to 20 meter warning area, and has a 270° field-of-view.

[For more information](#)  
[Tech Brief](#)  
[Brochure](#)  
[Video: Product animation](#)

## RESOURCES

Here is a collection of reference documents on the topic of robot safety

### INDUSTRY INSIGHTS: ROBOTS IN MANUFACTURING

In spring 2020 we conducted an industry survey with Machine Design magazine regarding the use of robots in manufacturing. This summary shows the key findings of the survey.

[Download the summary](#)



ARTICLE  
FAQ: Robot Safety



ARTICLE  
Future of Industrial Robots



BROCHURE  
Satech Perimeter Guarding

More and more robots are being introduced and utilized for industrial automation. From the traditional industrial robot to modern technology with collaborative robots, learn more about how to properly safeguard robots and robot cells in this Frequently Asked Questions (FAQ) article.

[Download the FAQ](#)

Robots which work “hand in hand” with humans have now found their place safely on to the factory floor. This article discusses the growing acceptance of cobots, their safety requirements, and how it might affect the use of traditional industrial robots.

[Download the article](#)

Industrial robots typically require to be fenced off in to robot cells. The Satech perimeter guarding system is perfect for guarding industrial robots. Learn more about this modular system in the brochure and about the various safety switches necessary for access points.

[Download the brochure](#)

### WEBINAR:

#### Safeguarding On Robots And Robot Cells

From the traditional robot to modern technology with collaborative robots, do you know what some of the basic criteria is for safeguarding designs? There are many advantages to Robot Integration, but also comes with challenges on having people effectively work safer on robots and robot cells. This webinar reviews some of the basic concepts and considerations with robot safeguarding. (YouTube, 1 hour)

[View the webinar](#)

### Webinar

**Safeguarding Robots and Robot Cells**

**NED** New Equipment Digest. **EHS Today**

## ENGINEERING SERVICES

tec.nicum Engineering Services can provide assistance with robot safety



ENGINEERING SERVICE  
Cobot Risk Analysis

Risk assessments are the starting point to any machine safeguarding initiative, even when the application involves inherently safe by design equipment such as a collaborative robot. Our Engineering Services group can perform collaborative robot risk analysis, based on the requirements referenced in ISO/TS 15066:2016 and ISO 10218:2012.

[Learn more](#)



ENGINEERING SERVICE  
Pressure & Force Limit Analysis

Collisions can be expected when workers interact with collaborative robots. ISO/TS 15066 specifies the safety requirements for collaborative robot systems and the work environment. Our Engineering Services group can preform the necessary pressure and force limit measurements and provide analysis on collaborative robots.

[Learn more](#)



BROCHURE  
Engineering Services

Beside the Cobot Risk Analysis and the Pressure & Force Limit Analysis, tec.nicum offers a variety of engineering services. Primary among them are machine safety training courses. We also offer the OSHA Outreach Training for General Industry (10 hour or 30 hour). Learn more in our 12 page brochure.

[Download the brochure](#)

## ASK THE EXPERT

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Have more questions? Ask Devin: [dmurray@schmersal.com](mailto:dmurray@schmersal.com)

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