

## III. Wiring & Installation Considerations

20

### **How can I guard multiple sides of a machine with one light curtain?**

Multiple sides of a machine or manufacturing cell can be guarded with a single light curtain using reflecting mirrors to bend the light beams around the corners ... provided that the performance characteristics of the light curtain and mirrors are adequate to span the sensing distance effectively.

21

### **Does the use of reflecting mirrors affect the maximum sensing range of the light curtain?**

Yes. Each mirror typically reduces the maximum sensing range by 10% to 25% depending upon the light curtain and the type of mirror used (e.g. front-surface reflecting, rear-surface reflecting, metal mirror, etc.)

22

### **What, if any, environmental conditions must be considered when using safety light curtains?**

Abnormal or unusual environmental conditions can compromise the performance of a safety light curtain system. For example:

- Sudden changes in temperature may result in condensation on the light curtain lenses or deflecting mirrors.
- The presence of fog, smoke or dense fumes typically reduce the effective range of a light curtain.
- The presence of steam or dust also typically reduces the effective range of a light curtain.

23

### **Must I be concerned about other light sources creating problems with my light curtain?**

Yes, one must be aware of other light sources (such as sunlight, reflections from nearby surfaces, welding arcs, light energy from other light curtains). Each should be considered when using safety light curtains.

## **24 Must light curtains only be used in the vertical position?**

No, some applications call for light curtains to be used in the horizontal orientation. When using light curtains horizontally, relevant industry standards (such as ANSI-RIA 15.06) should be respected.

## **25 Some light curtains are “matched sets” and some are not. Why and what does that mean to a user?**

A “matched set” means that the light curtain transmitter and receiver are matched at the factory (during manufacturing) for optimal performance. If during operation of the light curtain, the transmitter or receiver is damaged or fails, both must be replaced and returned to the factory for repair and adjustment.

If the light curtain's transmitter and receiver are not matched, and a receiver or transmitter unit fail or become damaged, it can simply be replaced with another unit. SCHMERSAL's light curtain pairs (transmitter and receiver) need not be matched.

## **26 Does my light curtain have to be hard-wired or may I use quick-disconnects?**

Both types of terminations are permitted. In either case, disconnecting the receiver or transmitter will result in a shut-down.

## **27 If I am using a Safety PLC, do I still have to use a safety controller (safety relay module) with my light curtain?**

A safety PLC may be used without a safety controller (safety relay module) provided that it:

- Can accept the light curtain's safety output signals,
- Has the correct diagnostics to meet the control reliability requirements, and
- Can provide a safety output suitable for initiating stoppage of the machine posing the hazard.

**28**

## **When using a light curtain with two safety outputs, may I use one for “safety” and one for “annunciation” (e.g. to send a signal to my PLC that the light curtain has been interrupted)?**

The answer depends on the safety category desired, as well as other elements in the safety system. For higher safety categories (Category 3 or 4) dual (redundant) safety outputs are needed to satisfy control reliability requirements. For such applications the answer is no.

**29**

## **How does one select the proper light curtain system for a given application?**

Typical selection factors include:

- How large is the object/body part that is being detected/protected? (This will determine the minimum required light curtain resolution.)
- What is the height/length of the area (“protected field”) to be guarded?
- What is the maximum distance (“range”) that will separate the emitter and the receiver in the application?
- How quickly must I stop the machine or process after interruption of the light curtain, and will the light curtain safety system have a fast enough “response time” to do so based on its intended location?
- What type of load will the light curtain safety outputs control, and are they sufficient for the application? (This will help determine the current capability required of the safety signals ... e.g. semiconductor outputs for controlling a safety PLC or solid state relay vs. relay outputs for direct control of a motor contactor).
- What safety level or safety control category does the application’s risk assessment indicate is required?