BeamSafe® III

Miniature Single-Beam Safety Control

**Description**

The STI BeamSafe III is a miniature, short-range, infrared safety control system designed for access guarding. A BeamSafe III system consists of the BS3-C controller combined with the diminutive BeamSafe III sensors to provide a true, type 4, self-monitoring system.

The BS3-C controller allows up to two transmitter-receiver pairs to be connected and provides a common set of redundant, force-guided, safety relay outputs. In addition, two non-safety outputs can be configured to follow the safety outputs or so that each one reports on the status of an independent transmitter-receiver pair.

On the top of the controller, LED indicators provide both diagnostic and status information. Terminal points are provided to monitor the primary control element of the guarded machine.

Muting can be accomplished using the optional BS3-M module.

**Sensor**
- 3 foot (1 meter) range
- Miniature size
- Alignment indicator
- 10 foot (3 meter cable)
- Reverse polarity and short circuit protected

**Controller**
- DIN-rail mount controller
- 24 VDC power
- Manual or automatic reset
- Prepared for muting (with optional muting module)
- Red-Green LEDs flash to indicate error codes
- Indicator LEDs for controller and safety output status
- Designed in accordance with IEC61496, EN954-1 and ANSI B11.19
- Accepts up to two sets of sensors
- Redundant force-guided relay safety outputs
- Dual solid-state auxiliary (non-safety) outputs
- MPCE test inputs

**Option**
- Mute module

Go to the Engineering Guide in this catalog for in-depth information on safety standards and use of this product.
Applications

A BeamSafe III system can provide access guarding for robotic systems, cutting machines, revolving machines, conveyor systems, production lines, graphic machinery, and semiconductor equipment. A typical example is shown.

Specifications

BS3-C Controller

Supply Voltage: 24 VDC ±20%
Power Consumption: 600 mA with two sets of sensors connected
Enclosure Rating: IP20
Terminal Blocks: 32 polar screw
Maximum Conductor Area: 2 x 1.5mm² with end sleeve, 2 x 2.5mm² with solid connectors
Safety Relay Outputs: Two potential-free, changeover outputs. Each protected with a 4A fuse.
  Response Time: <20mS
  Max. Switching Frequency: 1/s
  Max. Switching Voltage: DC 60V, AC 250V
  Max. Switching Current: 2A
  Max. Switching Power: 50W, 500VA (cos 1)
  Min. Switching Current: 20mA
Auxiliary (non-safety) Outputs: Two potential-free opto-coupler outputs
  Max. Switching Voltage: DC 30V
  Max. Switching Current: 30 mA
Inputs: Two sensors, two manual reset, two automatic reset, two MPCE test
Diagnostics: Two red-green LED
Safety Category: Type 4, self-monitoring system
Requirements: IEC 61496-1, -2; prEN 954-1
Operating Temperature: 32° to 131° F (0° to +55° C)
Storage Temperature: -13° to 131° F (-25° to +55° C)
Weight: Approx. 0.7 lbs. (300g)

Available Mute Module

Muting is used to temporarily suspend the safety function of the BeamSafe III system when product must pass through the infrared safety beam without stopping the guarded machine. This is accomplished by using BS3-M muting module in conjunction with two standard electronic or mechanical sensors (not supplied). An interruption of the infrared safety beam by an object which has not activated the two mute sensors in the proper manner will cause a stop signal to be sent to the guarded machine.
### Specifications (continued)

**BS3XM/BS3RM Sensor Set**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Range:</td>
<td>39 inches (1 meter)</td>
</tr>
<tr>
<td>Supply Voltage:</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Receiver Output:</td>
<td>PNP</td>
</tr>
<tr>
<td>Maximum Output Current:</td>
<td>250mA</td>
</tr>
<tr>
<td>Reverse Polarity Protected:</td>
<td>Yes</td>
</tr>
<tr>
<td>Short Circuit Protected:</td>
<td>Yes</td>
</tr>
<tr>
<td>Environmental Rating:</td>
<td>IP67</td>
</tr>
<tr>
<td>Operating Temperature:</td>
<td>32° to 122° F (0° to 50° C)</td>
</tr>
</tbody>
</table>

**BS3-M Mute Module**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage:</td>
<td>24 VDC ±20%</td>
</tr>
<tr>
<td>Power Consumption:</td>
<td>300 mA with two electronic sensors connected</td>
</tr>
<tr>
<td>Enclosure Rating:</td>
<td>IP20</td>
</tr>
<tr>
<td>Terminal Blocks:</td>
<td>16 polar screw</td>
</tr>
<tr>
<td>Maximum Conductor Area:</td>
<td>2 x 1.5mm² with end sleeve, 2 x 2.5mm² with solid connectors</td>
</tr>
<tr>
<td>Outputs:</td>
<td>One to BS3-C controller; one to mute indicator lamp (24 VDC, 50mA); one for sensor voltage (24 VDC, 500mA short-circuit protected)</td>
</tr>
<tr>
<td>Inputs:</td>
<td>One muting sensor (NPN); one muting sensor (PNP); one muting time limit; one safety system transmitter; one safety system receiver; one BS3-C controller</td>
</tr>
<tr>
<td>Diagnostics:</td>
<td>Two red-green LED</td>
</tr>
<tr>
<td>Safety Category:</td>
<td>Type 4, self-monitoring system</td>
</tr>
<tr>
<td>Requirements:</td>
<td>IEC 61496-1, -2; prEN 954-1</td>
</tr>
<tr>
<td>Muting Sensors:</td>
<td>Electronic sensors (e.g. optical, inductive, capacitive) and mechanical switches or a combination of both can be used. Electronic switches of the same kind or polarity cannot be connected.</td>
</tr>
<tr>
<td>Operating Temperature:</td>
<td>32° to 131° F (0° to +55° C)</td>
</tr>
<tr>
<td>Storage Temperature:</td>
<td>-13° to 158° F (-25° to +70° C)</td>
</tr>
<tr>
<td>Weight:</td>
<td>Approx. 0.35 lbs. (150g)</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>1.37 x 3.54 x 2.12 in. (35 x 90 x 54mm) W x H x D</td>
</tr>
</tbody>
</table>

Specifications are subject to change without notice.

Go to the Engineering Guide in this catalog for in-depth information on safety standards and use of this product.
**Dimensions**

Transmitter/Receiver

![Diagram of Transmitter/Receiver dimensions]

- BS3XM
  - Red: +24 VDC
  - White: Test
  - Black: 0 V

- BS3RM
  - Red: +24 VDC
  - White: Test
  - Black: 0 V

Controller

![Diagram of Controller dimensions]

**Ordering**

To have a complete system, it is necessary to order one BS3-C controller, one BS3XM transmitter and one BS3RM receiver. Use to the model numbers given below.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS3-C</td>
<td>Controller, 24VDC, redundant safety relay outputs, DIN rail mount</td>
</tr>
<tr>
<td>BS3XM</td>
<td>Transmitter, 10 foot (3 meter) cable</td>
</tr>
<tr>
<td>BS3RM</td>
<td>Receiver, 10 foot (3 meter) cable</td>
</tr>
<tr>
<td>BS3-M</td>
<td>Mute module, 24VDC, DIN rail mount</td>
</tr>
</tbody>
</table>

**Safety Standards and Precautions**

The BeamSafe III system consisting of a BS3-C controller, BS3XM transmitter and BS3RM receiver meets applicable OSHA, ANSI and RIA standards and was designed in accordance with IEC 1496 and prEN 954-1.

Only use a BeamSafe III system on machinery that stops consistently and immediately anywhere in its cycle or stroke. Never use a BeamSafe III system on a full-revolution clutched press or machine. The BeamSafe III is a single optical beam, not a curtain of light. Therefore it is not designed for use as a point-of-operation device. The point of operation is defined as "the location in the machine tool where material is positioned and a process performed." If one or more BeamSafe III systems do not protect all access to the hazardous machine area, the unprotected access must be guarded by fencing, barriers, or other appropriate methods.

The purchaser, installer and employer are responsible for meeting all appropriate laws, rules and regulations relating to the proper use, installation, operation and maintenance of this control and the guarded machine.

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For information on STI safety light curtain accessories, see page C122
Custom Modifications

For Safety Light Curtains

**Custom Modifications**

STI offers a wide range of safety light curtains. The correct curtain for your application is probably in this engineering guide. If it isn't, contact our engineers to discuss your requirements. STI has an established reputation for creating custom modifications of standard products. Some examples are highlighted below.

**ESD-safe Modification**

Versions of several STI safety light curtains are available for use in areas where it is important to dramatically reduce electrostatic discharge. The curtains have been tested to the standards of the EOS/ESD associations. Triboelectrification and static charge are well within the required limits. Consult STI for test results.

**Film-safe Safety Light Curtains**

When used in a photographic film production facility, the infrared light normally emitted by safety light curtains will fog the film and spoil production. STI has designed safety light curtains with no visible indicators and "film friendly" infrared light.

**High Temperature Fiber Optic Light Curtain**

STI can modify our standard MiniSafe MS4400 safety light curtain so that each individual beam is presented by a fiber optic cable. This allows the transmitter and receiver electronics to remain safely out of the high temperature area.

**Controller Quick-disconnect**

Certain applications call for safety light curtains to have double-ended quick-disconnect cables. This custom modification is available from STI. Quick-disconnect cables are available for transmitter, receiver, input power and relay output connections.

Go to the Engineering Guide in this catalog for in-depth information on safety standards and use of this product.