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PICO-GUARD[™] Fiber Optic Safety System

System Daily Checkout Procedure

To Be Performed at Every Power-up, Shift Change, and Machine Setup

Daily checkout and checkouts after tooling and machine changes must be performed by a Designated Person (appointed and identified in writing by the employer). During continuous machine run periods, this checkout must be performed at regular intervals. A copy of the checkout results should be kept on or near the machine: see OSHA 1910.217(e)(1).

- ✓ The Designated Person must:
- 1.
 □ Verify that:
 - Access to any dangerous parts of the guarded machine is not possible from any direction not protected by the PICO-GUARD System, hard guarding, or supplemental safeguarding, and
 - It is not possible for a person to stand inside the guarded area, or
 - Supplemental safeguarding and hard guarding, as described by the appropriate safety standards, are in place and functioning properly in any space between the optical elements and any hazard large enough to allow a person to stand undetected by the PICO-GUARD System.
 - If the USSI inputs are to be used, verify the system(s) checkout procedures for the external safety systems or other devices connected to the USSI inputs as described by the appropriate manuals. Do not proceed until all checkout procedures are completed successfully and all problems have been corrected.
- 2. Uverify that the maximum gap openings or minimum separation distances meet the calculated amounts per the PICO-GUARD Application and Design Guide.
- 3. □ Verify that:
 - The Reset switches are mounted outside the guarded area, out of reach of anyone inside the guarded area, and
 - The means of preventing inadvertent use is in place.
- 4. □ Once the System Status indicator is steady Green, test the effectiveness of the PICO-GUARD System using the Trip Test.
- 5. 🗆 TRIPTEST
- 5a. UWith power ON, verify that the PICO-GUARD System is in a RUN condition. Controller status indicators should be as follows:

Green
Green
Green

5b. □ For Fiber Optic Safety Interlock Switch optical elements:

With the guarded machine at rest, open each door/gate/guard individually for each channel and verify that:

The appropriate Channel indicator, and the System Status and OSSD indicators are Red.

5c. □ For Fiber Optic Safety Grid or Point optical elements:

With the guarded machine at rest, pass the test piece downward through each beam at three points: near the receiver, near the emitter, and midway between them (see Figure 1).

- If the emitter and receiver are far from the controller, a second person may be needed to monitor the indicators while the test piece is used.
- If corner mirrors are used in the application, the beams must be tested at three points *on each leg of the beam path* (between emitter and mirror, and also between mirror and receiver, as shown in Figure 2.



(Point elements are shown; procedure is functionally identical for Grid elements)

Figure 1. PICO-GUARD Point and Grid trip test



Figure 2. PICO-GUARD Point or Grid trip test with corner mirrors

5c. (continued)

Verify *individually for each channel* that the appropriate Channel indicator, and the System Status and OSSD indicators are Red.

If the System Status, appropriate Channel or OSSD indicators go Green at any point while the door/gate/guard is open or while any beam is blocked (5b and 5c), check for and eliminate problems with reflective surfaces as follows:

- If possible, relocate the optical elements to move the light beam away from the reflective surface(s), being careful to maintain adequate separation distance (see step 2).
- If possible, paint, mask, or roughen the surface to reduce the reflectivity.
- **Repeat the trip test** to verify that these changes have eliminated the problem reflection(s).

Do not continue with this checkout procedure or operate the guarded machine until the situation is corrected and the appropriate indicators turn steady Red whenever the door/gate/ guard is open or any optical beam is blocked.

- 5d. □ If fiber optic emergency stop devices are used, exercise one button at a time, and verify that the appropriate Channel indicator, and the System Status and OSSD indicators are Red.
 - Twist the E-stop button actuator to arm it, and reset the controller latch function; verify that the System Status, Channel, and OSSD indicators are Green.
 - · Repeat for each emergency stop device individually.
- 5e. □ Verify that when the door/gate/guard is closed, when all beams are clear, or when the emergency stop is armed:

The Channel indicators turn steady Green.

If any Channel indicators flicker, the signal is weak. To correct this problem, do the following:

- Clean the optical element lens windows. Verify that all Channel indicators turn steady Green; if so, go to step 6.
- Realign the optical elements as needed (see the PICO-GUARD Application and Design Guide). Verify that all Channel indicators turn steady Green; if so, go to step 6.
- Inspect the fiber optic cable for damage (see the PICO-GUARD Application and Design Guide). Verify that all Channel indicators turn steady Green; if so, go to step 6.



WARNING . . . Before Applying Power to the Machine or Initiating Machine Motion

Verify that the guarded area is clear of personnel and unwanted materials (such as tools) before applying power to the guarded machine.

Failure to do so could result in serious bodily injury or death.



WARNING . . . If Trip Test Indicates a Problem

If the PICO-GUARD System does not respond properly to the trip test, do not attempt to use the System. If this occurs, the System cannot be relied upon to stop dangerous machine motion when a person or object enters the beam.

Serious bodily injury or death could result.

- 6. □ If the System is operating in Latch Output mode, verify: • OSSD outputs remain OFF,
 - · System Status indicator is steady Red, and
 - System Reset indicator is flashing Yellow.

Perform a system reset, and verify that the System Status and OSSD indicators are steady Green.

7. □ Initiate machine motion of the guarded machine, and while it is moving, open each door/gate/guard individually, block each optical beam, or actuate each emergency stop device. Do not attempt to enter or reach into the dangerous parts of the machine.

Verify that the dangerous parts of the machine come to a stop with no apparent delay.

Close the door/gate/guard, clear the optical beam or arm the emergency stop device(s), and verify that:

- · The machine does not automatically restart, and
- Initiation devices must be engaged to restart the machine.
- 8. □ With the guarded machine at rest, open each door/gate/guard, block each optical beam individually or arm the emergency stop device(s), and verify that:

The guarded machine cannot be put into motion while the door/ gate/guard is open or any beam is blocked.

- 9. □ Check carefully for external signs of damage or changes to the PICO-GUARD System, the guarded machine, their electrical wiring, and fiber optic cables. Any damage or changes found should be immediately reported to management.
 - Do not continue operation until the entire checkout procedure is complete and all problems are corrected.



WARNING . . . Do Not Use Machine Until System Is Working Properly

If all of these checks cannot be verified, do not attempt to use the PICO-GUARD System/guarded machine until the defect or problem has been corrected (see the Controller Manual, Section 5).

Attempts to use the guarded machine under such conditions could result in serious bodily injury or death.

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