

**PICO-GUARD<sup>™</sup>** Fiber Optic Safety Interlock Switches, Grids, and Points

the machine safety specialist

System Semi-Annual Checkout Procedure

# To Be Performed Every Six Months Following System Installation

Perform this checkout procedure as part of System installation (after the System has been interfaced to the guarded machine) or whenever changes are made to the System (either a new configuration of the PICO-GUARD System or changes to the machine). Semi-Annual checkouts must be performed by a Qualified Person (as defined by OSHA and in the Safety Glossary of the Controller manual). A copy of the checkout results should be kept on or near the machine: see OSHA 1910.217(e)(1).

To prepare the System for this checkout, configure the System as if for machine operation.

- ✓ The Qualified Person must:
- 1. Examine the guarded machine to verify that it is of a type and design compatible with the PICO-GUARD System. See PICO-GUARD Application and Design Guide for a list of misapplications.
- 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:
  - 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.
- 4. 
  U 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.
- 5. 
  Examine the electrical wiring connections between the PICO-GUARD System OSSD outputs and the guarded machine's control elements to verify that the wiring meets the requirements stated in the Controller Manual, Section 3.
- 6. Inspect the area near the optical elements and the optical path (including guard frame pieces, work pieces, and the guarded machine) for reflective surfaces. (Reflective surfaces may cause light to reflect around an object in the beam, preventing normal detection of the safeguard and failing to stop the machine motion.) Remove the reflective surfaces as possible by relocating, painting, masking, or roughening them. Remaining problem reflections will become apparent during step 10.

- 7. □ Apply power to the PICO-GUARD System, ensure that power to the guarded machine is OFF, and remove all obstructions from the light beam. If the System is configured for manual power-up, the controller System Reset indicator will be doubleflashing. Perform a System Reset by closing the System Reset switch for 1/4 to 2 seconds, then opening it. Verify that the System Reset indicator goes OFF.
- 8. D Observe the status indicators on the controller to determine System status:

#### Stop condition, indicated by:

System Status and OSSD indicators steady Red One or more Channel indicators steady Red USSI 1 or USSI 2 input indicators steady Red

### Run condition, indicated by:

System Status and both OSSD indicators steady Green Channel indicators of all enabled channels steady Green (flickering Green if excess gain is marginal) Channel indicators for disabled channels OFF All USSI Input indicators steady Green

#### Optical channel latch condition, indicated by:

System Status indicator steady Red System Reset indicator flashing Yellow Channel indicators of all enabled channels steady Green (flickering Green if excess gain is marginal) Channel indicators for disabled channels OFF Latch Output: outputs come back ON only when all enabled channels are clear and after a System Reset.

#### USSI 1 latch condition, indicated by:

System Status indicator steady Red USSI 1 Reset indicator flashing Yellow Both USSI 1 input indicators Green The USSI 1 latch will be cleared only when both USSI 1 inputs are closed (ON) and after a USSI 1 Reset.

#### Lockout condition, indicated by:

System Status indicator flashing Red Additional indicators (indicating error type) may also flash Red

- 9. If in a run condition, go to step 10. If in a lockout condition, refer to the Controller Manual, Section 5. A stop condition indicates that an optical element is misaligned or interrupted or that a USSI stop signal is present. To correct this situation:
  - a. Check carefully the position of optical elements (open or closed) and check for any obstruction in the beam path.
  - **b. Check for contamination.** Clean the optical element windows as required (see the Controller Manual, Section 5).
  - **c.** If the beam path is completely clear of obstructions and all interlock switches are closed, realign the optical elements, as described in the Application and Design Guide and the Controller Manual.
  - d. Check the USSI inputs and device operation per the Controller Manual, Section 3.

If the System is in an optical latch condition, perform a System Reset.

If the System is in a USSI 1 latch, perform a USSI 1 Reset.

10. Donce the System Status and OSSD indicators are steady Green, perform the Trip Test (described on the Daily Checkout Card) to verify proper System operation and to detect possible reflection problems.



## 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.



# WARNING . . . Before Applying Power to the Machine

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.

12. Initiate machine motion of the guarded machine and, while it is moving, open (block) the beam through an optical element. Do not attempt to reach into the dangerous parts of the machine. Upon opening (blocking) the beam, the dangerous parts of the machine should come to a stop with no apparent delay. Upon closing (clearing) the beam, verify that the machine does not automatically restart and that the initiation devices must be engaged to restart the machine.

- 13. □ If USSI inputs are used, initiate machine motion of the guarded machine and, while it is moving, generate a USSI stop signal. Do not attempt to reach into the dangerous parts of the machine. When the USSI stop signal occurs, the dangerous parts of the machine should come to a stop with no apparent delay. Clear the USSI stop signal, and verify that the machine does not automatically restart and that the initiation devices must be engaged to restart the machine.
- 14. Remove electrical power to the PICO-GUARD System. All OSSD outputs should immediately turn OFF and should not be capable of turning ON until power is re-applied and, if configured for Manual Power-up, a manual reset is performed (Auto Power-up requires no manual reset).
- **15.** Test the machine stopping response time, using an instrument designed for that purpose, to verify that it is the same or less than the overall system response time specified by the machine manufacturer. (Banner's Applications Engineering Department can recommend a suitable instrument.)
- **16.** □ **If any decrease in machine braking ability has occurred,** make the necessary clutch/brake repairs, readjust separation distance (Ds) appropriately, record the new Ds calculation on the Daily Checkout Procedure card and/or the Controller Manual, Section 6, and re-perform the Daily Checkout procedure.
- **17. Examine and test the machine primary control elements** (MPCEs) and any intermediary controls (such as interface modules) to verify that they are functioning correctly and are not in need of maintenance or replacement.
- 18. Inspect the guarded machine to verify that no other mechanical or structural problems could prevent the machine from stopping or assuming an otherwise safe condition when signalled to do so by the PICO-GUARD System.
- 19. Examine and inspect the machine controls and connections to the PICO-GUARD System to verify that no modifications have been made that adversely affect the System.

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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