1 Purpose

This Initiative only applies to equipment that uses presence sensing devices. These devices can be laser scanners, radio-frequency field sensors, but most commonly include light curtains. If equipment does not use any presence sensing devices, then that equipment does not need to be included in this initiative and therefore does not need to be reviewed.

To ensure that equipment installations (new, modified, transferred and relocated) within the workplace that use Presence-Sensing Device Initiation (PSDI) or Muting technology are correctly functioning as defined in ANSI B11.19.

The Equipment Installation Approval Initiative is:

- A **onetime initiative** for locations to perform within a prescribed timeframe as mandated by C/HSE3-NA
- A task to confirm that locations are aware that they are using this technology and that it is properly functioning
- Location compliance to ANSI B11.19 Sections 6.7 and 6.8 as understood by Bosch

The Equipment Installation Approval Initiative is not:

- A comprehensive safety check of the equipment and facility to ensure that it meets all ANSI B11.19 requirements

After completion of the PSDI/Muting Approval Initiative the location should be able to:

- Identify equipment that uses PSDI or Muting technology
- For the equipment that uses PSDI or Muting technology, certify that the technology is properly functioning and that all requirements of ANSI B11.19 Section 6.7 and 6.8 are implemented
    - **Additional professional resources may be needed to accomplish this task**
- Certify that moving forward the location will ensure that PSDI and Muting technology is properly used and maintained

2 Definitions

Presence-Sensing Device Initiation (PSDI): The use of presence sensing devices (e.g., light curtains, laser scanners, radio-frequency field sensors…) both to safeguard the associate and to initiate a machine cycle. PSDI is used to initiate the cycle of a machine by counting the number of "breaks" or obstructions of a presence sensing device (such as a light curtain).
Muting: The temporary automatic suspension of a safety function during the non-hazardous portion of the process/machine cycle. It is not to be confused with blanking or bypassing. As an example, muting a light curtain would ignore the light curtain safety function.
Blanking: Bypassing a portion of the sensing field of a presence-sensing safeguarding device. Note that this is a portion of the sensing field, not muting the entire safeguarding device.
Human Machine Interface (HMI): Software application that presents information to an operator or user about the state of a process, and to accept and implement the operator's control instructions.

3 References

3.1 External references

ANSI B11.19: American National Standard for Machines: Performance Criteria for Safeguarding

3.2 Internal references

Bosch General Delivery Specifications (GDS)

4 PSDI Approval Initiative Process

4.1 Background for the Initiative

PSDI is an operating mode that utilizes a presence-sensing device to initiate a single machine cycle when it senses that work motions of the operator related to feeding or removing parts are completed and all parts of the operator's body are withdrawn from the sensing field of the device.

With a manually controlled machine operation, an operator is required to utilize hand or foot controls to start the machine manually after each interaction. The use of a PDSI device can allow for improved cycle time, as it does not require the hand or foot control to start the machine. Rather, the PSDI device senses when the operator's body part has been removed from the sensing field and automatically starts the machine operation.

A light curtain with PSDI operates in the same way as a traditional light curtain, however, logic is used to recognize interruptions in order for the device to determine when it is safe to initiate the next machine cycle. It is typical for muting to be used in conjunction with PSDI. The muting function allows the operator's body part to be within the sensing field during the non-hazardous portion of the machine cycle. For example, when using PSDI on a machine, a single or double break (interruption) of the detection field of the safety device causes an automatic cycle initiation. In other words, when the operator's hands enter the protected area during a hazardous portion of the machine cycle, the equipment will come to a stop, just like a typical light curtain application. Then for a single break application, the light curtain will also detect when the operator's hands enter the protected area to remove the part; as soon as the operator's hands leave the protected area, the next machine cycle can immediately begin.

While this technology is not new, it is becoming more widely used. The PSDI technology requirements are described in B11.19, but there are some uses that OSHA does not permit this to be used. OSHA does not allow PSDI to be used on mechanical power presses or in any machines that cannot be immediately stopped. It is permitted by OSHA to use them on hydraulic and pneumatic power presses, power press brakes, and robot systems.

Although there may seem to be many benefits to using PSDI, there is also added responsibility to using this technology. Since the machine safety for PSDI is controlled by machine logic, it is essential that the logic is correctly programmed and properly managed (i.e., not permitted to be changed without proper approval). In addition, all the ANSI B11.19 requirements must be met.

4.1.2 Bosch Required Actions

C/HSE3-NA has determined that all locations will take the following actions on all equipment to review and confirm that PSDI and muting is correctly used:

1) Review all equipment that utilizes presence sensing devices to determine if PSDI or Muting Technology is used.

   Items to look for when reviewing equipment (note: additional support may be needed from other functions with the organization to identify PSDI/muting):
   a. PSDI - Any machine that activates based only on the change in state of a safety sensor such as light curtain or area sensor (e.g., Associate's body part removed from sensing field and machine cycle initiates)
      i. Clearing a safety barrier light curtain AND then requiring operator to activate machine cycle with a push button, 2 hand control or other interaction with Human Machine Interface (HMI), is a manual operation, thus not PSDI
      ii. Area scanners may NEVER be used as part of PSDI if the protected area allows full body entry (e.g., robot enclosure cage)
   b. Muting - MAE that continues in motion when a safety barrier is entered. Generally these will be found only when Safety PLC's are in use
      i. Note: It is possible to program some light curtains to have a muting zone that does not include the full length of the light curtain bar. This is referred to as "Blanking" (see example below)

Example 1(PSDI): The light curtains and no start push button, the machine inatites after the hands are removed from the sensing field.
Example 2 (Blanking): A portion of machine is in front of light curtain, however light curtain still is functional in other areas.
Example 3 (Muting): Light curtain is controlled by a Safety PLC which "mutes" the light curtain to allow the work piece carrier to pass through the opening without stopping the machine. The design assumes operator can't get hand into hazard zone while pallet is passing through and thus blocking the entry point.

Example 1

Example 2

Example 3

2) If equipment that uses PDSI or Muting is identified, the list of equipment must be provided to C/HSE3-NA (Ryan Young) for locations in the US and Canada and C/HSE3-MX (Miguel Jaurez) for locations in Mexico. C/HSE3-NA and C/HSE3-MX will work with each location to review the list of equipment and determine next steps.

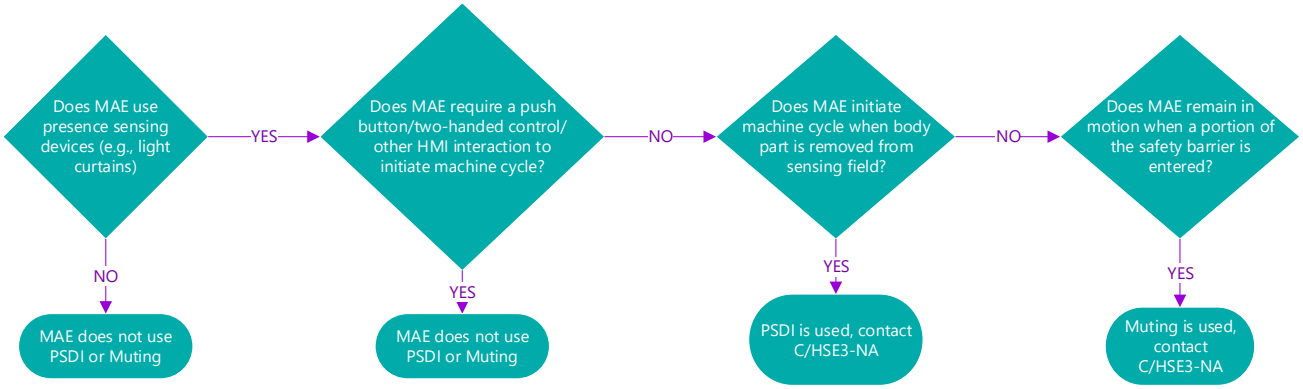
3) C/HSE3-NA and C/HSE3-MX will collect all responses from locations and then work with each loction to confirm compliance. Responses from locations will be tracked until completition. Next steps may include performing a risk assessment of the equipment, evaluating the equipment for compliance to ANSI B11.19 or reviewing equipment to determine if PSDI/Muting technology is necessary. Please note, external resources may be needed for equipment review (e.g., machine safety consultants).

4.2.5 Continual Compliance

Locations must utilize the Bosch GDS or other location specific resources (including location specific machine acceptance/change process) to ensure that equipment is built or ordered to meet US OSHA and ANSI B11.19 regulations. Installation and subsequent release of equipment must follow the Location specific machine release process which needs to include compliance to OSHA and ANSI B11.19 installations.

The Location is responsible for maintaining documentation to show compliance to OSHA, ANSI B11.19 and Bosch standards.

5.0 Flowchart for PSDI/Muting Equipment Review



6.0 CHANGE/REVIEW RECORD

Revision	Description of Change	Effective Date	Change Reviewed By
Original	Original Issue	10/23/19	C/PSR3-NA