OPERATOR & ELECTRONICS DIVISION
DASMA TECHNICAL DATA SHEET
#368
Door & Access Systems Manufacturers Association International

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Edge Sensors

INTRODUCTION

Edge sensors are used to detect obstructions in the openings controlled by or in the vicinity of garage doors, rolling doors, rolling grilles, or gates and provide a signal so that operators can respond appropriately. These external edge devices are usually attached to, or are part of, the bottom edge of an upward acting door or grille or the leading and/or trailing edge of a moving gate or on an object in the vicinity of the door or gate such as a post or wall. When an edge sensor detects an obstruction, it will signal the operator to stop and/or reverse, or prevent movement of the door, grille, or gate, by the operator.

Edge sensors are typically used to protect against entrapment. Entrapment is defined as the condition when a person is caught or held in a position that increases the risk of injury. Edge sensors that are intended to be used as external entrapment protection devices are required to be monitored per ANSI/CAN/UL 325, *Standard for Safety for Door, Drapery, Gate, Louver, and Window Operators and Systems*.

This Technical Data Sheet will help you understand the capabilities of edge sensors and will provide important safety information. It is important to remember that an edge sensor provides a signal to an operator and does not control a door/grille/gate itself, and that the operator must choose what to do with that signal.

IMPORTANT NOTE: Refer to the operator instruction manual and contact the operator manufacturer or edge sensor manufacturer for information on compatible edge sensors. Only edge sensors that are monitored and have been evaluated with an operator to ANSI/CAN/UL 325 and are listed in the operator Instruction Manual as monitored external entrapment protection devices are to be used as entrapment protection.

PRINCIPLES

Edge sensors in gate/door/grill systems are sometimes described as being "monitored" or "non-monitored." These terms refer to requirements in ANSI/CAN/UL 325 that apply to various types of systems.

- "monitored" system: the operator system checks for the presence and connection of the entrapment protection device. For example, a monitored system will detect a short or open condition in the edge device, its wiring or interruption of the wireless signal and will require constant pressure to move the operator in the direction of travel being protected or shall only be moved manually. Check and test for proper operation of the device monthly. Repair or replace damaged devices to return to normal operator function. Only monitored device systems may be used as entrapment protection.

- "non-monitored" system: the operator system does not check for the presence and connection of the entrapment protection device. A non-monitored operator system will not detect faults in the circuit. It is important to test the activation regularly along the entire length of the edge sensor. An open or short in the wiring to the operator or in the edge will result in loss of signaling capability until devices and connections are repaired. Non-monitored systems may be used for functional needs or for property protection. Non-monitored systems may not be used as entrapment protection.

TYPES OF EDGES

There are several different types of edge sensors, as follows:

Contact Edge Sensors (requires contact with the edge to sense an obstruction)

- Pneumatic Edge Sensor
  A pneumatic edge sensor is a flexible astragal or profile enclosing an air chamber along the full length of the astragal. The air chamber can also be defined through an additional rubber or plastic tube inside the astragal. The seal on the ends can be made with a plug or glued endpiece. A hose/tube exiting any side of the air chamber (e.g. through one of the plugs or through the back of the profile) leads to the pneumatically activated electric switch that is connected to the control circuit of the motor operator. When a door/grille/gate closes on an obstruction, the pressure in the edge/tube increases and

activates the electric switch, thus activating the edge sensor circuit. Sensitivity of the electric switch should be adjusted, if necessary, per manufacturer's recommendations.

If the air chamber is damaged (e.g. punctured, the tube is cut open, or an end plug falls out), the edge sensor may not function properly. In order to prolong the life and effectiveness of the edge sensor, the edge or (where applicable) the tube inside the pneumatic sensing astragal should not be compressed when the door/grille/gate is closed. Stops can be attached to the door/grille/gate to prevent a compressed astragal/edge from occurring. Always follow the manufacturer's recommendations.

- Electric Edge Sensor
  An electric edge sensor typically consists of two (2) adjacent conductive materials inside an astragal. These conductive materials are normally separated by a small gap. When the astragal is compressed, the conductive materials make contact, thus activating the edge sensor signal.

  The signal may be monitored or non-monitored by the operator system.

  Electric edge sensors typically are configured as follows: 2-wire normally open [non-monitored], 2-wire terminated [monitored], 4-wire normally open [monitored], 2-wire normally closed [monitored]. In the 4-wire configuration, external wires are connected to both ends of the conductive materials. In the 2-wire terminated configuration, component(s) such as capacitor, resistor, diode, or any means that could be used as a part of the monitored system is/are connected across the two adjacent conductive materials at the end of line (opposite to the wire exit end).

- Optical Electronic Edge Sensor
  An optical electronic edge sensor typically consists of a light transmitter and a light receiver plugged into an astragal. When the astragal is compressed, the light beam is blocked, thus activating the edge sensor. The system could contain self-monitoring circuitry to detect faults occurring from light beam blockage, wiring opens/shorts, and loss of power. The edge signal may be monitored by the operator system.

Non-Contact Edge Sensors (technology not requiring physical contact to sense the obstruction)

- Capacitance Edge Sensor
  A capacitance edge sensor is a non-contact sensing system consisting of a flexible astragal with an integrated sense antenna that is a part of a powered closing device. Connected to this sense antenna are electronics that create a field that surrounds or precedes the closing device. The field will sense conductive objects, such as individuals or metal items, in its path before contact is made. When an obstruction is sensed, the circuitry will send a signal, thus activating the edge sensor. (Note: Non-conductive materials like paper, wood, and plastic will not be detected.)

- Light Beam Edge Sensor
  A light beam edge sensor is a non-contact sensing system consisting of a light transmitter and a light receiver plugged into a holder that travels with the door. When an obstruction blocks the light beam, the edge sensor is activated. The system could contain self-monitoring circuitry to detect faults occurring from light beam blockage, wiring opens/shorts, and loss of power. The edge signal may be monitored by the operator system.

MEANS OF CONNECTIONS

- Hard Wire
  Connecting the edge sensor to the operator controls with wires, typically achieved through a coiled cord or retractable reel.

- Inductive Signal Transmission
  Connecting the edge sensor to the operator through a touchless connection along heavy duty steel cable without need for periodic maintenance due to servicing batteries.

- Wireless
  Paired wireless transmitters and receivers can be used to send signals from edge sensors to the door/grille/gate operator in place of “hard wires”. They are part of the monitored or non-monitored system. The transmitter sends a signal when the edge sensor is activated.

Common wireless transmitter systems are radio frequency (RF) and infrared (IR). RF system range and operation may be affected by metal objects, EMI (electromagnetic interference), or RFI (radio frequency interference). Receiver antennas should be located as far away from the metal enclosure of the door/grille/gate control as possible. IR systems usually require an unobstructed line of sight between the transmitter and receiver. Periodic maintenance is required to ensure system integrity (such as servicing batteries).

IMPORTANT SAFETY INFORMATION

Refer to the operator instruction manual and contact the operator manufacturer or edge sensor manufacturer for information on compatible edge sensors. Only sensors that are monitored and have been evaluated with an operator to ANSI/CAN/UL 325 and are listed in the operator Instruction Manual as monitored external entrapment protection devices are to be used as entrapment protection.

- Edge sensors must be installed, visually inspected, and tested in accordance with the manufacturer's written instructions.
- Check for damage to the edge sensor and the wiring between the edge sensor and the motor operator regularly as noted in the manufacturer's instructions. Repair or replace as necessary to keep system in good working order.
- Test stopping capability regularly as noted in the manufacturer's instructions.
- DASMA recommends that installers of doors, grilles and gates verify that all functions of the door/grille/gate and the operator are working correctly according to the manufacturer's installation instructions and also verify that the edge sensor works properly.
- Fault conditions may be overridden by manual control of the door/grille/gate only if provided by the motor operator.