



UL 325-2018

Standard for Safety

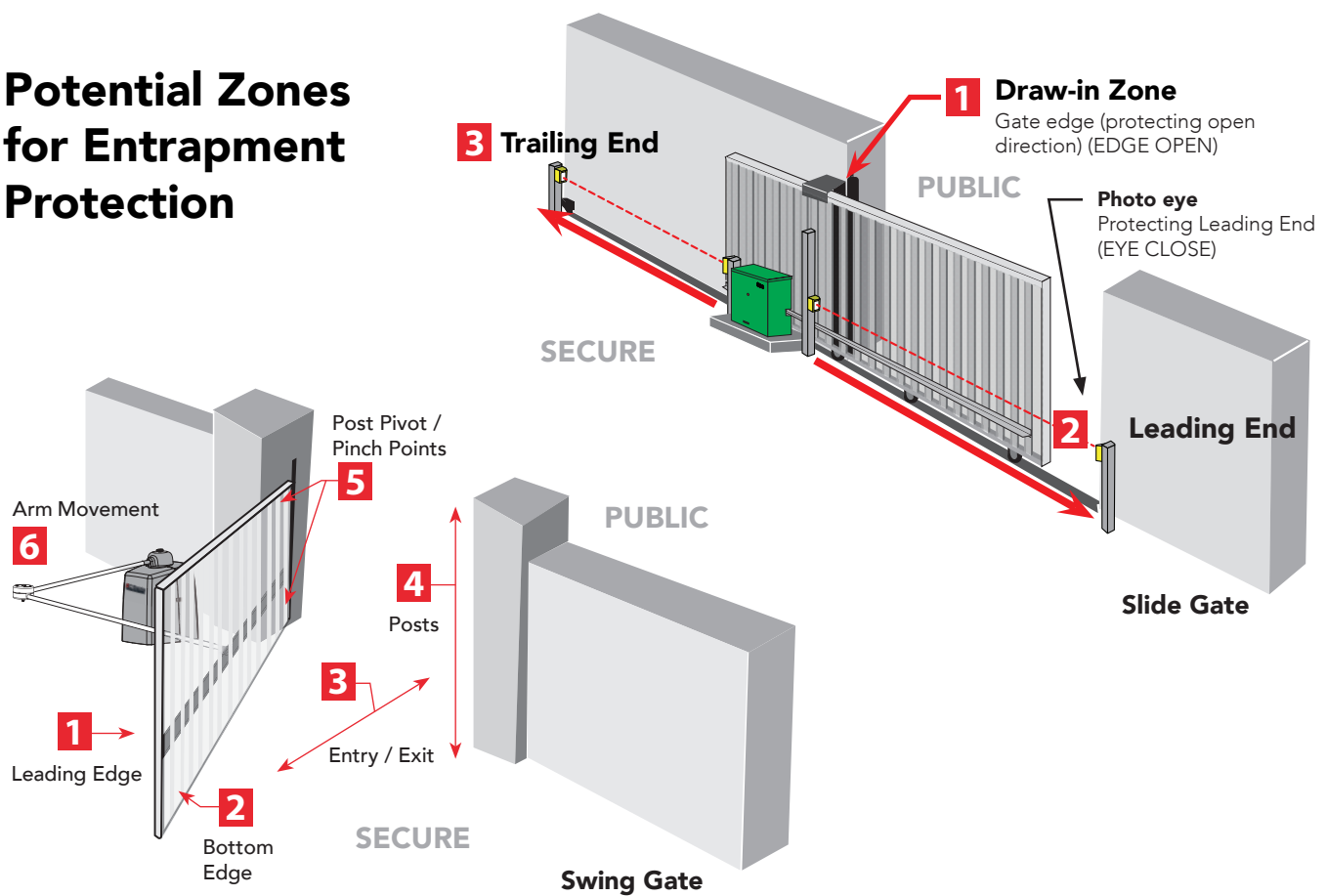
HySecurity Products Version

UL 325 - 7th Edition

Frequently Asked Questions

Changes for UL 325-7th Edition - effective for gate operators manufactured after August 1, 2018

Potential Zones for Entrapment Protection



Frequently asked questions about the 7th Edition of UL 325 - effective for gate operators manufactured after August 1, 2018

Q1 Where can I go to get a basic understanding of UL 325 and its history?

A: The Door and Access Systems Manufacturing Association (DASMA) publishes many excellent Technical Data Sheets. TDS #353 provides details about Underwriters Laboratories, the history of UL 325 and many other key details. www.dasma.com/pdf/publications/techdatasheets/operatorelectronics/tds353.pdf

Q2 How is UL 325 7th Edition different from UL 325 6th Edition?

A: Not much and a lot. Changes were made to the 7th edition to clarify the confusion that occurred in 2016, when the 6th Edition went into effect. The primary confusion regarded the minimum number of entrapment protection sensors that are required to meet the standard. Since year 2000, UL 325 has required that gate operators be installed with two independent means of entrapment protection and that each means must protect both directions of gate travel. For 2016, a monitoring requirement for external sensors was added to block fully automatic operation until the minimum number of entrapment protection sensors have been installed. The wording of the 7th Edition of UL 325 has been clarified to resolve the differing interpretations regarding the minimum number of sensors required for each type of gate.

Q3 What is the minimum number of external entrapment protection sensors (combination of photo eyes and edge sensors) required in a typical automated gate installation?

A: The correct answer depends on the, the type of operator, the type of gate and the number of entrapment zones that must be protected. Table 32.2 was added to the 7th Edition of UL 325, making the minimum entrapment protection requirement very clear.

Note: For most gate operators, the first means of entrapment protection is the inherent sensor and the second means of entrapment protection is the external entrapment protection sensors the installer must add.

Table 32.2
Minimum Quantity of Entrapment Protection Means

	Opening	Closing
Horizontal Slide Gate	2	2
Horizontal Swing Gate	2*	2*
Vertical Pivot Gate	2	2
Vertical Lift Gate	1	2
* For a horizontal swing gate operator, at least two independent entrapment protection means are required in each direction of travel. Except, if there is no entrapment zone in one direction of travel, only one means of entrapment protection is required in that direction of travel; however, the other direction must have two independent entrapment protection means.		

Exception: A Barrier Arm is not required to be provided with means to protect against entrapment, unless the arm moves toward a rigid object closer than 16 inches. (32.1.1)

Q4 Explain what monitoring is

A: Monitoring is an electrical means to verify that the external sensor has been installed. Every external sensor that protects against entrapment must be monitored for presence at least once per gate cycle. If an entrapment protection sensor is not installed, a constant hold input from a wired device is required to ensure the person pushing the open or close button is watching to verify the path of the gate is clear.

Q5 How does an operator monitor an external sensor?

A: Manufacturers use one of three different methods to monitor external sensors.

- a. Connecting sensors using a NC (Normally Closed) circuit and cycling the power.
- b. Detecting a frequency or pulse generated by the sensor (2 or 4 wire design).
- c. Detecting a resistor, typically 10k ohm, which allows a small current to bleed through the circuit.

Each of these methods has advantages and disadvantages. HySecurity selected the NC, Normally Closed solution to monitor external sensors because it allowed use of the existing Smart Touch and Smart DC control boards with no hardware changes whatsoever and minimal software adaptations, thus allowing the use of the same boards that our customers have become familiar with over many years.

Q6 How many monitored external sensors can I connect to a HySecurity operator?

A: All HySecurity control boards have three function programmable external entrapment sensor inputs. The inputs are marked Sensor 1, Sensor 2 and Sensor 3. Only one sensor can be connected to each input, so a maximum of three external sensors can be used. If you need to have more external sensors, an adapter made by Miller Edge named The Solution (part number MIM-62) can be added. The Solution module has six inputs and two outputs, which must be wired to two of the Sensor inputs. When a Solution module is used, along with the third Sensor input, the maximum number of external sensors that can be connected is seven.

Q7 Since an edge sensor is a normally open (NO) contact, how is it possible to monitor this?

A1: New edge sensors have an internal resistor and this resistor allows a small current to pass through the edge, which is how the edge will be monitored. This change also means that old edge sensors without the 10k resistor cannot be monitored, therefore you must be certain to buy edge sensors with a 10k resistor.

A2: For hard wired edges, you will also need to add an edge interface module: The HySecurity Hy2NC, part number MX4018, monitors the 10k ohm resistor in the edge sensor and converts the edge to a normally closed (NC) contact. Since the Hy2NC module has two channels, it can support up to two hard wired edge sensors when connected to two of the three Sensor inputs on HySecurity's control board.

A3: If the edge sensor is to be transmitted to the gate operator, (not recommended) you won't need the Hy2NC module, but instead a Wireless Link Kit will be required. Either the EMX WEL-200, or the iGAZE RE Kit are recommended. If you plan to transmit two edge sensors, such as the leading end and trailing end of a slide gate, you'll need an additional transmitter. Only one receiver is needed because the receiver has multiple channels. Each channel can monitor at least one transmitter. You must however be aware that wireless edge transmitters are prone to radio frequency interference (RFI) issues. To minimize end user frustration and installer call backs, avoid using wireless edge transmitters in crowded RF locations, such as police or fire stations, courthouses, airports and defense or military bases.

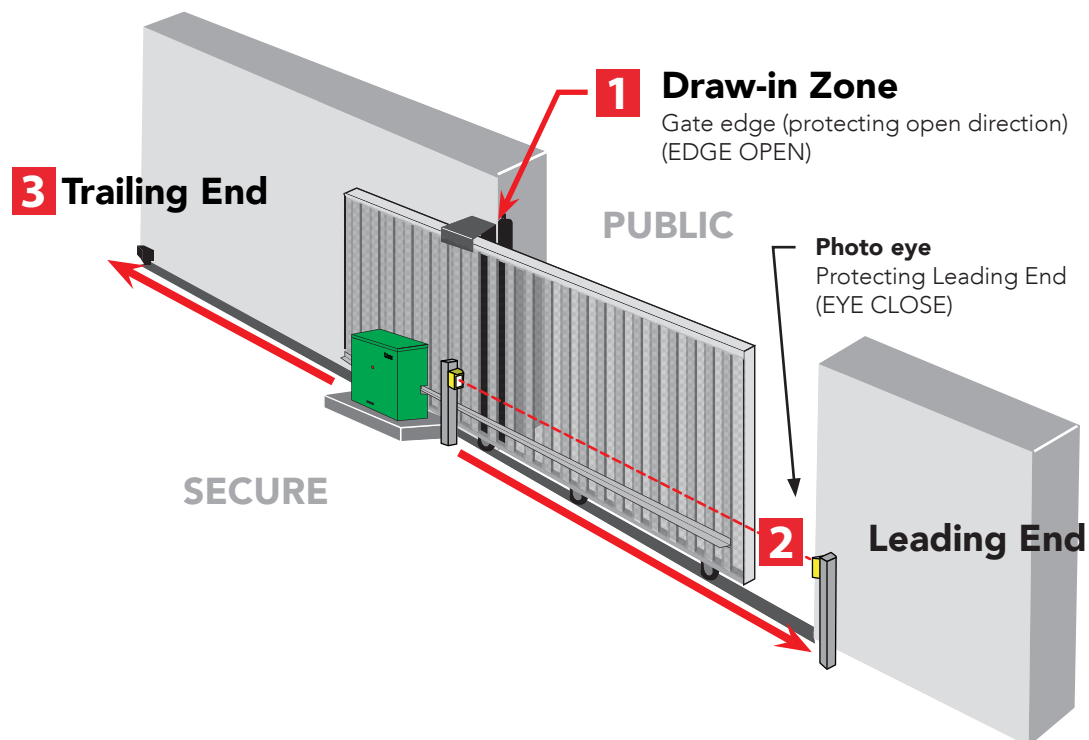
Q8 Why does HySecurity recommend hard wiring an edge sensor and avoiding use of a wireless edge transmitter?

- A:**
1. Risk of RFI interference, which may cause a monitoring fault.
 2. Faster signal communication means the gate will begin reverse faster if hard wired.
 3. No batteries to fail, which with monitoring, will cause a service call.
 4. Hard wiring an edge sensor also lowers the cost of installation.

Q9 I normally installed edges sensors on the leading and trailing end of a sliding gate. Isn't that the best way to protect against entrapment?

A: Not necessarily. While the leading and trailing ends of a sliding gate are potential entrapment zones, the risk of entrapment, serious injury or death is greatest at the "Draw-In" zone. Common installer practice has been to prioritize installation of edge sensors on the ends of a sliding gate, while not protecting the "Draw-In" zone where the gate travels past a rigid object such as a wall, gate support posts or stationary fences. HySecurity strongly recommends that the first edge sensor installed on a sliding gate be installed to protect the Draw-In zone. See slide gate illustration below:

Most common areas requiring entrapment protection



Installers must assess each specific site and install sensors that protect all potential entrapment zones.

Q10 What happens if one of the external Entrapment Protection Sensors becomes disconnected or fails in a HySecurity gate operator?

A: The operator will stop cycling in automatic mode. The gate operator monitors the “Presence” of each entrapment protection sensor. When the operator no longer detects a sensor, it will cease automatic operation only in the direction of the missing or failed sensor. The operator will still function, but only with a “Constant Hold Input” from a wired access control device within sight of the gate.

Q11 What devices have been tested for use with HySecurity gate operators?

A: The following sensors have been tested with HySecurity gate operators by an independent laboratory and certified to comply with UL 325 7th Edition. Only select sensors from this list for UL compliant gate automation solutions with HySecurity operators.

HySecurity Recommended Sensors				
	Mfg. Part #	Mfg.	Details	Hysecurity Part #
Photo Eyes (Retroreflective)	E3K-R10K4-NR	Omron	40 ft max range limit	MX000999
	NIR-50-325	EMX	45 ft max range limit	
	IRB-RET	EMX	53 ft max range limit	
	E-931-S50RRGQ	Seco-Larm	46 ft max range limit	
Photo Eyes (Thru-Beam)	IRB-MON*	EMX	65 ft max range limit	MX3990
	E-960-D90GQ	Seco-Larm	90 ft max range limit	
Edge Sensors	Sentir Series**	ASO Safety	Channel mount, high profile Channel mount, low profile Round, wraparound Square, wraparound	AS1502-0440-05 AS1502-0430-05 AS1501-0760 AS1501-0790
	CPT210-2U-#-T2	Miller Edge	10k resistor termination (replace # with length requirement in feet)	
Edge Sensor, Converters (10K to NC Contact)	Hy2NC	HySecurity	2-channel edge converter	MX4018
Edge, Wireless Kits	iGAZE RE Kit	Transmitter Solutions	50 ft line of sight max range limit	
	WEL-200 (kit with receiver and transmitter)	EMX	200 ft line of sight max range limit	
Multi-Input Module	The Solution – MIM-62	Miller Edge	6 inputs to 2 outputs	MX3987

*IRB-MON photo eyes are pre-bundled with HySecurity SwingSmart DC, SlideSmart DC and SlideDriver operators.

**Sentir Series ASO edge sensors are pre-bundled with HySecurity SlideSmart DC and SlideDriver operators.

Q12 Can any UL Recognized or ETL Listed sensor be installed with any UL or ETL Listed gate operator?

A: No. In addition to UL 325 component recognition or an ETL Listing, a sensor must also be tested together with the specific gate operator to meet UL 325 Standard of Safety and be included on the operator manufacturers list of compatible sensors. (60.8.7)

About Component Recognition:

UL's component recognition service covers the evaluation of components or materials intended for use in a complete product or system. These components are intended only for incorporation into other end-use products that may be eligible for UL's Listing, Classification or Certificate Service.



You must consult your gate operator manual to determine the components that are tested for use with that specific gate operator. All entrapment protection sensors, such as photo eyes and edge sensors, must be tested

by UL, ETL or another Independent Test Laboratory. Successfully passing a UL 325 component test allows the component manufacturer to “Mark” the product with a label that looks like one of these:



UL Recognized

This UL logo indicates that the component, in this case an EMX photo eye, was tested by UL and met the UL 325 standard for photo eyes.



ETL Listed

This circular ETL LOGO with a registration number below indicates that the component, in this case an EMX photo eye, was tested by Intertek and met the UL 325 standard for photo eyes.

However, neither “UL 325 Recognized” nor “ETL 325 Listed” as shown above fully qualifies a component to be used with a gate operator. Each sensor, brand and model, must still pass another test proving its compatibility and functionality when connected to a UL 325 Listed or ETL Listed gate operator. All gate operator manufacturer’s installation instructions must list the sensors which are approved for connection to their gate operators. (32.2.1.1, 60.8.7)

Q13 Does HySecurity recommend a specific brand of edge sensor?

A: Yes, HySecurity recommends ASO brand edge sensors because the ASO design is robust and significantly more reliable (less prone to monitoring failure) than an edge sensor made with rubber coated foam.

Q14 Does HySecurity recommend a specific type of edge sensor on a swing gate?

A: Yes, on the leading end of a swing gate with a 2 inch frame. HySecurity recommends a Wraparound style edge sensor, because one wraparound edge sensor can protect in both the open and close directions of swing gate travel. All HySecurity Smart Control Boards have an input option that allows a single wraparound edge sensor to reverse the gate either when opening or when closing.

Q15 What other key changes were made to the 7th Edition UL 325, effective 8/1/2018?

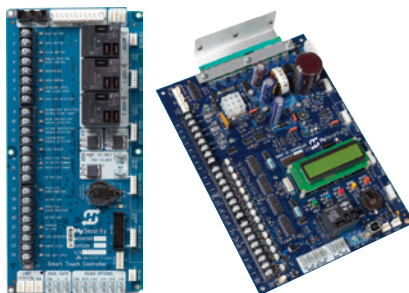
A: There are several other noteworthy wording clarifications and additions, as noted below:

1. Entrapment zones have now been defined for each type of gate. Rather than put all the details here, please review the gate operator instruction manual. (4.23, 4.24, 4.29, 4.34)
2. An important clarification stated that every external entrapment protection sensor installed must be monitored. (32.1.8)
3. Common work around techniques to bypass monitoring have been specifically prohibited: It shall not be possible to make simple modifications in the field by adding, suppressing, or changing either on the operator or external entrapment protection device(s), to bypass, interfere with, or otherwise defeat the monitoring function, via a) The connection of wires; b) Terminals; c) Switches; d) Jumpers; or e) Components supplied with the operator or external entrapment protection device. (32.1.10)
4. The manual shall not provide instructions for which the stated purpose is to reprogram, reconfigure, or reset the monitored outputs such that they do not comply with the minimum entrapment protection requirements, except to revert to original factory settings. (32.1.11)
5. The operator shall not be provided with resistors installed or intended for installation across the terminals that are intended for monitored external entrapment protection devices and the manufacturer shall not recommend the use or installation of such resistors. (32.1.12)
6. A component, such as a resistor, capacitor, etc. required for monitoring shall be permanently installed at the factory by the manufacturer of the entrapment protection device. (32.1.13)
7. UL 325 - 7th Edition of is now the National Standard in Canada for Door & Gate Operators.

Q16 If an older HySecurity Smart Touch or Smart DC board requires replacement, do I need to change the installation to comply with the UL 325 - 2018 standard?

A: No. The requirements of the UL Standard are not retroactive to older operators. HySecurity's control boards and software manufactured in 2018 is backwards compatible with older HySecurity operators.

HySecurity Smart Touch & Smart DC Control Boards didn't change. They are backwards compatible with pre-2018 operators.



Q17 Do gate operators manufactured prior to August 1st, 2018 require Monitored Entrapment Protection Sensors?

A: Yes and No. Monitoring of external entrapment protection sensors is only required when the automatic gate operator is manufactured after January 11, 2016. There is no requirement to update a pre-2016 operator to comply with a newer standard.

Q18 Can I update an older HySecurity operator to meet the new 2018 UL 325 standard?

A: Yes, very easily. Just upload new software version h4.60 (Smart Touch) or h5.60 (Smart DC) or later and add the necessary entrapment protection sensors that have been tested and approved by HySecurity.

Q19 What UL 325 inspired changes may impact my external sensor choices?

A: The added expense and potential for false monitoring failures add complexity when using a monitored wireless transmitter/receiver and may push some installers to change their installation practices and choose locations for edge sensors that can be hard wired directly to the gate operator. Some installers may develop a preference to use photo eyes as entrapment protection sensors, because a photo eye may be easier to install and monitor than an edge sensor and because a photo eye offers non-contact protection. HySecurity is emphasizing that the most important and first location to install an edge sensor for all sliding gates is to protect the Draw in Zone on the public side, where the gate moves behind the fixed fence line or wall during opening. The risk of entrapment, serious injury or death is greatest at the "Draw-In" zone.

Q20 What I can do to assure more reliable photo eye performance and less false tripping?

A: Be aware that not all photo eyes are equal and be careful about trusting the published maximum range of a photo eye. Manufacturers frequently do not tell the whole story when publishing their specifications. This is especially true for reflective style photo eyes. A photo eye must have significant "excess gain" to ensure reliability in outdoor applications, because fog, ice, snow and/or dirty optical surfaces are all normal in an outdoor environment. Unfortunately, most photo eye manufacturers do not publish their "excess gain" charts or tell you a reliable range for outdoor usage. They generally publish only a theoretical maximum range, which may suffice for indoor use. Be conservative when using photo eyes with longer gates. As a quick rule, limit the distance that you use a photo eye in an outdoor application to a maximum, of 75% of the manufacturers' published range. Some photo eyes will only reliably operate at 50% of their published range. The photo eyes approved for use with HySecurity Gate Operators are shown in the table in Q11 above with our conservative ranges, based on our tests or a detailed review of the manufacturers' specifications. Additionally, in more challenging climates, we strongly recommend the use of hoods or preferably covers over photo eyes and reflectors to shield all the optics from dirt, condensation and ice.

Q21 If I add monitored entrapment protection sensors and download a software update from HySecurity into an older HySecurity gate operator, won't that force me to update to comply with UL 325 – 2018?

A: No. HySecurity has a configuration menu in our software that will only appear after loading new software into an older operator. This new menu will prompt the installer to enter the Build Year [BY x] and by entering a setting of [BY 1] the software will function the same as if it was a pre-2016 operator. If you set the Build Year to [BY 2] the operator will be configured as a 1/1/2016 – 7/31/2018 operator and If you set the Build Year to [BY 3] the operator will be configured for UL 325 7th Edition – Build date 8/1/2018 or later. It's that simple! Of course, you will also have to add the required number of approved external entrapment protection sensors, which will be monitored.

Q22 Can I use a new Edge sensor (with a resistor) on an older gate operator without a monitoring circuit?

A: No. For 2015 and older HySecurity gate operators, you must be certain to add the Hy2NC module as an interface or buy edge sensors without a resistor. Directly connecting an edge sensor, with a resistor, to HySecurity's controller is likely to falsely trigger the sensor input. If an installer uses an Edge with a resistor on a pre-2016 HySecurity operator, a functional, but non-monitored connection can be created by using an Hy2NC module and setting the Installer Menu "GC" GATE EDGE to "1," (Normally Closed). Note: In pre-2016 gate operators, the GATE EDGE menu defaults to N.O. (Normally Open).

Visit www.hysecurity.com/gatesafety for more information



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