



Guide to Safety Edge Systems



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Guide to Safety Edges

All new automatic gate & door systems installed in the UK should comply to BS-EN13241-1 & EN-138491-1 harmonised safety standards (See page 8). ASO safety solutions are Europe's market leading manufacturer of resistive safety edges and inductive transmitting systems for gates & door systems.

At EGD we supply the full ASO package, from design & training through to on-site installation and technical support. This guide describes the functionality of ASO safety systems and how they comply to the law with examples of where and how to fit them to automatic gates & doors.

(This document is designed as an introductory guide only. Each individual gate or door installation is unique and a full risk assessment should always be carried out first before any work is undertaken. For full training and expertise please contact us to arrange a visit from one of our safety experts).

Safety Edge System Explained

The ingenious design of an ASO Safety Edge comprises of a fully extruded rubber profile with an integrated switching chamber. The switching chamber consists of two conductive rubber surfaces separated by a 4mm void, each surface has a connection wire extruded through its entire length.

A pre-formed plug containing an 8.2kΩ resistor is glued in to one end of the switching chamber penetrating both wires. At the other end a pre-formed wiring plug is glued in to place, again penetrating the chamber wires. This enable monitoring of the entire safety edge.

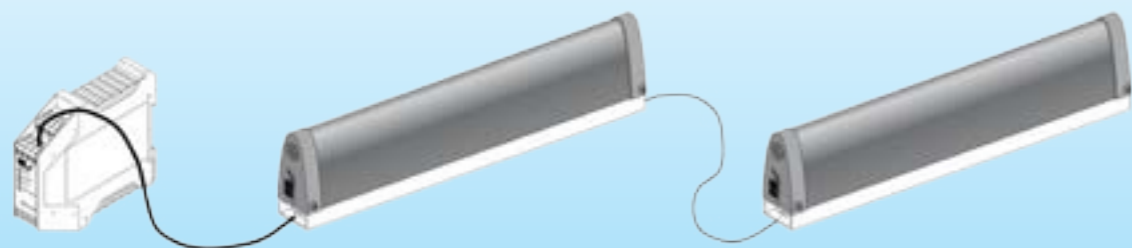
Finally an end cap is applied at each side to finish the construction of the safety edge. When mounted vertically, the lower end cap has a water drainage seal which needs to be removed to prevent moisture build up. When mounted horizontally, it is recommended that both of the end cap's seals are removed to ensure no moisture build up.

When the safety edge is connected to its control electronics the system reads the 8.2kΩ resistance. When the safety edge is pressed the two conductive rubber surfaces come together and create a short between



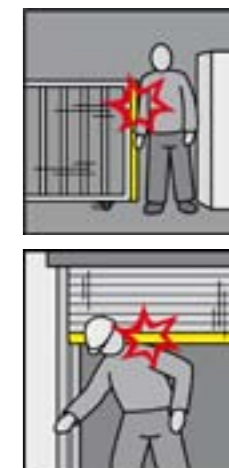
them, this cuts the 8.2kΩ signal being monitored by the control electronics.

The control electronics then output a N/C contact or voltage signal (depending on model) to the door or gate control panel.



Features and Benefits

- Safety edge continuously monitored and tested by electronics.
- Very fast switching time due to fully sealed chamber design.
- One piece construction, no additional chambers or micro switches to install.
- Safety edge sensitive along its entire length.
- EPDM material, highly resistive to environmental corrosion and physical damage.
- Pre-assembled or self-assembly options available.
- Quick assembly time & can be made to exact length required.
- Safety edge's certified by a notified body (TUV Nord) to EN1760-2.
- Wide selection of profile sizes to suit any application.



Safety Edge Profiles

The below ASO profiles are most suited to sliding gates, swing gates, barriers and roller shutter installations. Pre-assembled safety edges are available in the profiles shown below and can be made to your exact specifications. Self-assembly material is supplied in 25 Meter

rolls, along with aluminium backing in 5 meter lengths. Endcaps, resistors & connecting cables are supplied individually. Full assembly training is offered free of charge at your premises by one of our safety experts. Contact us today for free advice & training.



GE 225 TK

Low profile T-Foot 25mm
W: 25mm H: 25mm
Material: EPDM
Aluminium Backing Exposed
Pre-Assembled/Self Assembly (25m roll)

*Appropriate for Swing & Sliding Gates



GE 245 TK

Medium profile T-Foot 45mm
W: 25mm H: 45mm
Material: EPDM
Aluminium Backing Exposed
Pre-Assembled/Self Assembly (25m roll)

*Appropriate for Swing & Sliding Gates



GE 365 TK

Large profile T-Foot 65mm
W: 35.2mm H: 66mm
Material: EPDM
Aluminium Backing Exposed
Pre-Assembled/Self Assembly (25m roll)

*Appropriate for Sliding Gates



SKL 15-10 TK

Low Profile Clip Foot 45mm
W: 15.5mm H: 9mm
Material: EPDM
Aluminium Backing Exposed
Pre-Assembled/Self Assembly (25m roll)

*Appropriate for Hinge points



GE F45 SK

Low Profile Clip Foot 45mm
W: 34mm H: 45mm
Material: EPDM
Aluminium Backing Hidden
Pre-Assembled/Self Assembly (25m roll)

*Appropriate for Swing & Sliding Gates

Also available in 85mm (GEF 85) & 115mm (GEF 115) sizes



GE F65 SK

Large Profile Clip Foot 65mm
W: 34mm H: 65mm
Material: EPDM
Aluminium Backing Hidden
Pre-Assembled/Self Assembly (25m roll)

*Appropriate for Sliding Gates

Swing Gate, Barrier and Shutter Transmission System

ASO's safety electronics are designed and produced to comply with and exceed BS-EN13241-1 requirements for automatic gates & doors and also comply with the future EN13849-1 regulations. The electronic controller range (SK series) is used to continuously monitor the 8.2kΩ signal from safety edge's providing a full fail safe system.

When a safety edge is pressed, damaged or the connecting cable is cut - the controller outputs a contact signal. The SK series of controllers has multiple input voltage options and a choice of relay dry contact, N/C or voltage outputs.



SK 32 - 24



SK 38 - 72



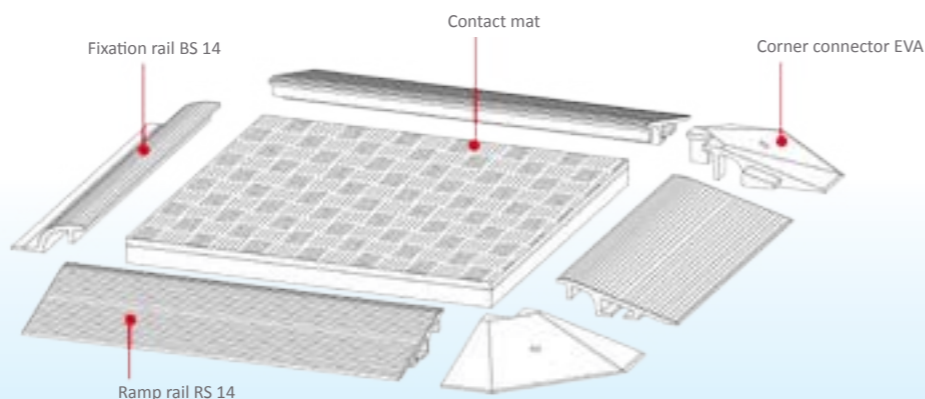
SK 32 - 31

Input Voltage: 24V AC/DC	Input Voltage: 24V DC	Input Voltage: 230V, 24V AC/DC
Safety Category: CAT3	Safety Category: CAT3	Safety Category: CAT3
Housing: 35mm DIN Base	Housing: 22.5mm DIN Base	Housing: External IP rated IP65
Output: 2 x N/C dry contact relay	Output: 2 x Transistor outputs (12V)	Output: 2 x N/C dry contact relay
Dimensions: W: 38mm H: 82mm	Dimensions: W: 22.5mm H: 99mm	Dimensions: W: 122mm H: 56mm

Contact Mats (Machine Industry)

The ASO-Safety contact mats consist of a surface area which has been encased in a polyurethane to ensure impermeability to water. This process gives the mat a very high resistance against water, dust and any other damaging factors.

Different factors are decisive when it comes to the layout of different facilities. The ASO contact mat adapts to any given situation. Built in ramp rail can be installed directly in front of the machine. Larger areas may be safeguarded by using several safety mats. For this reason they are connected in series, the last contact mat has a resistance of 8.2kΩ.

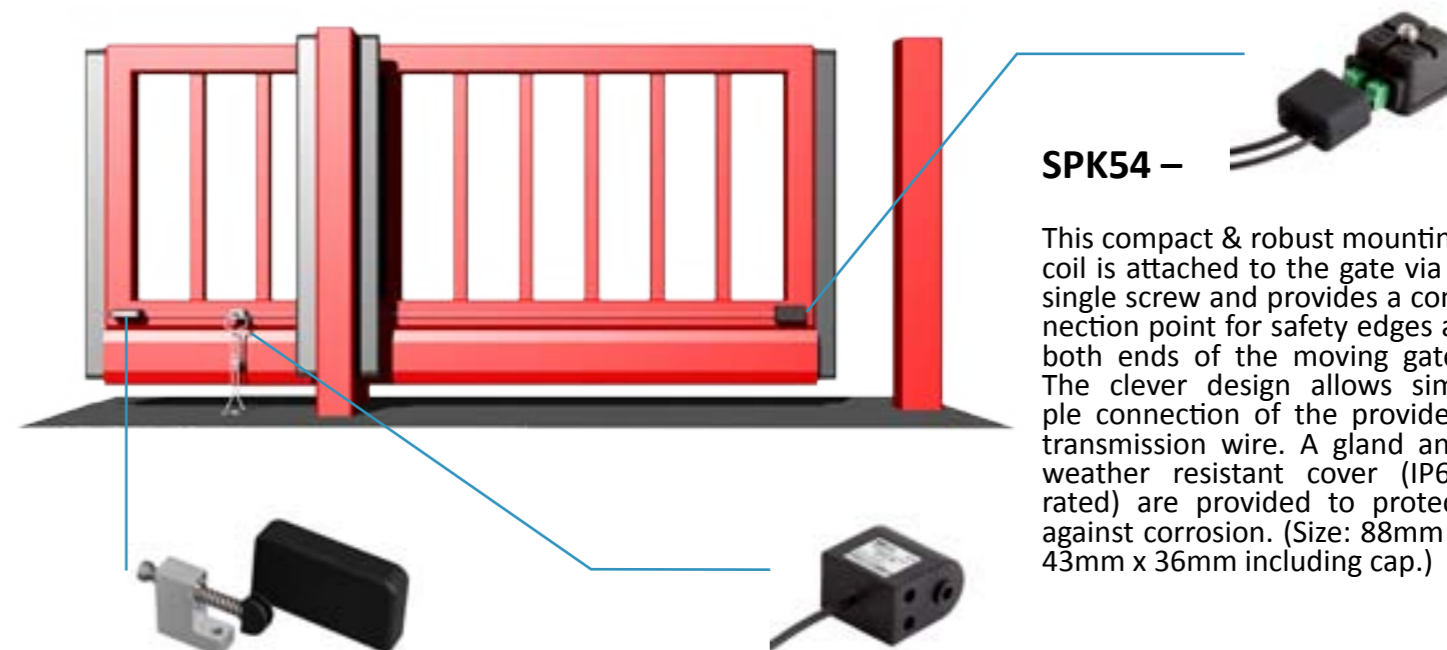


INDUS Sliding Gate System

The INDUS compact mounting unit for sliding gates is the latest evolution of ASO's tried and tested inductive transmission system. The system complies to BS-EN13241-1 & EN13849-1 standards and is certified by a notified body (TUV Nord).

The inductive transmission system allows for continuous monitoring of the safety edges installed on the moving part of the gate through a specially coated transmission wire. This wire is attached via the mounting coil SPK54 at one end of the gate, then passes through the pick-up coil SPK55 in the centre and is finally tensioned and terminated at the far end of the gate.

The inductive system allows the 8.2kΩ signals from both safety edges to be monitored separately through the SPK55 coil. The SPK55 coil then connects to a suitable electronic controller which in turn monitors the transmission system and safety edges and gives an output signal when either an edge is pressed or the system is faulty.



SPK54 –

This compact & robust mounting coil is attached to the gate via a single screw and provides a connection point for safety edges at both ends of the moving gate. The clever design allows simple connection of the provided transmission wire. A gland and weather resistant cover (IP65 rated) are provided to protect against corrosion. (Size: 88mm x 43mm x 36mm including cap.)

Tensioning Unit –

This unit is mounted to the gate at the opposite end to the SPK55 coil and provides the completion of the inductive circuit. The unit again is mounted with a single screw to reduce installation time and has an integrated tensioning system to keep the transmission wire taut. The tension is adjustable via 2 screws and a black plastic cover is provided to conceal the unit. (Size: 89mm x 15mm x 48mm including housing)

SPK55 –

This is the pick-up coil that transmits the inductive signal to the controller electronics, providing full monitoring for both the edges and transmission system. The pick-up coil is provided with a custom made stainless steel bracket and is designed to allow some free movement of the coil to prevent wear and snagging should the gate become damaged. (Size: 39mm x 27mm x 40mm)

Electronic Control Units –

The following control unit options are available for connection to the sliding gate's control board unit or inverter. These are included with the INDUS kit, when ordering please state which controller is required. Both controllers have the input for stationary edges.



ISK 71-24

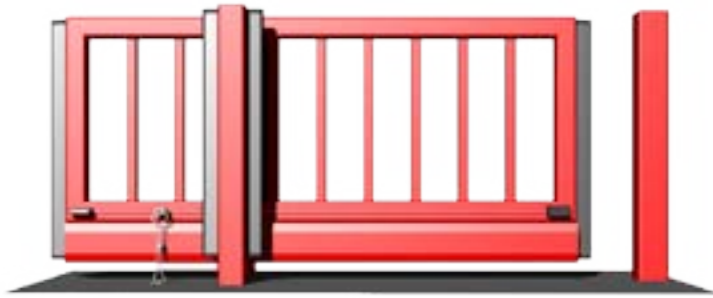


ISK 74-31

Input Voltage: 24V AC/DC	Input Voltage: 230V, 24V AC/DC
Safety Category: CAT3	Safety Category: CAT3
Housing: 35mm DIN Base	Housing: External IP rated IP65
Output: 2 x N/C dry contact relay	Output: 2 x N/C dry contact relay
Dimensions: W: 38mm H: 82mm	Dimensions: W: 122mm H: 56mm

Example Safety Edge Installations

Scenario 1



In this scenario we see a typical barred sliding gate moving through a stationary frame where the motor and control electronics are housed. To protect this design we require safety edges to be installed on the leading, closing & opening edges (up to a height of 2.5M where required).

In addition to protect against shearing in the stationary frame we require safety edges to be installed on both sides of the frame (and in both opening & closing directions). Additional edges may be required to protect the motor casing or other shearing points depending on the design of the gate.

Scenario 2

In this scenario we have a sliding gate that has been finger meshed, boarded or in-filled to prevent shearing as the gate passes through the stationary frame. The mesh in-fill used must be fine enough to prevent trapping of body parts (30mm x 30mm) and the gap between the gate itself and the frame as it passes through must be 100mm or less to comply with regulations.

To protect this design we require safety edges to be installed on the leading closing & opening edges (up to a height of 2.5M where required). Additional edges may be required to protect at the motor case or other shearing points depending on the design of the gate.



Scenario 3



In this scenario we see a typical barred sliding gate moving through a stationary frame behind a wall. To protect this design we require safety edges to be installed on the leading closing & opening edges (up to a height of 2.5M where required). In addition to protect against shearing on the stationary frame we require safety edges to be installed on both sides of the frame (and in both opening & closing directions).

In addition we require a safety edge to be installed on the outside wall to prevent shearing in the opening direction. Additional edges may be required to protect the motor casing or other shearing points depending on the design of the gate.



Scenario 4



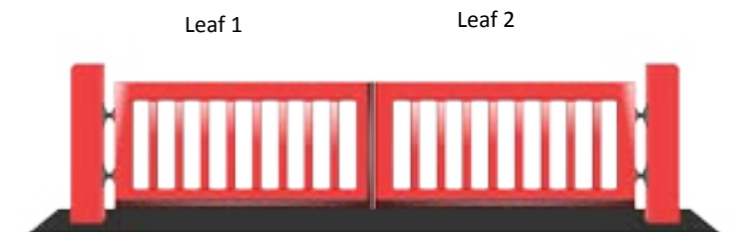
In this scenario we see a typical swing gate configured for the gates to close with a leaf delay. There are no shearing or crushing points in the opening cycle of the gate, and the gap between the gate and pillars is less than 100mm or infilled.

To protect the gap in-between each closing gate leaf - we should install a safety edge vertically at the corner of leaf 1 as shown. Additional edges or protection may be required in the gate hinging area to protect against shearing or crushing.

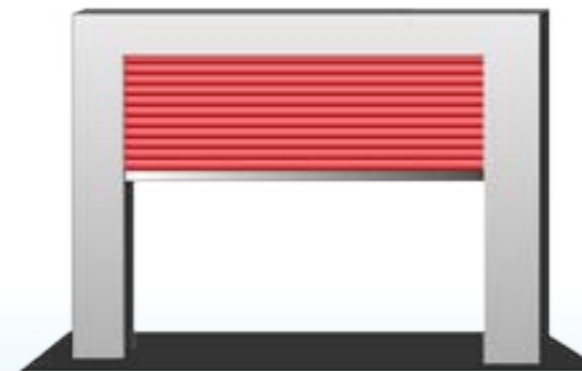
Scenario 5

In this scenario we see a typical swing gate configuration configured for the gates to close with a leaf delay. The gate opens against an obstruction (wall, fence or high kerb) so will require protection in the opening and closing phases. To protect the gap in-between the closing gate leaf's we should install a safety edge vertically at the corner of leaf 1 as shown.

To protect the opening phase we should install additional safety edge's along the bottom bar of leaf 1 and leaf 2. Additional edges or protection may be required in the gate hinging area to protect against shearing or crushing.



Scenario 6



In this scenario we see a typical shutter door to protect this installation we should fit a safety edge that is active along its entire length to the bottom of the roller shutter.

Scenario 7

In this scenario we see a typical barrier, to protect this installation we should fit a safety edge that is active along its entire length to the bottom of the barrier arm.



BS-EN13241-1 For Gates Explained

EN13241-1

Is the 'umbrella' harmonised standard used in machinery directive MD2006/42/EC for installation, testing and ongoing compliance of automatic gate & door systems.

The standard has been in force in the UK now since May 2004 and ALL new gate systems installed should comply to the standard. The standard covers both commercial & residential gate and door systems. The appropriate parts of the following standards must be observed:-

Requirement

Solutions

Examples

EN12453

Defines the crushing points, shear & pull-in areas of automatic gate & door systems and stipulates the allowable impact force (N) on an object or person. To comply the force exerted on an object or person in the last 50cm of travel must not exceed 400N, and the system must stop AND back off following contact within 0.75 seconds in either the opening or closing phase of operation. An active detection system is required up to height of 2.5M.

EN12453

- Design gate to eliminate shearing and trapping
- Eliminate gaps larger than 100mm
- Use EN12453 marked automation units (*)
- Use rpm sensor, encoders, force detection
- Use full light curtain system on danger areas
- Use PSPE system (Safety Edges)

(*) – Not guaranteed to comply unless tested

RPM Sensors, Encoders and Force Detection built in to automation control boards require exact configuration to comply. These measures are also easily bypassed or altered. Force measurements must be carried out to ensure compliance at installation or following any changes.

EN12453

- Correctly fitted, installed & suitable EN12453 compliant automation drive unit with fully compliant control board with obstruction sensing configured to exert less than 400N. (*)
- Suitable ASO safety edges and inductive transmission system fitted to gate.

(*) – To fully comply the force of the gate may not be sufficient to operate correctly in all conditions. High wind, snow or corrosion to gate hinges all effect forces required to operate.

EN12445

This standard specifies testing points on gates and doors. This defines the distances and locations that testing of force must be carried out to comply with the standard. (Slider 500mm, 300mm, 50mm from stop), (vertically 50mm from bottom, 300mm from top plus half way up gate). Each measurement must be made 3 times for a total of 27 measurements.

EN12445

- ITT (Initial Type Test) gates to comply with required testing points and forces.
- Use force testing device on new types of gates or modified gates to comply. I.e. Retrofit
- Use manufactured gate prefitted with automation and safety edges certified to this standard.

EN12445

- ITT certificate provided with new gate produced by manufacturer/installer.
- CE marked gate with date of production & Sn.
- Test certificates for force testing.
- Test certificates from safety edge manufacturer
- Declaration of conformity certificate

All of the above must be provided with any new installation.

EN12978

Defines the self-test and monitoring characteristics of the transmission system to comply with safety category levels or performance levels. (i.e. Continuous monitoring of system, and redundancy in the event of a failure).

EN12978

- Fit ASO Cat 3 inductive transmission system
- Fit EN1760-2 compliant safety edges
- Fit Cat 2 transmission with external testing (*)

(*) – The CAT2 transmission systems relay(s) must be tested before each operation.

EN12978

- Gate fitted with ASO INDUS system
- Gate fitted with ASO monitored safety edges
- ASO safety edges with Cat2 transmission system (*)

(*) – Cat2 system must have auto-test function and be connected to test signal from control board.

EN1760-2

Defines level of sensitivity, performance characteristics, response time and percentage of sensitive surface area of safety edges used.

EN1760-2

- Fit safety edge with monitoring technology
- Fit safety edge certified to EN1760-2 standard

EN1760-2

- ASO GE/GEF/SKL safety edge profiles