SMARTSCAN

MACHINERY SAFETY SYSTEMS

8K3 SERIES
CROSS-BEAM MUTING
ACCESSORIES

INSTALLATION GUIDE

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Important!

Failure to read and follow the instructions provided on the Installation Sheet and Installation Guide can lead to the incorrect application or use of the 8K3 series mute accessories. This could lead to personal injury and damage to equipment. The 8K3 series safety light curtain Installation Sheet and Installation Guide must be used in conjunction with the 8K3 series mute accessories Installation Sheet and Installation Guide. All applicable machine safety standards and regulations should be taken into account when installing the 8K3 series mute accessories or any machine safety product.

The Installation Sheet and Installation Guide can be downloaded from our web site at www.smartscan.co.uk

The 8K3 series mute accessories Installation Guide (CD693) is subject to change without notice. Smartscan Ltd shall not be held responsible for technical errors, editorial errors or omissions contained herein, nor for incidental or consequential damages resulting from the use of this material.

CONTENTS

**8K3 Series (Model No. 087-xxxxx) Mute Accessories
Installation Sheet (CD692/170321)**

Figure A - Unpacking

❏ Remove all packaging material and retain it
❏ Locate and keep the delivery note
❏ Inspect all items for transit damage
❏ Match goods supplied to those specified on the delivery note
❏ Keep the Installation Sheet in a safe place
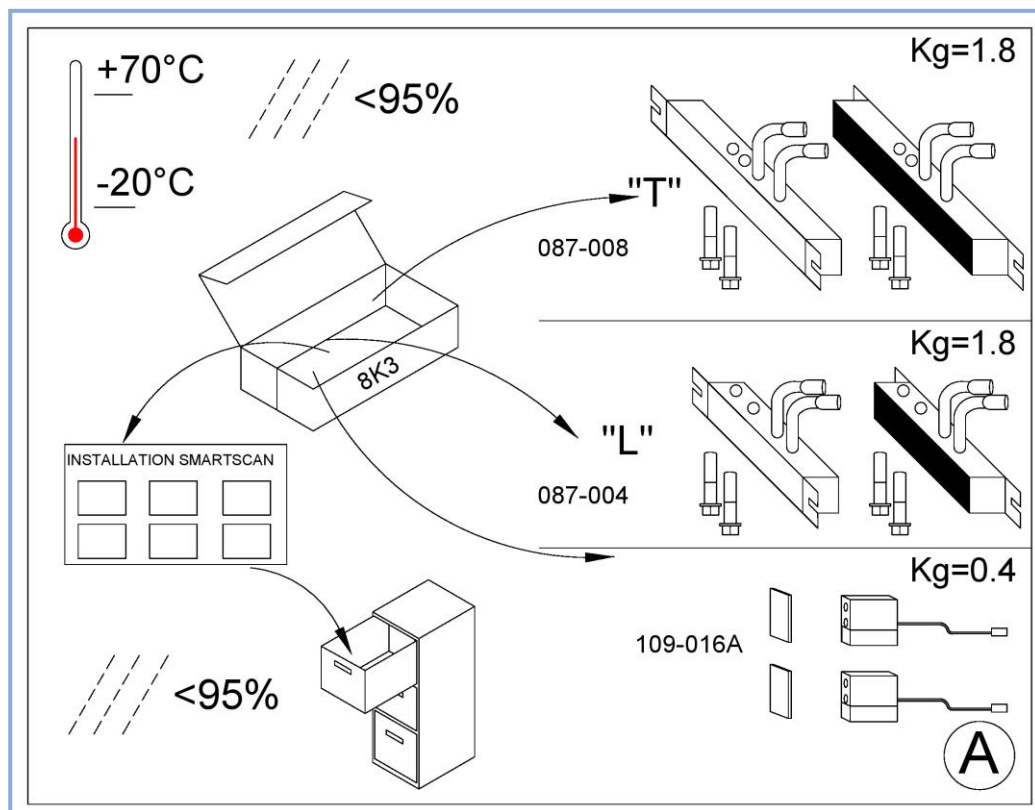
Each 8K3 series mute accessory kit supplied would normally include:

❏ Pair of 'L' or 'T' muting modules with fixing bolts or polarised retro-reflective sensors with cables and connectors affixed, together with mounting brackets.
❏ Installation sheet
❏ Service questionnaire form

Storage requirements:

❏ Humidity - <95%
❏ Temperature range between –20°C and +70°C

Figure B – Dimensional Information

The 8K3 Series T and L cross-beam muting modules have the same cross section as the light curtain, 50 x 50mm.
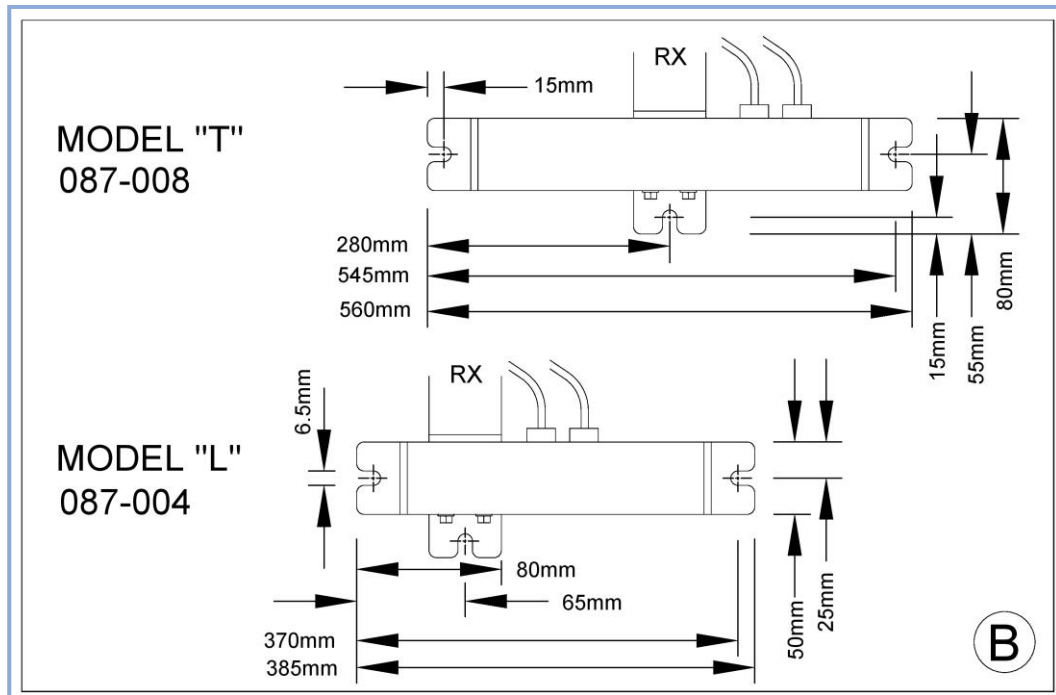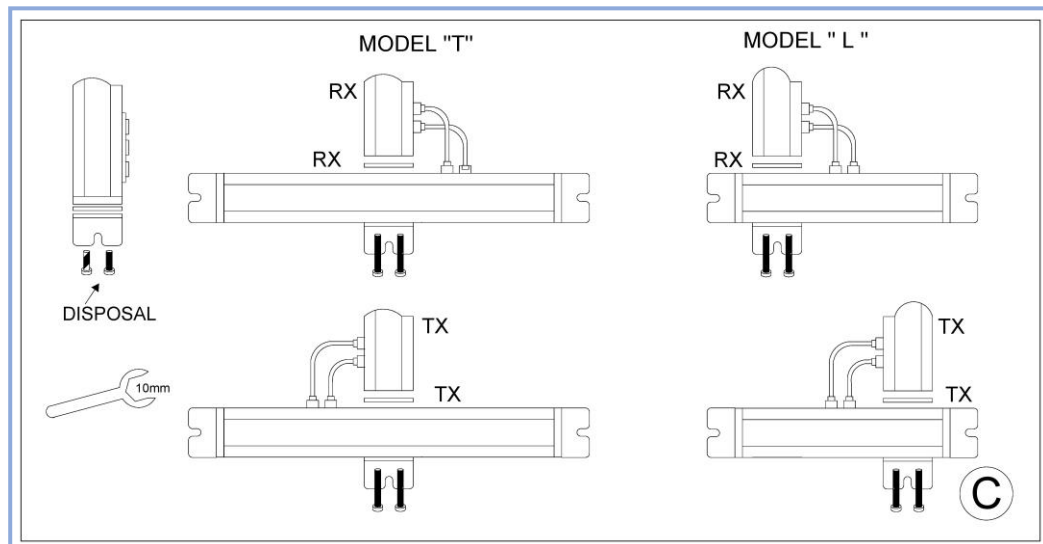
Figure C – Muting Module Mechanical Connection

Fixing 'L' or 'T' cross-beam mute modules to the safety light curtain columns is very easy. Undo the fixing bolts and remove the end-cap fixing bracket and rubber seal from both the transmitter (Tx) and receiver (Rx) columns.

Fit the appropriate 'L' or 'T' module to the base of each column using the longer bolts that are supplied with the units. Tighten the bolts enough to ensure waterproof sealing between the aluminium housings. If an additional guard mounting point is required the bottom end cap bracket can be re-fitted underneath the mute module housing.

Red LED's in the receiver Rx mute module are illuminated to show the mute beams are active.

On the Receiver (Rx) the two mute inputs are situated below the B (User) cable connection and the A (interconnect) cable connection. On the Transmitter (Tx) head the mute inputs are situated below the A (interconnect) cable connection.

Plug in the two cables from the Mute modules to the light curtain column as shown above. Note the Rx Mute module cables must be crossed when using the inverted 'T' shape cross-beam muting or the 'L' shape cross-beam muting. The cables are connected so they are parallel when using the parallel beam muting (timing control).

Figure D – Retro-Reflective Photocell Connection
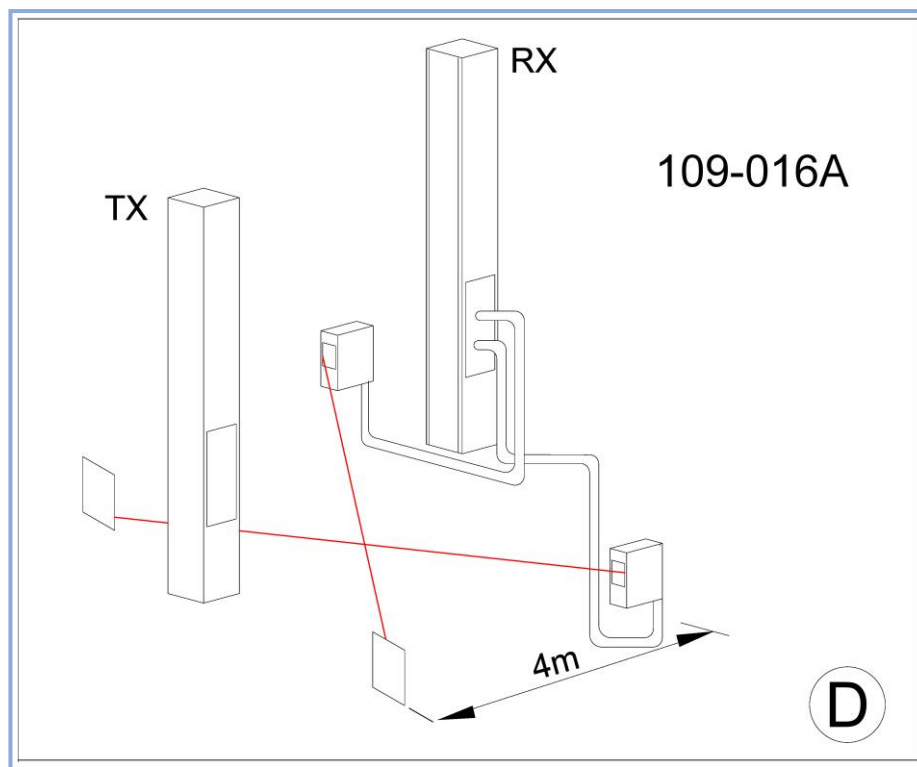
The picture shows options for configuring the 8K3 series safety light curtain in applications using non-integrated mute sensors.

There are particular applications where the standard mute modules are not suitable for example, where there is a limitation in the space available for mounting the modules. In such cases external sensors that allow more flexibility are often used.

Polarised retro-reflective sensor - Type 109-016A, Maximum range = 4m

The sensor transceiver comes complete with polarised reflector, a 1.5m cable, mounting brackets and a 4 pin bayonet locking connector for direct connection to the mute input sockets, M1 and M2, on the Receiver (Rx) head of the 8K3 series safety light curtain.

The sensors can be used in the cross-beam configuration.

Figure E – Mute Modules Showing Mute Beam Arrangements
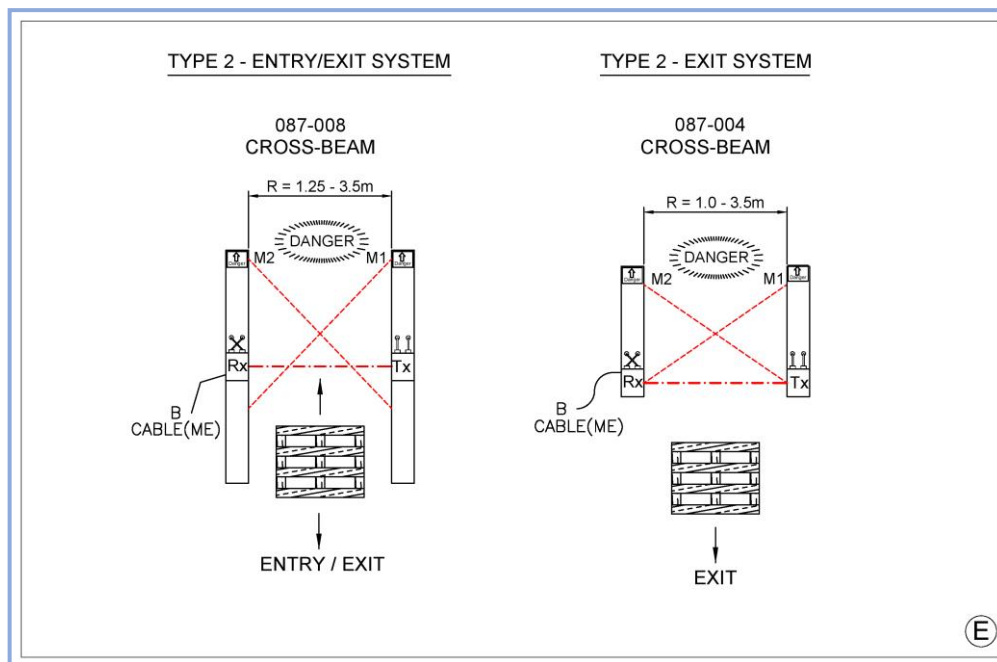
Figure E shows the cross-beam muting for entry/exit and exit only applications.

The Receiver head which has the status indication LEDs and the B (User) cable connection back to the machine control panel/local junction box is located to the left side of the conveyor when looking towards the danger area. The Receiver head has the status LED indicators which are useful during installation, for status checking during normal operation and diagnostics for fault finding.

Entry and Entry/Exit 'T'

087- 008 (Type 2)
Inverted 'T' shape cross-beam muting at in-feed zones or in situations where a pallet load may need to pass along the conveyor in both directions through the safety light curtain.

This system is normally used at the infeed to a machine. The horizontal mute modules house the muting beams transmitting diagonally across to the receiver side forming a cross-beam muting arrangement.

The system works by the pallet load moving into the two mute beams and interrupting them. The two mute beams are monitored with a disparity timer of 2.5 seconds.

The cross-beam entry system has a no time delay-off as default. Therefore, if one of the mute beams is remade or the load is out of the cross-beam mutes the safety light curtain will unmute at once.

The entry/exit inverted 'T' mute beams have a scanning range of 1.25m to 3.5m.

Position the unit to ensure a pallet load does not stop in the safety light curtain beams after clearing the mute beams.

Exit only 'L'

087- 004 (Type 2)
The 'L' shape cross-beam muting is only for use at outfeed zones. You will note that the mute beams are arranged on one side of the 8K3 safety light curtain. The pallet load is always travelling in one direction, out from the danger area and through the safety light curtain to the safe area.

The system works by the pallet load moving into the two mute beams and interrupting them within the monitored mute disparity time of 2.5 seconds.

There is a short period of time when the trailing edge of a pallet load 'clears' the detection field of both mute sensors but is still interrupting the light curtain beams. A timer is incorporated within the safety control system that allows a period of 2.5 seconds between the pallet load 'clearing' the mute sensors and 'clearing' the light curtain beams. If the 2.5 second period is exceeded the safety system will trip.

Note for this exit system the MODE wire (Black/White) needs to be linked to +24V DC in order for the 2.5 second mute delay-off timer to be active.

The exit only 'L' mute beams have a scanning range of 1m to 3.5m

Position the unit to ensure a pallet load does not stop in the safety light curtain beams after clearing the mute beams.

> Warning: The 'L' shape mute module must *NOT* be used at in-feed zones, (out-feed only).

Mute Enable Input

The 'mute enable' signal is a control system requirement for both entry/exit and exit only cross-beam muting applications. This third signal is typically taken from the conveyor transport system (conveyor run). This signal acts as a permissive signal to the mute beam logic.

Inclusion of the signal indicates to the safety control that the conveyor is transferring products towards the detection field of the safety light curtain, thus instructing the controller to initiate the MUTE logic condition during a pallet transfer through the safety light curtain.

Figure F – Pallet Load Positioning
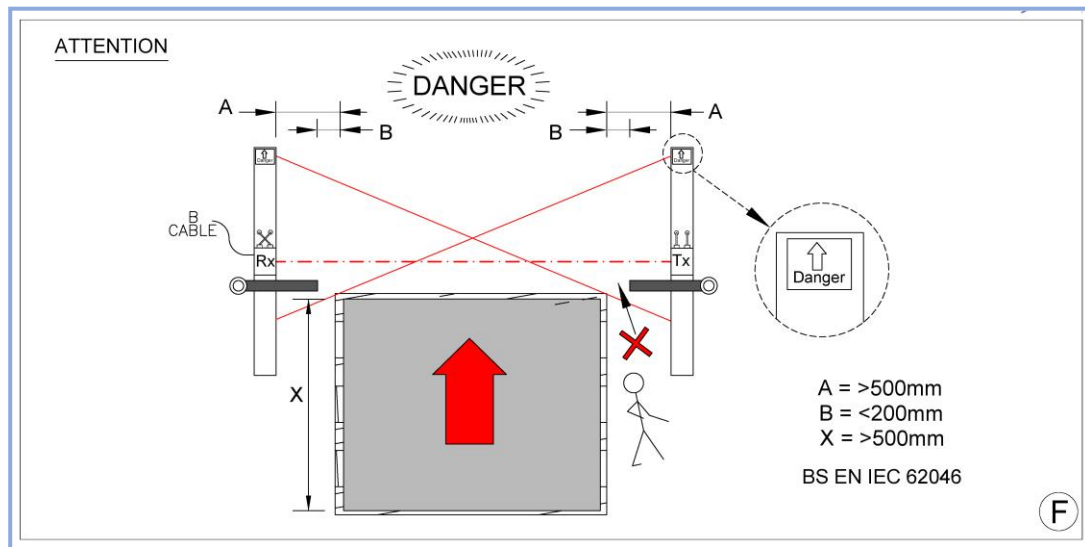
Figure F shows pallet load positioning on the conveyor relative to the transmitter and receiver heads (note distances for A and B)

Ensure that the pallet when entering and exiting the self-muting safety light curtain system is central on the conveyor. The distance for A and B to avoid 'trapping' or 'crushing' hazards and preventing entry during the muted condition should all be considered in-line with the guidance within BS EN IEC 62046:2018.

X shows the minimum pallet load size, 500mm in length.

Figure G – Operating requirements
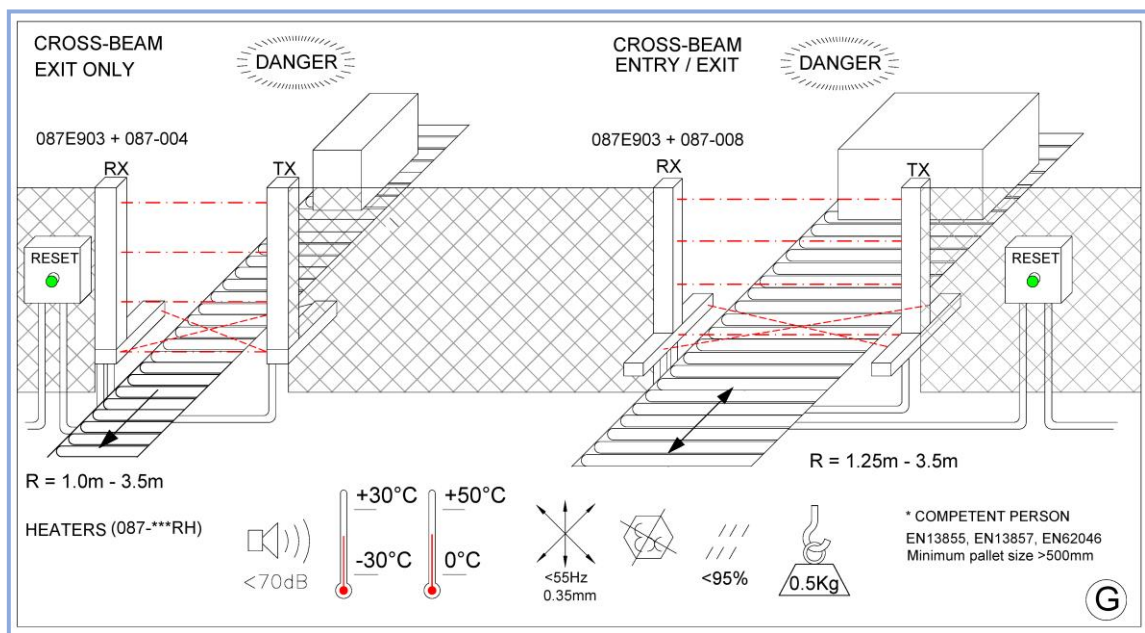
- ❑ Humidity <95%
- ❑ Temperature range between 0°C and +50°C or -30°C and +30°C
- ❑ Vibration: Frequency <55Hz Max. Movement <0.35mm
- ❑ Do not use equipment in explosive atmospheres (contact the manufacturer for further advice).
- ❑ Noise generated by the equipment will never exceed 70 dB

Environmental factors can affect the operation of a safety light curtain and proper consideration should be taken into account for mounting a system where fog, rain, smoke, dust, large temperature fluctuations etc. is a consideration.

Safety light curtains do not protect personnel from chemicals, heat, gases, radiation, flying parts etc. as they are not a physical barrier.

The owner/provider must carry out a Risk Assessment and provide machine operators instruction for the use of the safety light curtain on the machinery.

The 8K3 series safety light curtain can be configured with either the 'L' type (exit only or a 'T' type (entry / exit) system.

The 'L' muting module configuration shown above is for out-feed zones ONLY. It operates in a cross-beam muting beam configuration, the distance between the Transmitter (TX) and Receiver (RX) should not exceed 3.5 metres.

The inverted 'T' shape muting module configuration shown above is for infeed and infeed/outfeed positions. It operates in a cross-beam muting beam configuration, the distance between the Transmitter (TX) and Receiver (RX) should not exceed 3.5 metres.

Heater options are available for application environments like cold stores.

Reset devices must be located such that the danger area can be seen to be clear of persons before the system is activated. The reset device should also be positioned so as not to be accessible from inside the danger area.

Activate Switch Electrical Connection

Activate switch - (F7). Connect the red/white wire in cable B to a <u>normally open</u> switch contact. Connect the other side of the switch contact to +24V DC. The switch could either be a spring return to off key switch or push button.

Mode - (F8) Connect the black/white wire in cable B to 0V DC, or for exit only system where the mute delay-off timer is required to +24V DC.

Figure H – Muting Timer Sequence
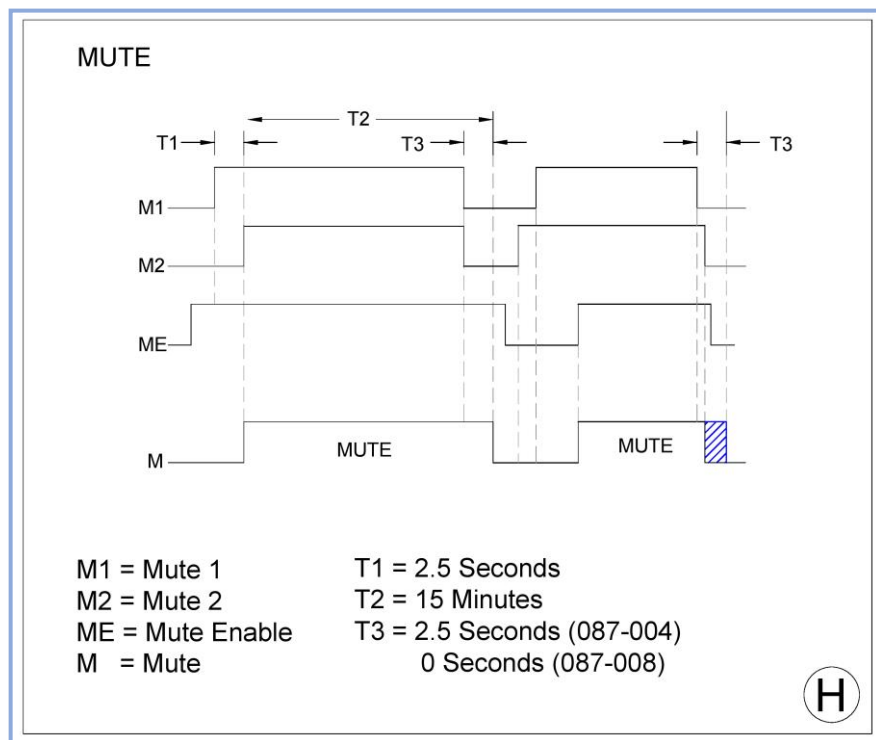
The timer diagram above shows the mute timer sequence for the 'L' shape Exit only cross-beam muting system, with and without the mute off delay time and the inverted 'T' shape Entry/Exit (bi-directional) cross-beam muting system.

Cross-beam Control Timers

T1 (Mute 1 and Mute 2 Disparity Time) = Maximum time allowed between activation of signals mute 1 (M1) and mute 2 (M2) prior to the pallet load entering the safety light curtain.

T2 (Mute Time Out Period) = A maximum pre-determined time the safety light curtain will remain in a muted condition. Following this timed period, if the pallet load is still interrupting the mute beams or the safety light curtain beams the OSSDs will de-energise thus initiating a stop condition. Providing the pallet clears the safety light curtain before the maximum time T2 is exceeded then the automatic transfer of the pallet will continue.

T3 (Mute Off Delay Time) = This function can be used for the 'L' shape Exit system only and **MUST NOT** be used for the inverted 'T' Entry/Exit system. A predetermined time that the safety light curtain will remain in a muted condition following de-activation of one or both of the mute signals.

Software version example
The standard 8K3 Series is supplied with 'E' version software, for example 087E903. This provides the following functions for cross-beam muting timers, T1 = 2.5 Sec T2 = 15 min T3 = 2.5 Sec.

Figure I – Identification Labels

Examples are shown below of the identification labels that are affixed to the bottom of the transmitter (TX) and receiver (RX) columns.

Figure J – Test and Maintenance

Testing the mute accessories with a test piece

The test procedure should be carried out frequently as indicated by the risk assessment for the particular installation.

A test must be carried out at the initial installation and prior to the machine start-up.

Smartscan Ltd recommends the test should be carried out daily prior to normal operation of the machine.

Any changes to the configuration of the safety light curtain must be followed by testing to check the system is still working correctly.

Regular function checking of the safety light curtain as well as at initial installation is required as part of the test and maintenance process.

The operating instructions for the safety light curtain and machine must be made available for the operator and those responsible for installation, maintenance and safety control at all times.

Power-up the 8K3 series safety light curtain and activate the output switching circuits to an ON condition.

Cross-Beam
Insert a test piece of appropriate size into the detection zone of one of the mute sensors. After 2.5 seconds the safety outputs will turn OFF. Repeat this operation for the second mute sensor, again the outputs should turn OFF within 2.5 seconds.
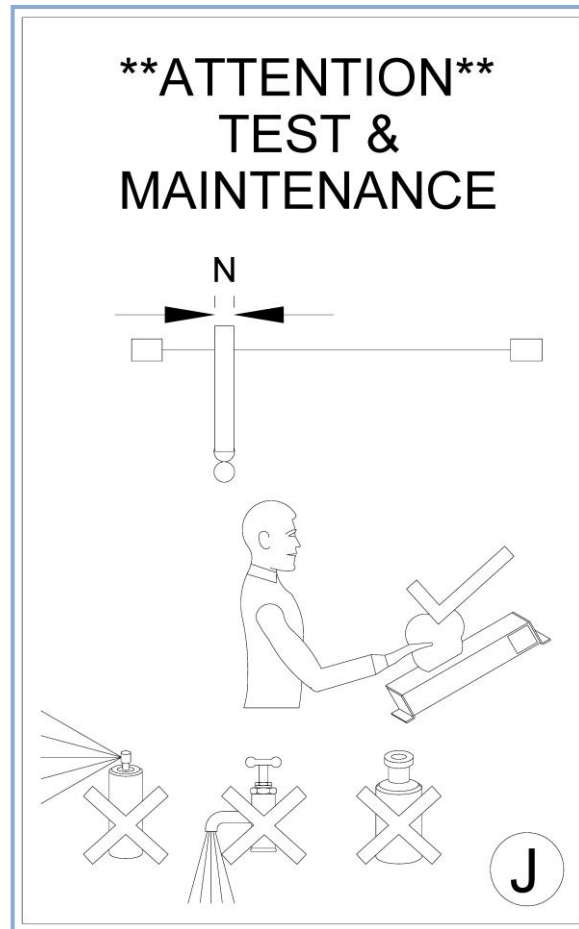
Maintenance

The Transmitter (TX) and Receiver (Rx) windows should be cleaned regularly as indicated on the Installation Sheet, Figure K.

Dirt build-up or scratching on the windows may lead to intermittent tripping or a totally blocked condition of the light curtain. Clear adhe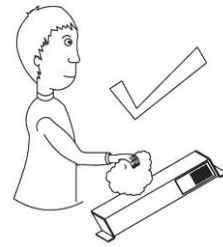sive tape may be applied to the windows of curtains in dirty or abrasive conditions. Renew the clear adhesive tape periodically.

Dust particles can be attracted to the Perspex window due to static charges. This can be prevented by the use of an antistatic plastic cleaner and antistatic cloth.

Clean the windows with a clean damp cloth using a mild detergent. Never use abrasive, corrosive cleaners or spray detergents.

During the maintenance inspection of the safety device and the danger area checks include, damage and general wear, connection cables and the electrical connections.

Check the mountings and physical extrusion, Perspex.

Access to the danger point should be through the infrared field of the safety light curtain only.

See also the Operation Cycle checks within this document.

Figure K – Operation Cycle

❑ Before installation read and understand the Installation Sheet provided paying particular attention to the information provided in Figures C, E and I

❑ Refer to Fig. J for test and maintenance procedures

❑ Every 24 hours carry out tests as indicated in Fig. J

❑ Every 6 months check the entire installation including those on the installation sheet for the safety light curtain.

❑ If the equipment fails to operate as intended check through the entire installation sheet.
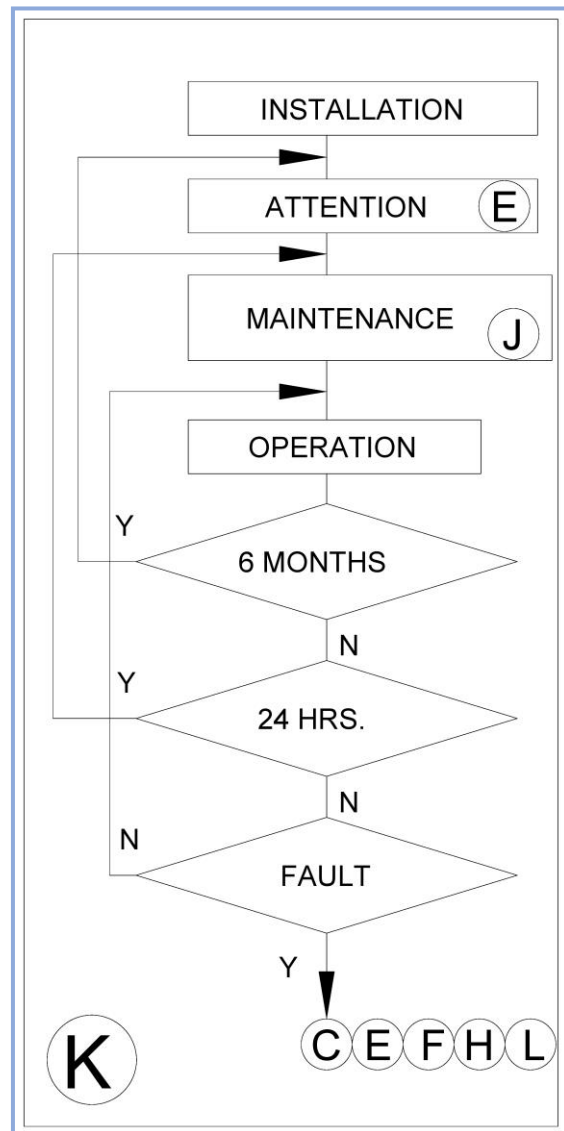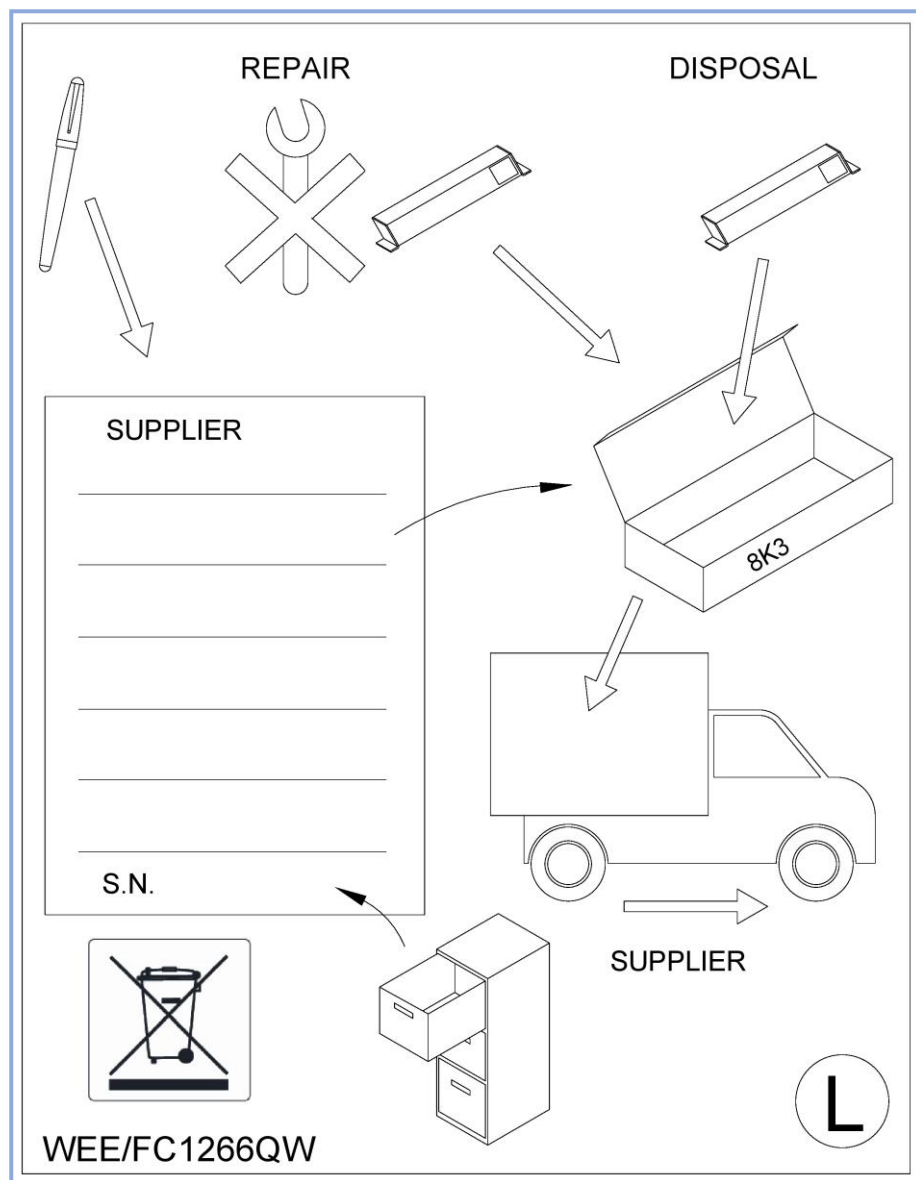
Figure L – Product Return Procedure

If a fault occurs that cannot be resolved or the equipment is damaged return the equipment to the nearest Smartscan distributor or Smartscan Ltd. Indicate the nature of the fault and the symptoms displayed on the form provided.

Note   Please ensure that returned guards (Transmitter and Receiver heads) are matching serial number pairs.

Figure M – Declaration of Conformity

CD803/170321

SMARTSCAN

UK Declaration of Conformity

Product: Smartscan 8K3 Safety Light Curtain series.

Smartscan Limited, Pywell Road, Willowbrook Industrial Estate, Corby, Northamptonshire, NN17 5XJ, UK

Declares that the safety components(s) described: 8K3 Safety Light Curtain series, Serial Numbers: Between 440 000 and 479 999.

Fulfils the following safety function: Electro-sensitive protective equipment – Active Opto-electronic Protective Device (safety light curtain).

Conforms to the following Statutory Instruments:
2008 No. 1597 The Supply of Machinery (Safety) Regulations 2008 (as amended)
2016 No. 1091 The Electromagnetic Compatibility Regulations 2016 (as amended)
2016 No. 1101 The Electrical Equipment (Safety) Regulations 2016 (as amended)

Complies with the relevant requirements of the following Standards:
EN IEC 61496-1, EN IEC 61496-2   Type 3
EN ISO 13849-1   Category 3
EN   SIL 2
EN ISO 13849-1   PL d

Uses the following standards:
EN ISO 12100, EN 60204-1, EN 415-4, EN 62046

Complies with the examples to which the UK type examination certificate below relates, and is in conformity with the protection requirements of The Electromagnetic Compatibility Regulations 2016 (as amended) relating to electromagnetic compatibility.

The component is of a type listed in Schedule 2, Part 4, Annex IV of Statutory Instrument, The Supply of Machinery (Safety) Regulations 2008 (as amended). Examples have been submitted for type examination by the UK Approved Body as below.

Safenet Limited   Notified Body Number 1674

Address   Denford Garage, Denford, Kettering, Northamptonshire, NN14 4EQ, UK

Certificate No.   8327171219

Signed: _____   Date: 17.03. 2021

Name: HAROON R KHAWAJA

Title: Technical Director

CD822/170321

SMARTSCAN

EC Declaration of Conformity

Product: Smartscan 8K3 Safety Light Curtain series.

Smartscan Limited, Pywell Road, Willowbrook Industrial Estate, Corby, Northamptonshire, NN17 5XJ, UK

Declares that the safety components(s) described: 8K3 Safety Light Curtain series, in Serial Numbers: Between 440 000 and 479 999.

Fulfils the following safety function: Electro-sensitive protective equipment – Active Opto-electronic Protective Device (safety light curtain).

Conforms to the following Directives:
Machinery Directive   2006/42/IEC
Electromagnetic Conformity Directive   2014/30/EU
Low Voltage Directive   2014/35/EU

Complies with the relevant requirements of the following Standards:
EN IEC 61496-1, EN IEC 61496-2   Type 3
EN ISO 13849-1   Category 3
EN 62061   SIL 2
EN ISO 13849-1   PL d

Uses the following standards:
EN ISO 12100, EN 60204-1, EN 415-4, EN 62046

Complies with the examples to which the EC type examination certificate below relates, and is in conformity with the protection requirements of Council Directive 2014/30/EU, as amended, on the approximation of the laws of the Member States relating to electromagnetic compatibility.

The component is of a type listed in Annex IV of the Machinery Directive. Examples have been submitted for type examination by the approved Notified Body as below. Safenet Certification Services Limited are authorised to compile the technical file.

Safenet Certification Services Limited   Notified Body Number 2805

Address   Safenet Certification Services Limited
               Ducart Suite, Castletroy Park Commercial Campus,
               Plassey Park Road, Castletroy, Limerick, Ireland.

Certificate No.   2368190321

Signed: _____   Date: 17.03. 2021

Name: HAROON R KHAWAJA

Title: Technical Director

Figure N – Glossary of Words and Language Translation

GLOSSARY / ENGLISH	GLOSSAIRE / FRANCAIS	GLOSSAR / DEUTSCHE	BIBLIOGRAFIE / DUTCH	GLOSSARIO / ITALIANO	GLOSARIO / ESPANOL	ORDLISTA / SVENSKA	ORDBOG / DANSK
ACTIVATE	ACTIVER	AKTIVIEREN	ACTIVEREN	ATTIVAZIONE	ACTIVAR	AKTIVERING	AKTIVERE
ATTENTION	ATTENTION	ACHTUNG	ATTENTIE	ATTENZIONE	ATENCION	OBSERVERA	ATTENTION
AUTHORISED PERSON	PERSONNE AUTORISEE	AUTORISIERTE PERSON	BEVOEGDE PERSOON	PERSONALE AUTORIZZATO	PERSONA AUTORIZADA	BEHORIG PERSON	PERSON MED AUTORITET
BEAM	FAISCEAUX	GITTER	LICHTSTRAAL	RAGGI	HAZ	STRALAR	STRALE
CONTROL	CONTROLE	STEUERUNG	BESTURING	CONTROLLO	CONTROLAR	KONTROLL	KONTROL
CROSS-BEAM	RAYONS DIAGONALE	KREUZ STRAHL	DIAGONALE STRALEN	RAGGI INCROCIATI		KRYSS-STRALAR	KRYDS STRALE
DANGER	DANGER	GEFAHR	GEVAAR	PERICOLO	PELIGRO	FARA	FARE
DISPOSAL	DISPOSITION	ENTFERNEN	VERWIJDEREN	SMALTIMENTO	DISPOSICION	UPPLOSNING	RADIGHED
ENTRY	ENTREE	EINGANG	INGANG	ENTRATA		INPASSAGE	INDGANG
EXIT	EXIT	AUSGANG	UITGANG	USCITA		UTPASSAGE	UDGANG
FAULT	DEFAUT	FEHLER	FOUT	GUASTO	INCIDENTE	FEL	FEJL
INSTALLATION	INSTALLATION	INSTALLATION	INSTALLATIE	INSTALACIONI	INSTALLAZIONE	INSTALLATION	INSTALLATION
LIGHT CURTAIN	BARRIERE	LICHTGITTER	LICHTSCHERM	BARRIERA OTTICA	CORTINA DE SEGURIDAD	LJUS BARRIER	LYSTAEPPE
MAINTENANCE	ENTRETIEN	WARTUNG	ONDERHOUD	MANUTENZIONE	MANTENIMIENTO	UNDERHALL	VEDLIGEHOLDE
MODE	MODE	MODUS	MODUS	MODO	MODO	FUNKTIONSLAGE	MODE
MODEL	MODELE	TYP	MODEL	MODELLO	MODELO	MODELL	MODEL
MONTHS	MOIS	MONATE	MAANDEN	MESI	MESES	MANADER	MANED
MUTE	OPPRESSION	STUMMER	ONDERDRUKKEN	INIBIZIONE	MUDO	FORBIKOPPLING	MUTE
OPERATION	OPERATION	IN BETRIEB	IN BEDRIJF	FUNZIONAMENTO	OPERACION	DRIFT	OPERATION
PARALLEL BEAM	RAYONS PARALLEL	PARALLEL STRAHL	PARALELLE	RAGGI PARALLELI		PARALLELLA STRALAR	PARALLEL STRALE
RED	ROUGE	ROT	ROOD	ROSSO	ROJO	ROD	RØD
REPAIR	REPARATION	REPARATUR	HERSTELLING	RIPARAZIONE	REPARAR	REPARATION	REPARERE
SUPPLIER	FOURNISSEUR	LIEFERANT	LAVERANCIER	FORNITORE	PROVEEDOR	LEVERANTOR	LEVERANDØR

Ⓝ

Appendix 1 – **Important Safety Warning Information**

❑ Ensure that the Smartscan safety light curtain is installed by a qualified person.

❑ Smartscan safety light curtains are supplied as matching serial number pairs and must be used as matching serial number pairs.

❑ It is the responsibility of the employer that the safety light curtain is properly installed, operated and maintained as well as the machinery on which the safety product is installed. All the applicable national and international legislation and technical standards for the corresponding machine application must be complied with.

❑ The safety light curtain is only one element in the overall machine safety circuit, the whole machine safety control circuit must be a fail-safe design.

❑ The stopping elements of the machine should be regularly checked to make sure the machine stop time performance is reliable and within the specified parameters.

❑ Do not repair or modify the Smartscan safety light curtain. Smartscan products can only be repaired by the manufacturer. Any work carried out on the product that is not done by the manufacturer will invalidate the warranty terms. All products being returned for repair must be matching serial number pairs.

❑ The Smartscan Product installation sheet and installation guide do not provide instruction or operation information for the machine that it is integrated to.

❑ The Smartscan Product Installation instructions should be kept with the safety light curtain during its entire working life.

Appendix 2 **- Certifications**

Company

FM27829

Products

Smartscan safety light curtains are developed and manufactured in compliance with UK, European and International Legislation and Standards.

Smartscan products are Third Party approved by Safenet Limited, UK Approved Body number 1674 and Safenet Certification Services Limited, Notified Body number 2805.

Notes

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8K3 Series Cross-Beam Mute Accessories_____Installation Guide_

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