



1000 PLUS SERIES

SAFETY LIGHT CURTAINS 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 1000 PLUS series safety light curtain. This could lead to personal injury and damage to equipment. All applicable machine safety standards and regulations should be taken into account when installing the 1000 PLUS series safety light curtain or any machine safety product.

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

The 1000 PLUS series Safety Light Curtain Installation Guide ([CD1009A](#) and [CD1009B](#)) is subject to change without notice. SMARTSCAN TW 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.

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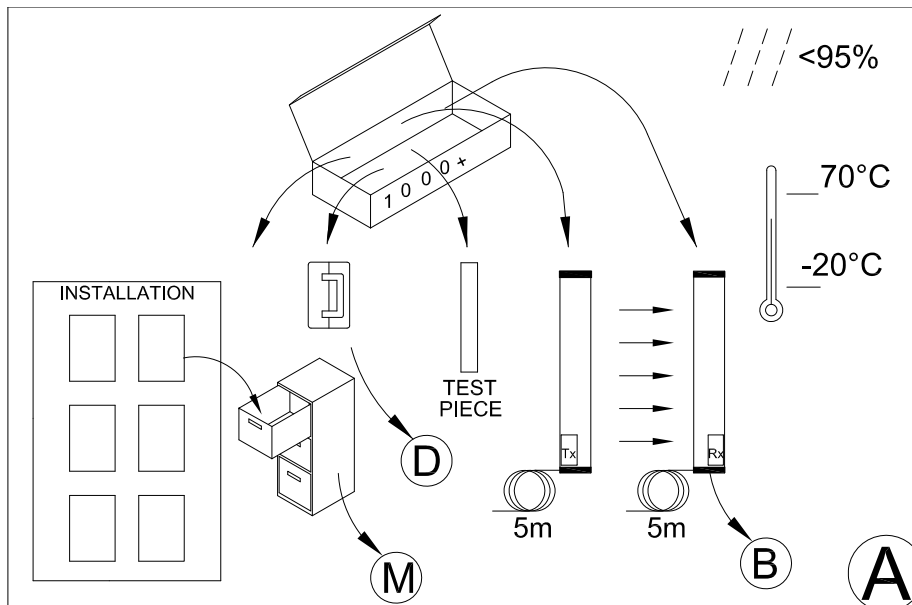
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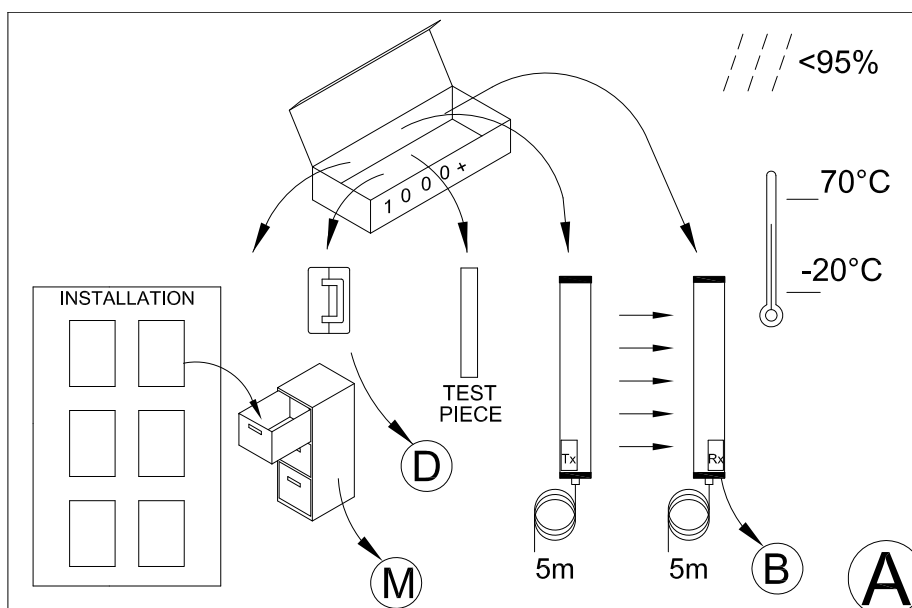
1000 PLUS Series (Model No. 012-xxx, 012-xxxT) Safety Light Curtain Installation Sheet (CD1009A-101016, CD1009B-101016)

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



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Each 1000+ series supplied would normally include:

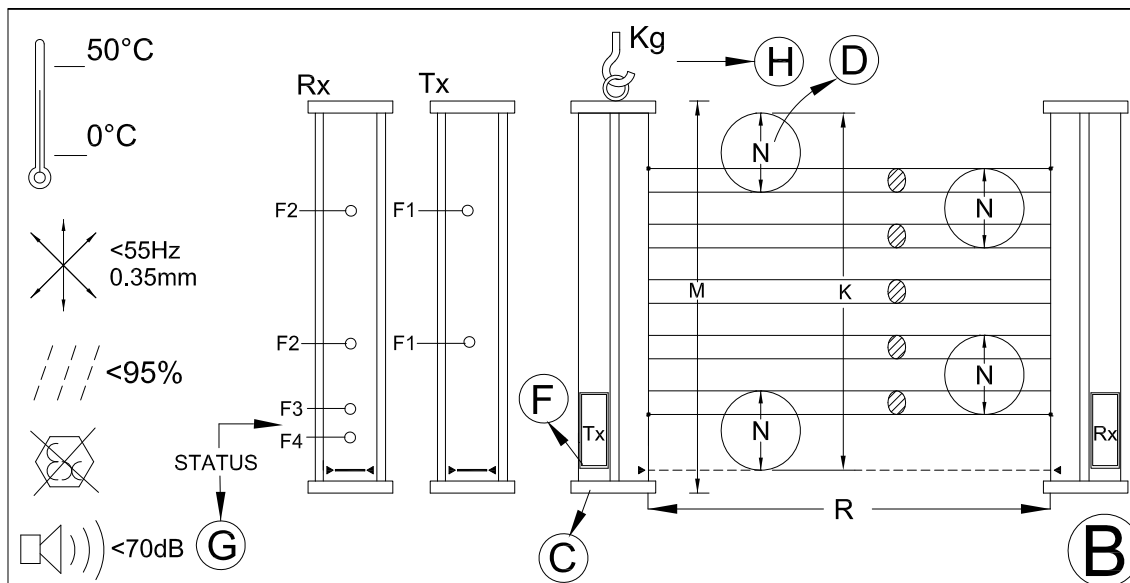
- ❑ Light curtain with 5m of cable attached to transmitter and receiver columns
- ❑ 012-xxx is direct wire-link model (CD1009A)
- ❑ 012-xxxT is M12 connector model (CD1009B)
- ❑ Test piece
- ❑ Installation sheet
- ❑ Service questionnaire form

Storage requirements:

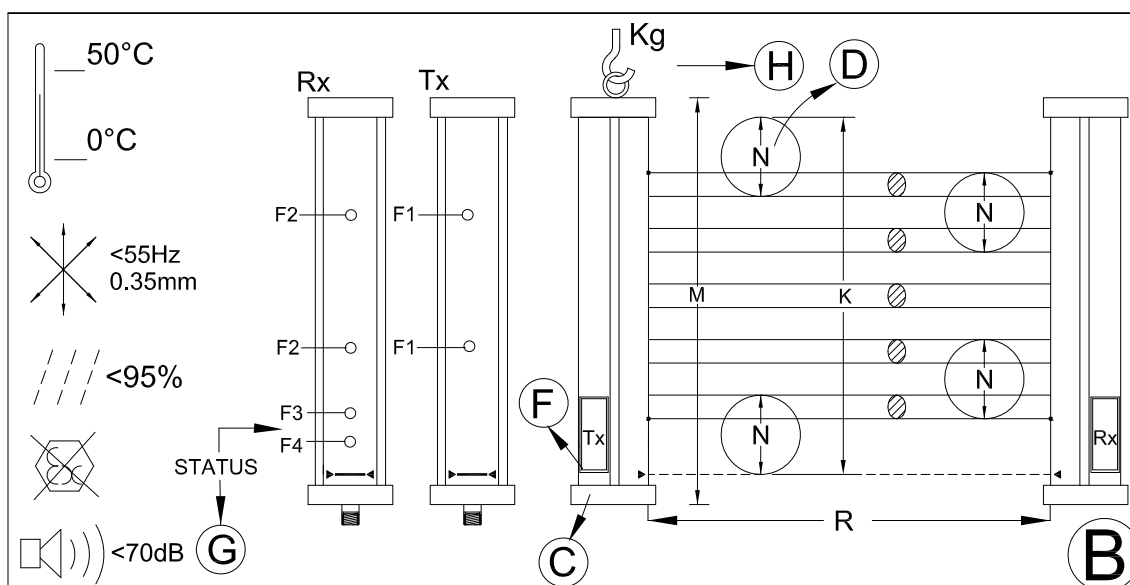
- ❑ Humidity - <95%
- ❑ Temperature range between –20°C and +70°C

Figure B – Operating Requirements

- ❑ Humidity <95%
- ❑ Temperature range between 0°C and 50°C
- ❑ Vibration: Frequency <55Hz Max. Movement <0.35mm
- ❑ Do not use equipment in explosive atmospheres, (contact the manufacturer for further advice)



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Figure B also describes important parameters associated with the light curtain. Those parameters are shown as M, K, R and N.

M – Overall length of light curtain enclosures

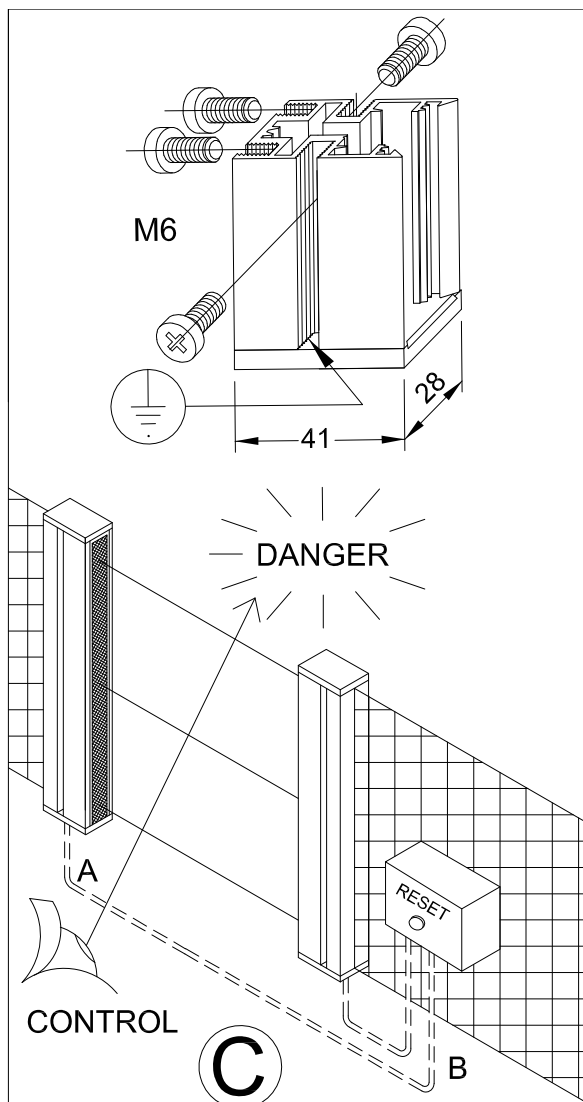
K – Detection zone width

R – Minimum and maximum scanning ranges of the light curtain

N – Object Detection Capability.

(The minimum size of object guaranteed to be detected when placed in the light curtain energy field.)

Figure C – Typical Mounting Arrangement for a Smartscan 1000 Plus



The 1000 Plus Series system does not use cable connectors (only on direct wire-link model). Both the transmitter and receiver units come complete with 5m cables attached. Transmitter = 2 way cable, Receiver = 4 way cable.

The 1000 Plus Series has a unique mounting arrangement. Threaded slots running from top to bottom of the transmitter and receiver columns enable M6 screws to be affixed at any position along the length of the slot.

The M6 threaded slots run the entire length of the aluminum extrusion, between the two end caps. There is a slot at each side of the extrusion and two slots at the rear as shown in **Figure C**.

Note:

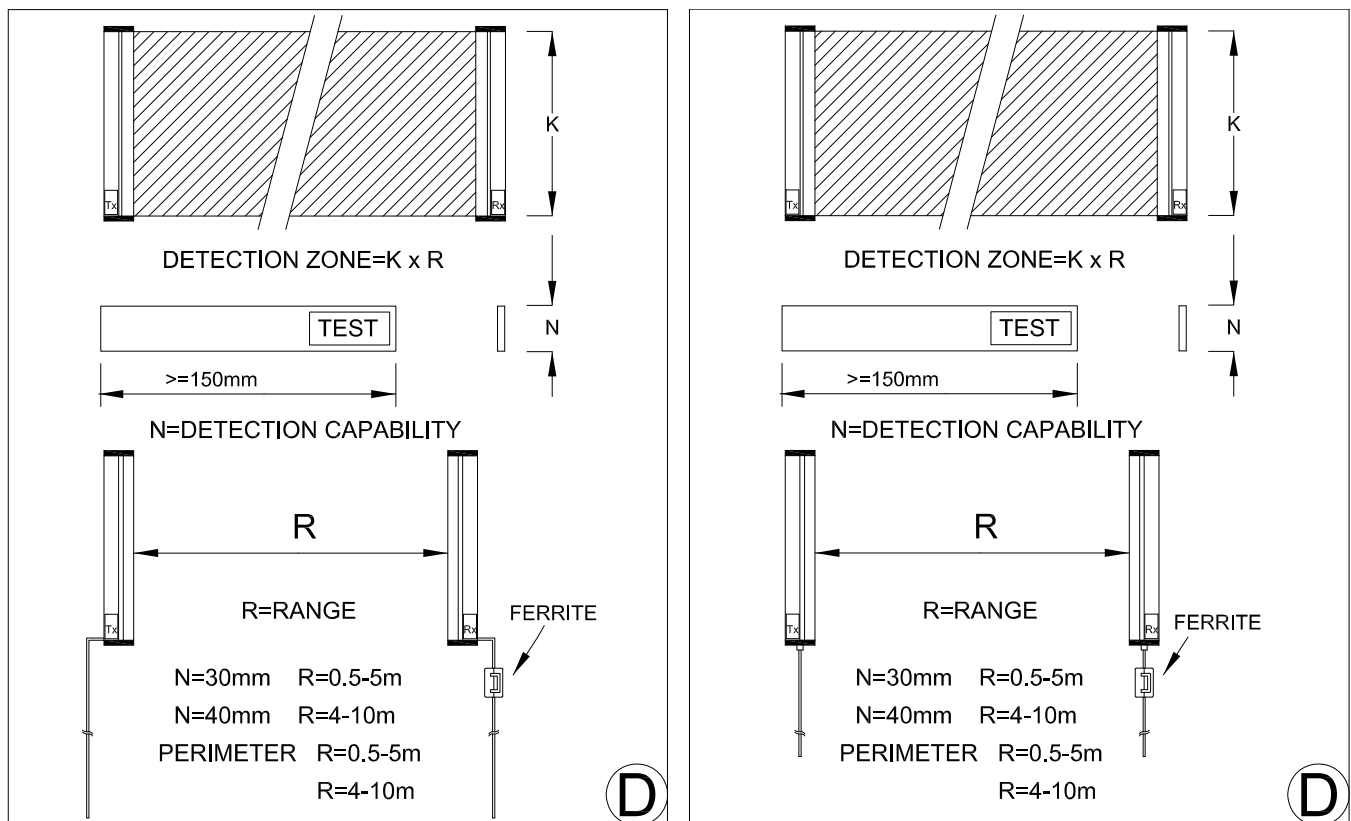
As an additional option a Mounting Bracket Kit (012-130) is available.

Figure D – Shows detection zone width, detection capability and range options

Detection zone width (K) - Must be of a suitable height for each application to prevent personnel access to the danger area either over, under or around the light curtains detection zone.

Detection capability (N) - A test piece of appropriate size is provided to test that the light curtain object detection capability is within the parameter specified for the particular model number.

Range (R) - Ensure the light curtain is capable of satisfying the range requirement for the application.



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Figure E – Important Installation Considerations

When installing a Smartscan 1000 Plus Series light curtain your attention is drawn to the following (**Figure E**):

1. Consider reflective surfaces that may give rise to optically 'short circuiting' the direct path of the light curtains as shown in Figure E. To ensure the light curtain is mounted far enough away from reflective surfaces use the formulae provided to calculate the minimum dimension between the light curtain and reflective surface.

X = minimum distance between reflective surface and light curtain.

2. To prevent intermittent tripping of the light curtain ensure extraneous infra red energy between 800 and 1000 nanometers is not directed towards the Perspex window of the receiver unit (RX). Extraneous sources would include infra red sensors, infra-red remote controls or scanning systems.
3. Ensure the mounting position of the light curtain in respect to the nearest danger point meets the requirements of European Standard ISO 13855.
4. Ensure the light curtain transmitter and receiver units are mounted accurately in line with each other and are both perpendicular and parallel to each other within the parameters shown for each axis.
5. If utilising mirrors to deflect the light curtain ensure the mirror length is 100mm longer than the light curtain detection zone width and, mounted centrally to the zone. To ensure reliable operation the light curtain deflection angle from the mirror must not be less than 40 degrees or greater than 100 degrees.

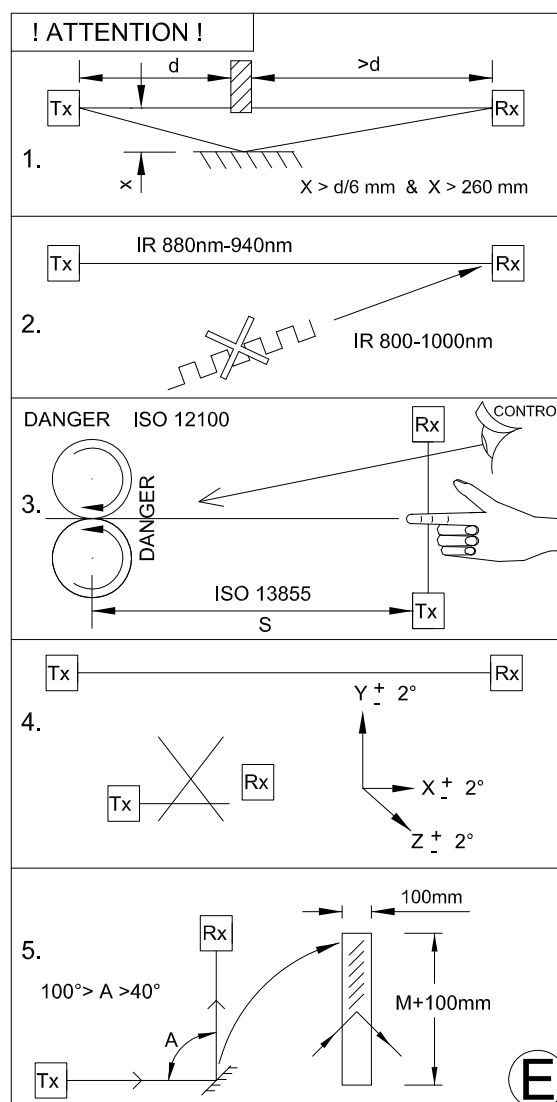


Figure F - Identification Labels

Figure F shows examples of the identification labels that are affixed to the end cap at the bottom of the transmitter and receiver columns.

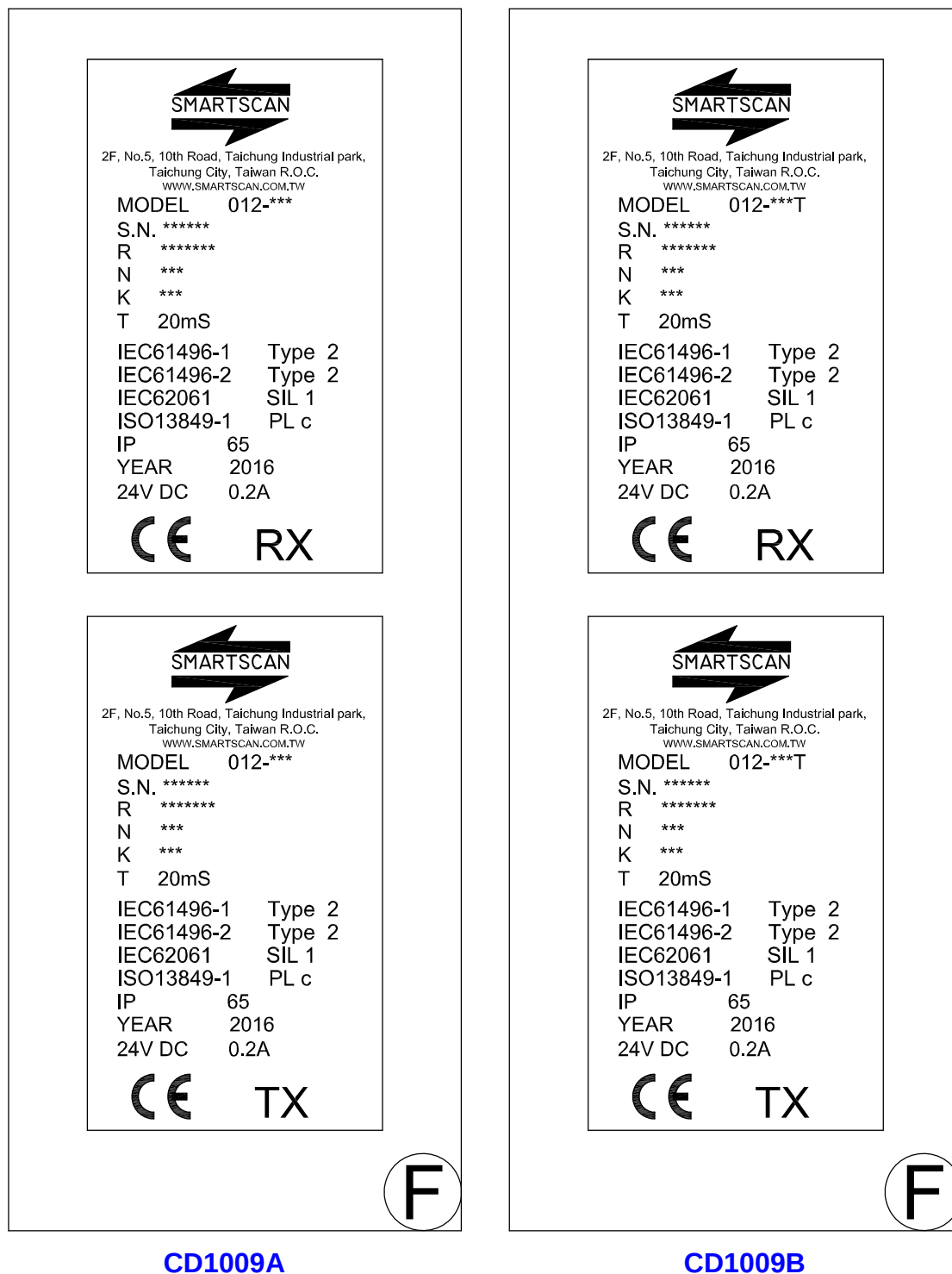


Figure G - Status and Diagnostic Indication

Figure G defines the features (F) associated with the Smartscan 1000 Plus system.

FEATURE ON		DIAGNOSTIC LEDS		G
F1	YELLOW	INDICATOR (Tx)	NOT FLASHING - FAULT	
F2	YELLOW	INDICATOR (Rx)	UNEVEN FLASHING - FAULT	
F3	GREEN	INDICATOR (Rx)	FLASHING - OUTPUT FAULT	
F4	RED	INDICATOR (Rx)	UNEVEN FLASHING - FAULT	
F6	L+	< 500mA (> 20mA)		

LED Status Indicators

F1 – If the yellow ‘flashing’ indicators on the (TX) transmitter column are flashing at an even flash rate the unit is powered-up and the electronic system is operating normally.

F2 - Yellow ‘even-flashing’ indicators on the (RX) receiver column indicate that communication is established between transmitter and receiver and the light curtain is correctly aligned. Yellow ‘steady’ indicators on the (RX) receiver column indicate that the light curtain is incorrectly aligned or the light curtain detection zone is ‘blocked’.

F3 - Green LED indicator at the receiver unit illuminates when the electronic output switches, OSSD1 and OSSD2 are ‘ON’ (only when the light curtain detection zone is ‘clear’ of any obstruction).

F4 - Red LED indicator at the RX unit illuminates when the electronic output switches, OSSD1 and OSSD2 are ‘OFF’ e.g. a trip condition or, when the light curtain detection zone is ‘blocked’. If the Red LED indicator is flashing the system is in lockout. To recover from a lockout condition disconnect the transmitter and receiver from the power source and then re-apply.

F6 - Output Signal Switching Devices OSSD1 and OSSD2 provide the fail-safe signals for switching a safe control relay or electrical contactor. Both output signals are termed, ‘control reliable’; the transistor output switches are automatically turned ‘OFF’ for a very brief period of time to enable the electronic safety system to automatically self-check thus ensuring the switches are able to turn OFF permanently if required to do so. This function increases the safety integrity of the Smartscan 1000 Plus system to a very high level. The switching period is so short (500 .s max.) that it has no effect on the output signal to the machine safety circuits, thus

the machine will continue to operate during the automatic test periods.

Note: The standing current for each OSSD should be no less than 20mA and no greater than 500 mA.

Figure H – Model List

Figure H shows the 1000 Plus Light Curtain model list showing part codes, detection zone width (K) and combined weight in Kg of transmitter and receiver columns.

MODEL N=30mm	K (mm)	M (mm)	Kg.	MODEL N=40mm	K (mm)	M (mm)	Kg.
012-098	180	189	0.3	012-099	190	189	0.3
012-100	330	339	0.5	012-101	340	339	0.5
012-102	480	489	0.7	012-103	490	489	0.7
012-104	630	639	0.8	012-105	640	639	0.8
012-106	780	789	0.9	012-107	790	789	0.9
012-108	930	939	1.1	012-109	940	939	1.1
012-110	1080	1089	1.3	012-111	1090	1089	1.3
012-112	1230	1239	1.5	012-113	1240	1239	1.5
012-114	1380	1389	1.7	012-115	1390	1389	1.7
012-116	1530	1539	1.9	012-117	1540	1539	1.9
012-118	1680	1689	2.1	012-119	1690	1689	2.1
012-120	1830	1839	2.3	012-121	1840	1839	2.3

MODEL	BEAMS	K(mm)	M(mm)	RANGE	Kg.
012-125	2	640	639	0.5-5m	0.7
012-126	3	990	989	0.5-5m	0.9
012-127	4	1290	1289	0.5-5m	1.2
012-122	2	640	639	4-10m	0.7
012-123	3	990	989	4-10m	0.9
012-124	4	1290	1289	4-10m	1.2

NOTE: PERIMETER GUARDS HAVE A 6 BEAM UNIT AT THE BEAM LOCATIONS



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MODEL N=30mm	K (mm)	M (mm)	Kg.	MODEL N=40mm	K (mm)	M (mm)	Kg.
012-098T	180	195	0.3	012-099T	190	195	0.3
012-100T	330	345	0.5	012-101T	340	345	0.5
012-102T	480	495	0.7	012-103T	490	495	0.7
012-104T	630	645	0.8	012-105T	640	645	0.8
012-106T	780	795	0.9	012-107T	790	795	0.9
012-108T	930	945	1.1	012-109T	940	945	1.1
012-110T	1080	1095	1.3	012-111T	1090	1095	1.3
012-112T	1230	1245	1.5	012-113T	1240	1245	1.5
012-114T	1380	1395	1.7	012-115T	1390	1395	1.7
012-116T	1530	1545	1.9	012-117T	1540	1545	1.9
012-118T	1680	1695	2.1	012-119T	1690	1695	2.1
012-120T	1830	1845	2.3	012-121T	1840	1845	2.3

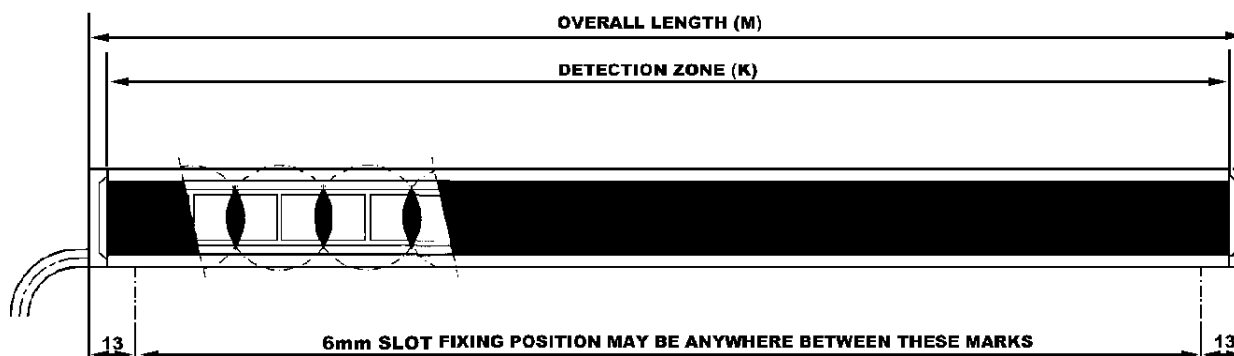
MODEL	BEAMS	K(mm)	M(mm)	RANGE	Kg.
012-125T	2	640	645	0.5-5m	0.7
012-126T	3	990	995	0.5-5m	0.9
012-127T	4	1290	1295	0.5-5m	1.2
012-122T	2	640	645	4-10m	0.7
012-123T	3	990	995	4-10m	0.9
012-124T	4	1290	1295	4-10m	1.2

NOTE: PERIMETER GUARDS HAVE A 6 BEAM UNIT AT THE BEAM LOCATIONS

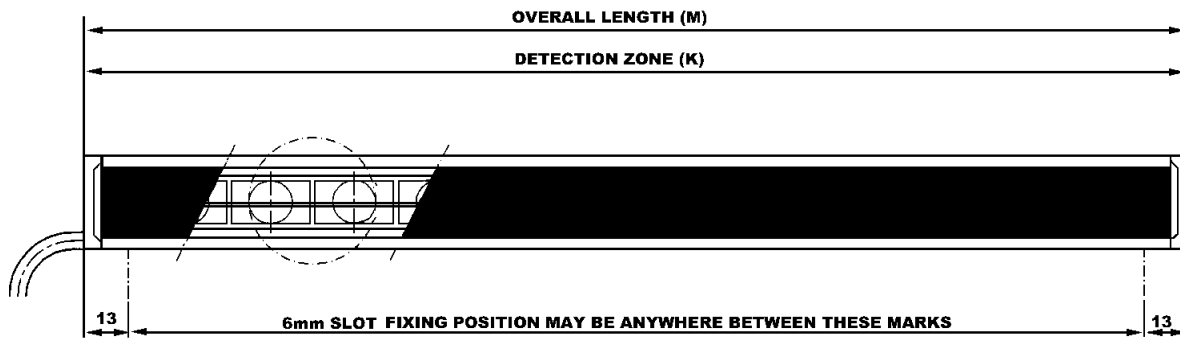


CD1009B

Light Curtains 30mm Detection Capability Range 0.5m to 5m



Light Curtains 40mm Detection Capability Range 4m to 10m



Light Curtains Perimeter Guarding Range 0.5m to 5m / Range 4m to 10m

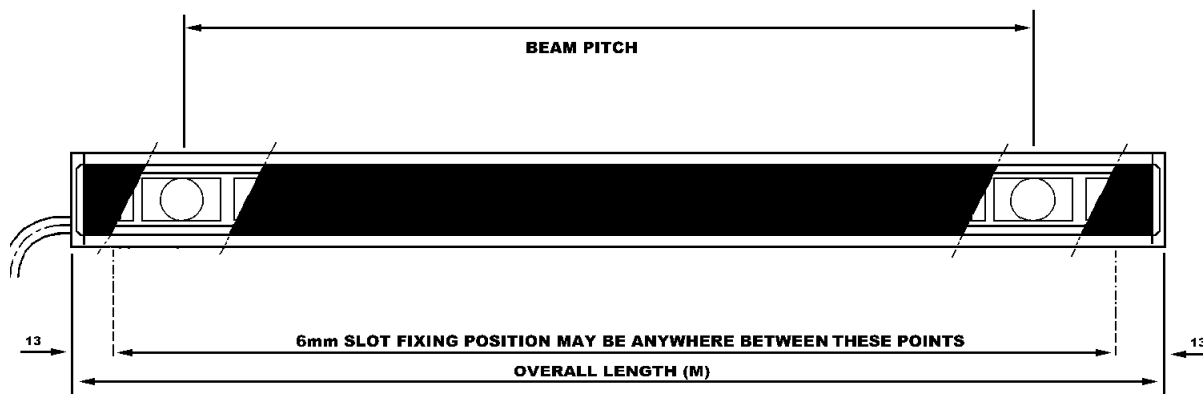
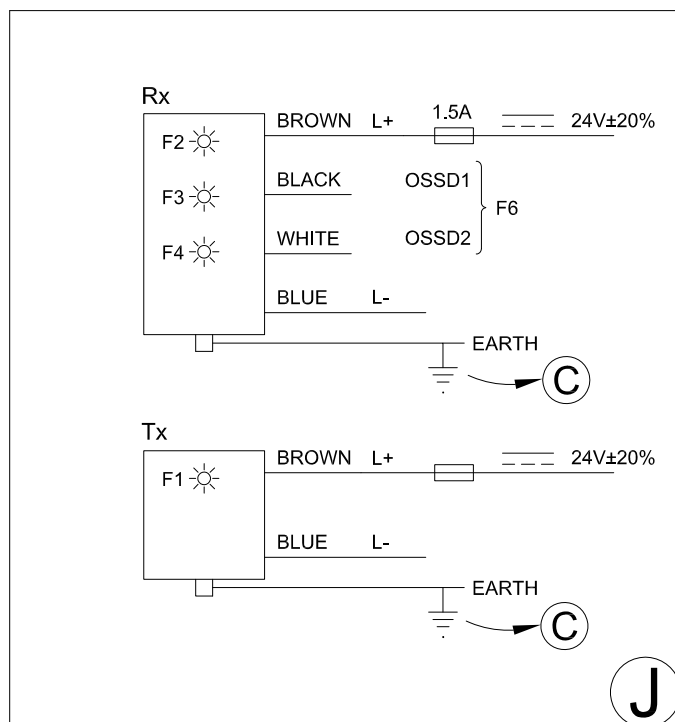


Figure J – Electrical Connections

Input and Output Connections at the Transmitter and Receiver Units (**Figure J**)



A 24V DC regulated power supply should be used for connection to the transmitter and receiver units. The transmitter and receiver units operate entirely independently from each other, e.g. there are no electrical connections between the transmitter and receiver units therefore separate 24V DC power supplies may be used if required. In order to protect the 1000 Plus Series electronic system please remember to install fuses of suitable rating between incoming 24V DC supply and 24V input connections at both the transmitter and receiver units. Recommended fuse ratings, transmitter 0.5A and receiver 1.5A.

OSSD1 and OSSD2 - Each output switch has a maximum current rating of 0.5A. To prevent possible damage never exceed the maximum current rating for the switching devices.

Note: Inductive load suppressors should be used when driving large power relays.

Ensure both transmitter and receiver units are connected to GROUND. Insert an M6 bolt into one of the threaded slots in the extrusion to ensure a good ground connection.

Glossary of Words and Language Translation

GLOSSARY of words and terminology used in the Installation Sheet in a number of International languages:

GLOSSARY	ORDBOG	GLOSSAR	BIBLIOGRAFIE	GLOSSAIRE	GLOSSARIO	GLOSARIO	ORDLISTA
English	Dansk	Deutsche	Dutch	Francais	Italiano	Espagnol	Svenska
attention	achtung	attention	attention	attenzione	atencion	uppmärksamhet	uppmärksamhet
beams	stråle	lichtstralen	stralen	faisceaux	raggi	vigas	stralar
black	sort	scharz	zwart	noir	nero	negro	svart
blue	blå	blau	blauw	bleu	blu	azur	blå
brown	brun	braun	bruin	marron	marrone	moreno	brun
control	kontrol	steuern	besturing	contrôle	controllo	controlan	kontroll
danger	fare	gefahr	gevaar	danger	pericolo	peligro	fara
detection capability	aftastnings mulighed	abfragungsfähigkeit	detectievermogen	capacité de détection	possibilità di rilevazione	capacidad de la detección	upplösning
detection zone	beskyttelses zone	abfragungsfähigkeit	detectie zone	Zone de détection	area di rilevamento	zona de detección	skyddsfält
diagnostic							
fault	fejl	störung	fout	défaut	guasto	incidente	fel
feature	muligheder	eigenschaft	eigenschap	dispositif	caratteristica	característica	egenskaper
flashing							
green	grøn	grün	groen	vert	verde	verde	grön
indicator	indikation	anzeige	indicator	indicateur	indicatore	indicador	indikering
installation	installation	installation	installatie	installation	installazione	instalacion	installation
light curtain	lystæppe	lichtschranken	lichtscherm	barrière	barriere	bamner de seguridad	ljus barrier
model	model	typ	model	modèle	modello	modelo	modell
months	måned	monate	maanden	mois	mesi	meses	manader
not flashing							
operation	operation	operation	in bedrijf	opération	funzionamento	operacion	operation
red	rød	rotes	rood	rouge	rosso	rojo	rod
safety	sikkerhed	sicherheit	veiligheid	securité	sigurezza	seguridad	sakerhet
status	status	rand	status	statut	stato	estado	status
supplier	leverandør	lieferant	leverancier	fournisseur	forniture	surditor	leverantör
test piece							
uneven flashing							
white	hvid	weis	wit	blanc		blanca	
yellow	gul	gelb	geel	jaune	giallo	amarillo	gul

Figure K – Test and Maintenance

Testing the Light Curtain with the test piece

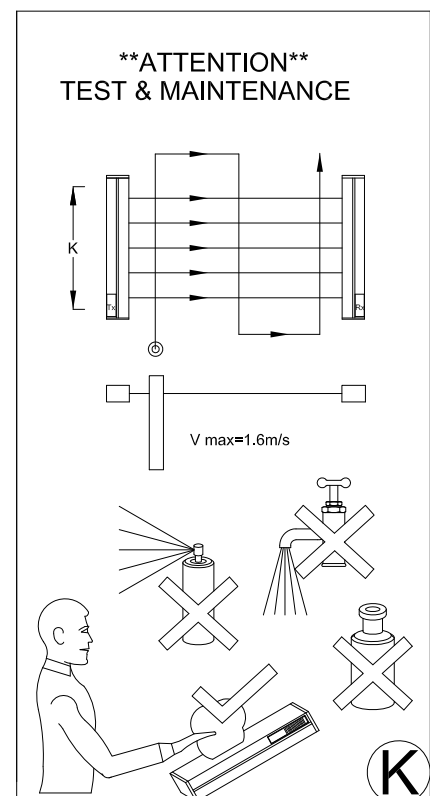
The test procedure should be carried out frequently as indicated by the risk assessment for the particular installation. Smartscan Ltd recommends the test should be carried out daily.

Light curtains with ODC (N) 30mm / 40mm - refer to Figure K.

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

Insert a test piece of appropriate size into the light curtain detection zone, at the bottom, 150mm from the transmitter unit. At this point the output switches will turn OFF. Sweep the test piece up through the detection zone parallel to the transmitter. Now sweep the test piece down through the detection zone equal distance between the transmitter and receiver. Now sweep the test piece up through the detection zone 150mm and parallel to the receiver unit. At no time during these tests should the output switches turn ON.

Now thrust the test piece anywhere in the light curtain detection zone and ensure the machinery stops without apparent delay.



For light curtain models with an ODC above 40mm / 55mm / 65mm undertake the same tests as described. During these tests the output switches should only turn OFF as the test piece totally obscures each beam in the light curtain. Ensure that while the test piece is obscuring each beam the output switches are OFF.

The Transmitter (Tx) and Receiver (Rx) windows should be cleaned regularly as indicated on the Installation Sheet.

No routine maintenance is required beyond periodic cleaning of the transmitter and receiver windows. Dirt build up on the windows may lead to intermittent tripping or a totally blocked condition of the light curtain. Clear adhesive tape may be applied to the windows of curtains in

dirty or abrasive conditions. Renew the clear adhesive tape periodically.

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

Figure L – Operation Cycle

Figure L. shows an operations chart for the 1000 Plus system.

Before installation read and understand the Installation Sheet provided paying particular attention to the information provided in Figure E.

- ❑ Refer to Figure K. for test and maintenance procedures
- ❑ Every 24 hours carry out tests as indicated in Figure K.
- ❑ Every 6 months check the entire installation paying particular attention to Figure E.
- ❑ If the equipment fails to operate as intended check the electrical connections as shown in Figure J.

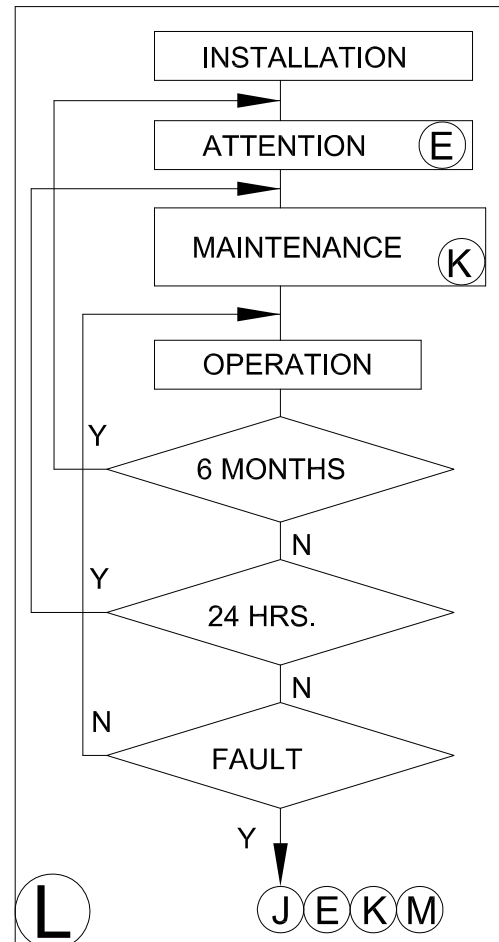
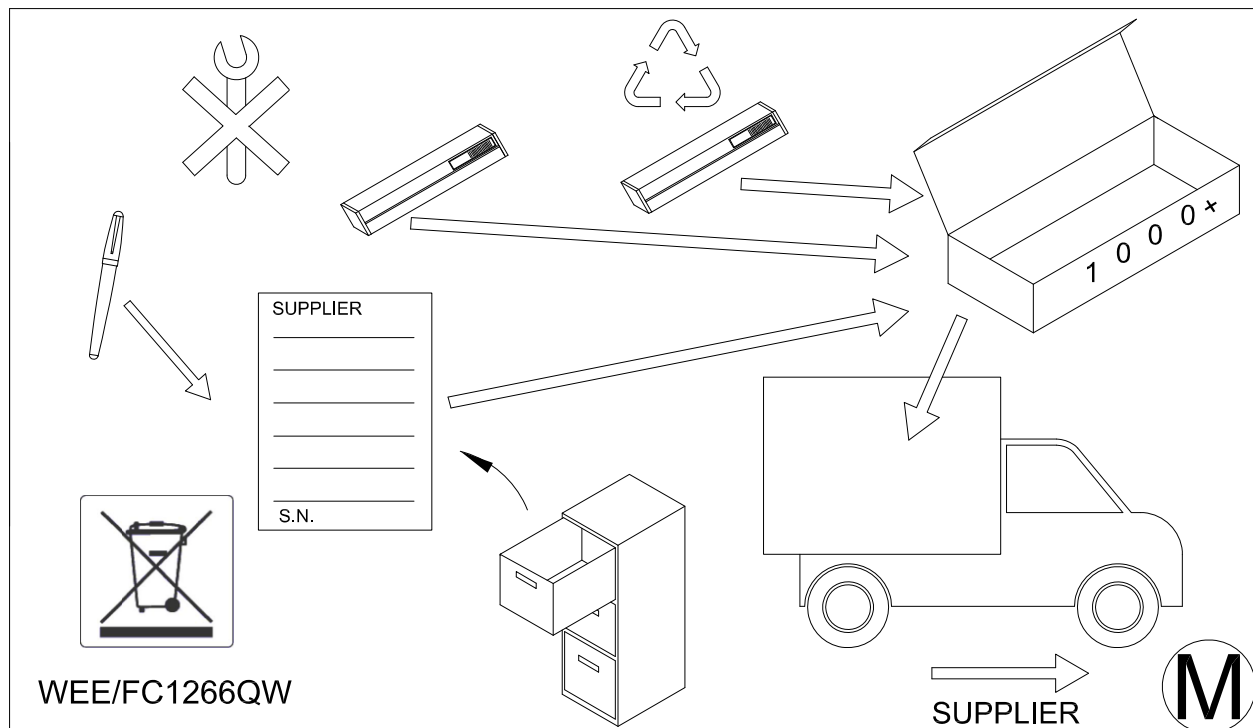


Figure M – Product Return Procedure

Figure M outlines the procedure for returning a Smartscan product.



If a fault occurs that cannot be resolved or the equipment is damaged return the system 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 are matching serial number pairs.

Figure N – Declaration of Conformity

Figure N. shows a copy of the Declaration of Conformity



CD1009A/101016

EC Declaration of Conformity

Product: Smartscan 1000 plus Light Curtain

Smartscan TW Limited, 2F, No.5, 10th Road, Taichung Industrial park, Taichung City, Taiwan R.O.C.

Declares that the safety components(s) described:
Serial Numbers: Between 310 000 - 329 999 and 330 000 – 399 999

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

Conforms to the following Directives:

Machinery Directive	98/37/EC, 2006/42/EC
Electromagnetic Conformity Directive	2014/30/EU

Complies with the relevant requirements of the following Standards:

IEC 61496-1, IEC 61496-2	Type 2
IEC 62061	SIL 1
ISO 13849-1	PL c

Uses the following standards:
ISO 12100

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 body identified below.

Safenet Limited Notified Body Number 1674
Safenet are authorised to compile the technical file in the EU.

Address Safenet Limited, Denford Garage, Denford, Kettering, Northamptonshire, NN14 4EQ, U.K.

Certificate No. 5929220616

Signed:  Date: 10. 10. 2016

Title: Technical Director



CD1009A



CD1009B/101016

EC Declaration of Conformity

Product: Smartscan 1000 plus Light Curtain

Smartscan TW Limited, 2F, No.5, 10th Road, Taichung Industrial park, Taichung City, Taiwan R.O.C.

Declares that the safety components(s) described:

Serial Numbers: Between 310 000 - 329 999 and 330 000 – 399 999

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

Conforms to the following Directives:

Machinery Directive	98/37/EC, 2006/42/EC
Electromagnetic Conformity Directive	2014/30/EU

Complies with the relevant requirements of the following Standards:

IEC 61496-1, IEC 61496-2	Type 2
IEC 62061	SIL 1
ISO 13849-1	PL c

Uses the following standards:

ISO 12100

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 body identified below.

Safenet Limited Notified Body Number 1674
Safenet are authorised to compile the technical file in the EU.

Address Safenet Limited, Denford Garage, Denford, Kettering, Northamptonshire, NN14 4EQ, U.K.

Certificate No. 5929220616

Signed:  Date: 10. 10. 2016

Title: Technical Director



CD1009B

Appendix 1 - Certifications

Company



Certificate No: 79Q13722

Smartscan Limited has a certified quality assurance system in compliance with ISO 9001:2008.
Certificate number: 79Q13722.

Products



Smartscan safety light curtains are developed and manufactured in compliance with the European Machinery Directive 2006/42/EC and International Legislation and Standards. Smartscan products are Third Party approved by the Notified Body Safenet Limited, Notified Body number 1674.

Appendix 2 - Multifunction Unit



Smartscan 1000 Plus Series light curtains incorporate two fail-safe, electronic output switches. If there is a requirement for relay output switching a Multifunction Safety Unit (MFU) may be used.

The MFU Type **011-149** is effectively a safety relay module and, just like any other proprietary safety relay, it provides relay output switching contacts and a choice of control functions, for example auto/manual reset and external device monitoring.

An, MFU Type **011-160** has much more to offer. Not only does it provide inputs for the emergency stop function but it also has two further sets of inputs for connecting up to two light curtains. The monitored output switching contacts are rated at 250V AC, 2A with two additional electronic outputs for status indication etc. Other features include selectable auto/manual reset modes, external device monitoring (EDM) and LED indicators for all input and output channels. The unit is automatically self testing and with simultaneous monitoring between related channels it ensures the unit is suitable for SIL 3 and PL e (Category 4) control systems as defined in EN 62061 and EN ISO 13849 (BS EN 954-1).

MFU Type **011-151** further enhances the Smartscan range of multifunction safety units. The unit incorporates a light curtain muting facility, designed specifically for those systems that require the light curtain detection zone to be inhibited, or muted, during specific periods of a machine's operating cycle. Muting allows access through the light curtain for the passage of material or for a person to load and unload parts through the light curtain during safe periods without interrupting the machines operating cycle.

MFU Type 011-151 provides a dual channel safety monitored input for automatically muting the

light curtain during safe periods of machine operation. Mute signals are often derived from the machine control system or from external sensors or switches. It also provides dual inputs for a Series 1000 light curtain and a two channel emergency stop system.

The monitored safety output relay switches are rated at 250V AC, 2A, for connection to a power-switching device or directly to a machines final control element. Two electronic outputs are provided one for guard status indication and the other to indicate a 'mute on' condition. Both are for direct connection to a PLC or indicator lamps etc.

Other features include external device monitoring (EDM) and LED indicators on all inputs and outputs.

Monitoring between associated input channels ensures the unit is suitable for SIL 3 and PL e (Category 4) control systems as defined in EN 62061 and EN ISO 13849 (BS EN 954-1).

MFU Type **011-155** has been designed specifically for entry/exit applications where the light curtain is positioned across a conveyor. The control module provides two safety monitored inputs for signals that automatically mute the associated light curtain during safe periods of the machine operation. Mute signals are usually derived from external PE sensors, limit switches or the machine control system.

For additional integrity a third mute input channel (mute enable) is provided. This input is often connected to a 'conveyor run' signal to enable a mute condition, ONLY when the associated conveyor is 'running'. The 011-155 also provides dual inputs for a Series 1000 light curtain and a 'guard override function'. The override facility enables the light curtain's safety output relays to be negated for a short period. This facility is essential in the packaging industry for light curtains that are positioned across conveyors that prevent access to personnel but allowing pallet loads to pass through.

The monitored safety output relay switches are rated at 250V AC, 2A, for connection to a power-switching device or directly to a machines final control element.

Electronic outputs are provided, one for guard status indication and the other for mute indication.

The MFU also includes external device monitoring (EDM) and visual indicators on all inputs and outputs.

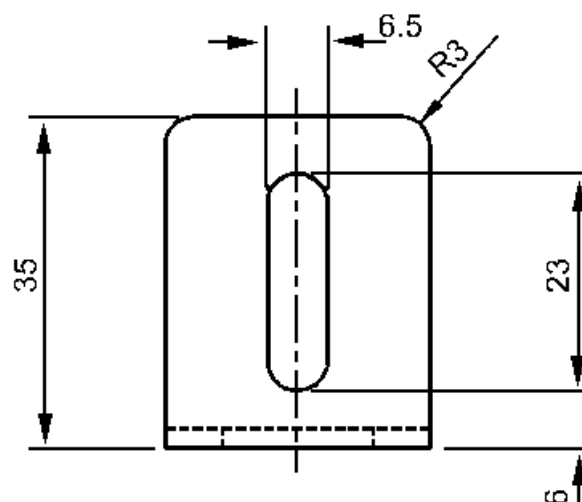
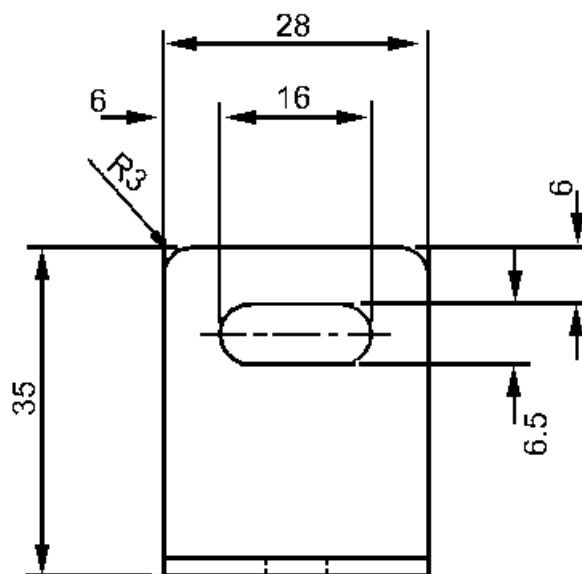
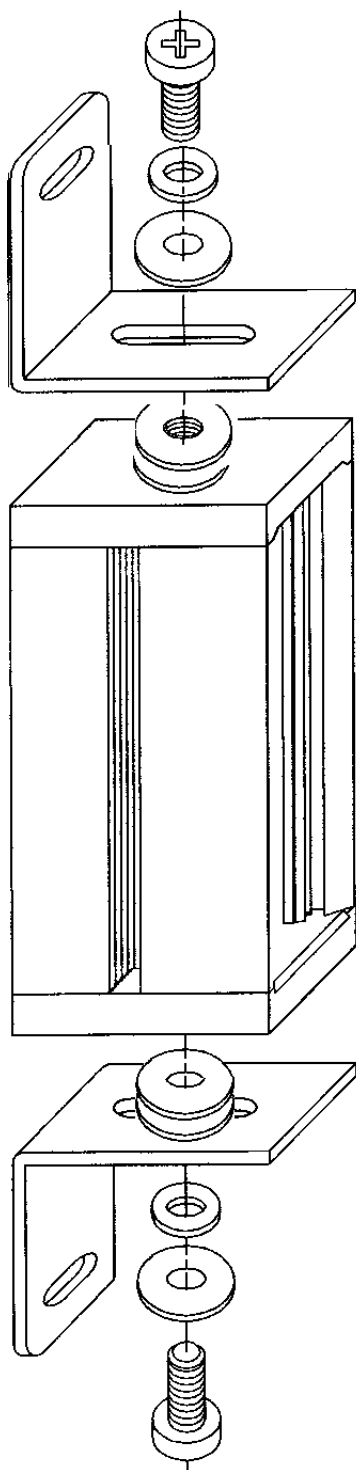
Monitoring between associated input channels ensures the unit is suitable for SIL 3 and PL e

(Category 4) control systems as defined in EN 62061 and EN ISO 13849 (BS EN 954-1).

Appendix 3 - Mounting Kit

Model number	Description
012-130	Mounting bracket kit

4 x 'L' shaped stainless steel mounting brackets and a set of M6 x 8mm screws.



For fixing centres 36mm + (m)mm

For (m) see product tables on **Figure H – Model List**

Appendix 4 - Mirrors

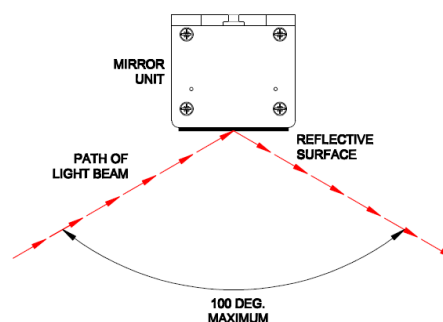
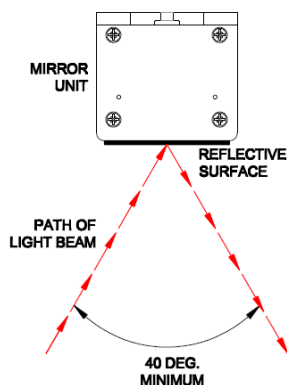
Reflector mirrors can be provided enabling two or three sides of a machine to be safeguarded with, what is effectively a single light curtain.

When mirrors are employed it is essential that the mounting of the transmitter unit, receiver unit and mirrors themselves are sufficiently rigid. Alignment becomes increasingly critical as the range and number of mirrors increase. Mirrors cause a reduction in optical efficiency, reducing the effective range. A guide to the practicality of using mirrors is given below.

Range of the light curtain	Maximum range through 1 mirror	Maximum range through 2 mirrors
0.5m – 5m	4m	3m
4m - 10m	8m	6.5m

Total Light Path	1 Mirror	2 Mirror
2m#	Easy	Easy
4m*	Easy	Medium
6m*	Medium	Hard
8m*	Hard	Not Feasible

Based upon a 012-105, * Based upon a 012-104

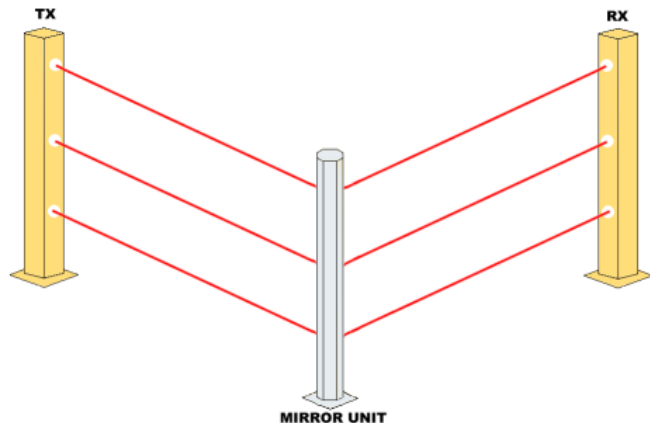


Note: Perimeter curtains will be easy to align, curtains over 900mm may be more difficult to align. Check with the Smartscan technical department prior to ordering for a particular application. support@smartscan.com, Tel: 886 - 4 - 23598885, Fax: 886 - 4 - 23599423

Note: The angle of the light curtain striking the reflective surface must be within defined limits.

Alignment though one mirror

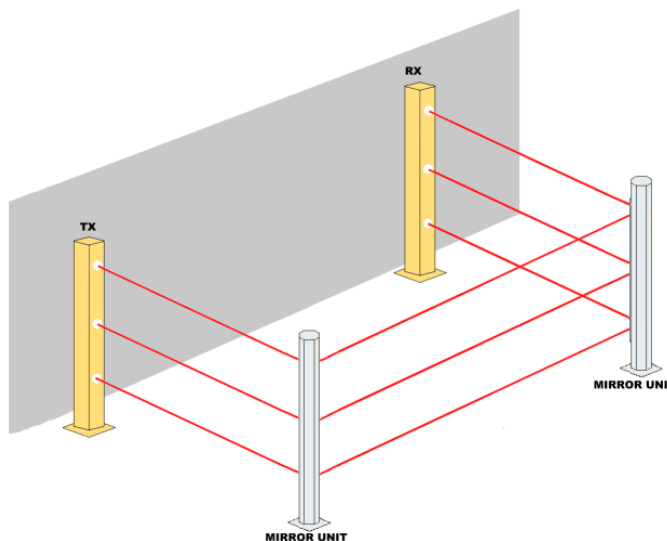
1. Secure the transmitter, receiver and mirror units in the position in which they are intended to be used.
2. Ensure all units are perfectly upright in all planes by using a spirit level.
3. If the units are floor mounted on stands ensure the floor is even. Shim the floor mounts if necessary to ensure the units are all upright.
4. With one eye looking over the top of the receiver unit in line with the centre of the extrusion look towards the reflective surface of the mirror, in a similar manner to looking through a gun sight.
5. A second person must adjust the mirror to the left and right until the Perspex window of the transmitter unit can be seen reflected in the mirror.
6. If the light curtain is scanning over a long range it may be difficult to see the reflection of the transmitter units Perspex window in the mirror. If so, cut a piece of white paper to the size of the Perspex window and mount directly in front of the window. Now repeat step 5.
7. If the reflection of the white paper is difficult to see in the mirror then employ a third person to hold a flashlight in front of the transmitter unit with the light beam pointing directly in line with the Perspex window towards the mirror. Now repeat step 5.
8. Use shims to ensure the mirror is accurately aligned to enable the infra red beams in the light curtain to reach the receiver. Alternatively, fabricate mirror mountings to include some form of adjustment to enable movement both left and right and also forward and backwards from the central axis of the mirror.



Alignment through two mirrors

9. Follow instruction 1-4

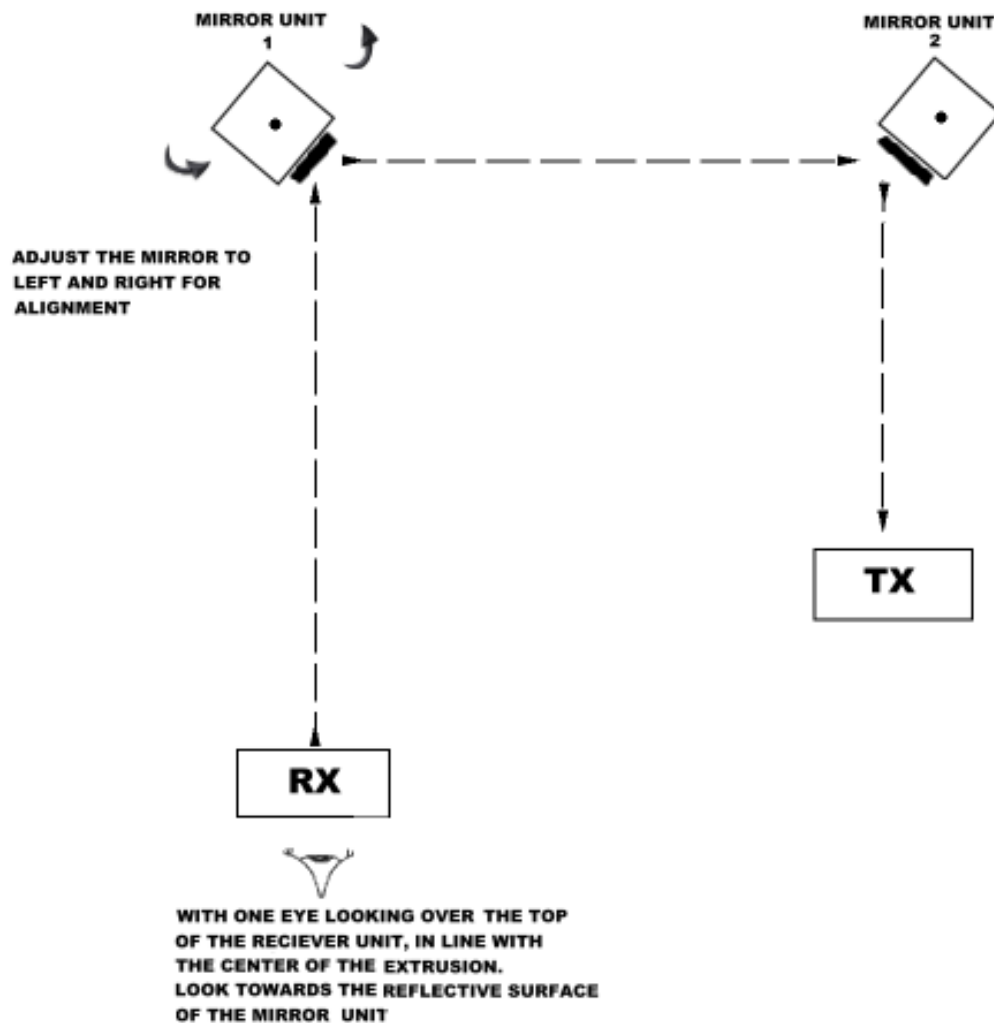
10. A second person must adjust the position of the first mirror to the left and to the right until the entire length of the second mirror is reflected in the first mirror. If difficulties are experienced in seeing the reflection on the second mirror in the first mirror then use a piece of white paper cut to size and position in front of the second mirror.



11. If the reflection of the white paper is difficult to see in the first mirror then employ a third person to hold a flashlight in front of the second mirror with the light beam pointing directly in line with its mirror housing towards the first mirror. Secure the first mirror.
12. Again follow instructions 1 to 4.
13. The second person must adjust the position of the second mirror to the left and to the right until the entire length of the transmitter unit is reflected through both the first mirror and the second mirror. If difficulties are experienced in seeing the reflection of the transmitter unit through both the first then the second mirrors then use a piece of white paper cut to size and position in front of the transmitter unit.
14. If the reflection of the white paper is still difficult to see through the first and second mirrors then employ a third person to hold a flashlight in front of the transmitter unit with the light beam pointing directly towards the second mirror. Secure the second mirror.
15. Ensure the mirrors are directly aligned thus enabling the infra red beams of the transmitter to reach the receiver. Alternatively, fabricate mirror mountings to include some form of adjustment to enable movement both left and right and also forwards and backwards from the central axis of each mirror.
16. Now turn on the power to the light curtain and check that the green LED beam indicator, mounted on the receiver unit is 'on'. If not, it may be necessary to finely adjust each mirror

in turn to ensure the infra-red energy from the transmitter unit is being reflected through the mirror(s) to the corresponding receiver unit.

Alignment of the light curtain using mirrors



Note: The mirror length must be a minimum of 100mm longer than the overall length of the light curtain to be installed e.g. 50mm above and 50mm below either end of the light curtain.

Appendix 5 – Specification Table

1000 Plus Light Curtains

Number of beams	2 – 72
Object detection	012-xxx, 012-xxxT series: 30mm, 40mm plus 2, 3 & 4 beam perimeter systems
Detection zone	180mm to 1840mm
Range	0.5 – 10m (model dependent)
Light type	Infra-Red 880nm
Response time	20ms
Operating temperature	0°C to +50°C
Light curtain enclosure	IP65, (H x W x D) H x 28 x 41mm
Status indicators	TX - Yellow (flashing) TX 'OK' RX - Red (steady) OSSDs 'OFF' - Red (flashing) system lockout RX - Green OSSDs 'ON' RX - Yellow (flashing) TX to RX communications established RX - Yellow (steady) incorrectly aligned or detection zone is 'blocked'
Power supply requirement	24V DC 1.5A ± 20% reg
Current consumption	200mA transmitter + 200mA receiver (OSSD LOAD ADDITIONAL)
Light curtain connection	5m cables connected to both TX & RX units
Finish	Polyester powder coated (yellow)
Classification	BS EN 61496-1 Type 2 BS IEC 61496-2 Type 2 EN 62061 - SIL 1, EN ISO 13849-1 PL c
Warranty	One Year

OUTPUTS

Safety Outputs OSSD1 & OSSD2	2 x electronic switches, each rated at 24V DC, 500mA - ON = 24V DC, OFF = 0V standing current (min 20mA)
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