

ISB

TYPE 4 SAFETY LIGHT CURTAINS



ISB MX SERIES



The ISB MX series of Light Curtains are Type 4 Active Optoelectronic Protective Devices (AOPD). Type 2 or 4 devices are terms established by the International Standard IEC 61496-1 indicating the safety level provided by the AOPD. Type 4 is the more stringent of the two types.

Category, as compared to type, is defined by EN ISO 13849-1, and state the required behavior of the light curtain in respect of its resistance to faults based on design considerations. Controls can be classified as category B, 1, 2, 3 or 4. When a type 2 AOPD is installed on a category 4 control, the category of the system will be downgraded to category 2. When a type 4 AOPD is installed the category level will be maintained.

■ FEATURES

Common Features of MX4100 and MX4200 Light Curtains

- Detection capability:
 - 14 mm for finger protection
 - 22 mm, 30 mm and 38 mm for hand protection
 - 82 mm for body protection
- Protective field height: 300 mm to 1800 mm
- Maximum range: 10 m
- Start / Restart Interlock, selectable.
- EDM: External Device Monitoring, selectable.
- OSSD two separate safety outputs.
- Easy set-up, no separate software or computer required
- Individual indicators for each beam
- Solid aluminium construction

Specific features of the MX4200

- Fixed monitored blanking
- Fixed partially monitored blanking
- Floating blanking
- Configurable tolerances for all blanking modes
- Muting



Part No: MX4138-800-SD	Protective range: < 10 m	Aperture angle: ± 2.5°	Supply voltage: DC 24V ± 20%
Revision: 1.07	Protective height: 900mm	Operating instruct: 00-1000	Power consumption: < 8W
Serial No: 130427001-01	Response time: < 18 ms	Software version: 01.01.18	0 °C < Ta < 50 °C
Safety Cat: Type 4 (SIL) / PL e	Nominal detection capability: 38 mm		Device Type: Safety Light Curtain
ISB www.isb.com Montreal QC Canada CE FS			

■ FEATURES AND FUNCTIONS

Start and restart interlocks

The MX4100 and MX4200 models provide two separate interlock functions: The start interlock function is intended to hold the OSSD outputs into its OFF state after a power up, even if the protective field is clear. The OSSD outputs will not be switched back to the ON state until actuation of the RST/EDM input (usually through a push button switch).

External device monitoring

The EDM function is intended to monitor the state of external contacts and its primary application is to detect malfunctions (e.g. contact welding) in the external relays, contactors or valve solenoids connected to the outputs of the MX4000 safety light curtain.

Muting (MX4200 only)

Muting is a deliberate and controlled suppression of the safety function of the MX4000 safety light curtain. As long as the muting function is active, the OSSD outputs will remain in the ON state even if the protective field is interrupted. The intended use of the muting function is to suspend temporarily the safety function when the machine does not represent a risk or hazard to the operator, e.g. a pallet over a conveyor or an automatic guided vehicle to pass through the protective field. When using the mute function, a **blue LED** light will blink to show that the safety light curtain is in a muted condition. Additionally, the auxiliary output can be configured to signal the current state of the muting function through an external indicator lamp.

Muting override (MX4200 only)

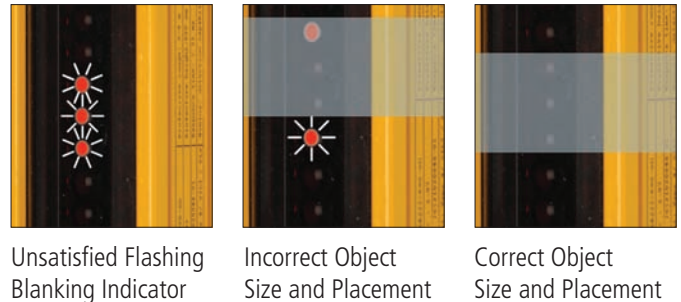
The muting override function allows the user to force a muting condition even if the prerequisite of a clear protective field is not satisfied. This function is intended mainly for automation applications (e.g. conveyors and packaging machinery) where it may be required to momentarily restart the machine in order to remove any object that may have clogged in the protective field due to a fault in the muting sequence.



Blanking (MX4200 only)

The blanking function is a special function which allows an object of a size greater than the detection capability of the safety light curtain to be inside the protective field without switching off the safety outputs of the ESPE. The intended uses of this function are those applications where a machinery part is required to be present in the protective field without impairing the manufacturing process or the functionality of the machine. In order to cope with the constraints of particular applications, the MX4200 system offers three different blanking modes:

- A** fixed monitored blanking,
- B** fixed partially monitored blanking,
- C** floating blanking



Fixed monitored blanking

The fixed monitored blanking allows an object of a fixed size to be located at a specific position in the protective field without deactivating the safety outputs of the light curtain. The actual size and position of the object are continuously monitored and, as soon as these parameters differ from the programmed values (if the object is moved or removed) the safety outputs of the light curtain will be immediately deactivated (OFF state). This blanking mode is intended to allow a fixed part of the machinery (e.g. part feeder, support arm, conveyor, etc.) to be present within the protective field without impairing the operation of the machine.

Fixed partially monitored blanking

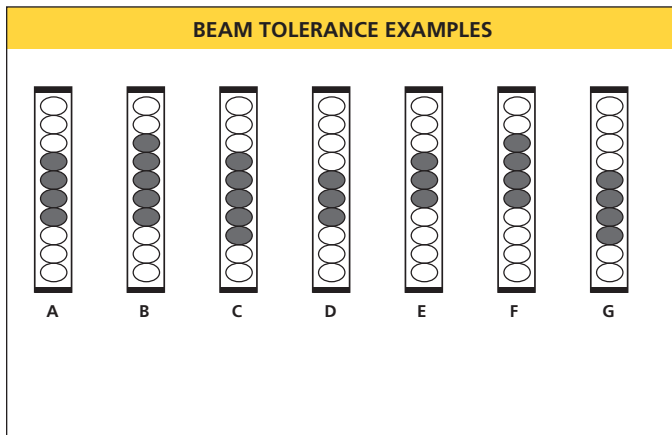
In this mode, the monitoring of the size of the blanked object is partial and limited to checking that it does not exceed the predefined maximum size. The object position is monitored and constrained to be within the boundaries of the predefined maximum object size. This blanking mode is particularly useful in those cases where an object is required to enter the protective field at the same position during the machine operation, e.g. parts over a conveyor, robotic feeders, etc.

Blanking tolerance

In some applications, the blanked object cannot be precisely positioned due to vibration, poor handling or physical limitations (e.g. flexing and twisting in large objects), hence causing size discrepancies in the sensed pattern. For these cases, the MX4200 can assign a blanking tolerance at each end of a fixed (monitored or partially monitored) blanking pattern.

EFFECTIVE DETECTION CAPABILITY WITH BLANKING TOLERANCE					
TOLERANCE (beams)	NOMINAL DETECTION CAPABILITY				
	14 mm	22 mm	30 mm	38 mm	82 mm
-1	14 mm	30 mm	45 mm	60 mm	150 mm
+1	14 mm	30 mm	45 mm	60 mm	150 mm
+2	22 mm	45 mm	—	—	—
+3	30 mm	60 mm	—	—	—
±1	22 mm	45 mm	—	—	225 mm
-1/+2	30 mm	60 mm	—	—	—
-1/+3	38 mm	—	—	—	—

If a bilateral tolerance of ± 1 beam is applied to the same object, then all the obstruction patterns in the examples (A, B, C, D, E, F and G) are allowed. Examples F and G depict a particular case in which the object uses both tolerances (plus and minus) at the same time (object is shifted by one beam)



Floating blanking

The floating blanking mode allows a single (or multiple) object(s) of a defined maximum size to enter and move within the protective field without switching off the safety outputs of the light curtain. This feature can be useful in those applications where it is necessary that a small object(s) can enter, leave, and move freely within the protective field during the operation cycle of the machine (e.g. hanging hoses, moving machinery parts, etc.).

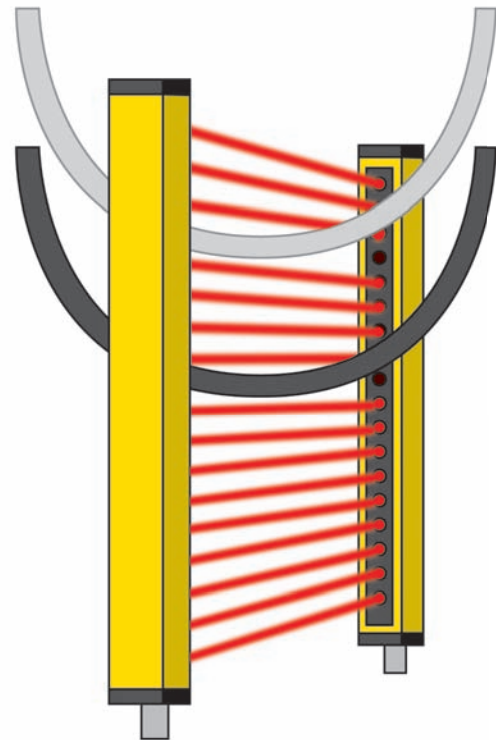
The blanked objects may enter and move only in the protective field areas that are not used by fixed blankings. Also, when allowing multiple blanked objects, they cannot overlap with each other. In any case at least one unobstructed beam must be between a blanked object and another.

EFFECTIVE DETECTION CAPABILITY FOR FLOATING BLANKING					
NUMBER OF FLOATING BEAMS	NOMINAL DETECTION CAPABILITY				
	14 mm	22 mm	30 mm	38 mm	82 mm
1	22	38	52	—	—
2	30	52	—	—	—
3	38	—	—	—	—

When using the floating blanking function, the effective detection capability of the AOPD is increased according to the number of floating beams, as shown in table above.

Auxiliary I/O

All safety light curtains on the MX4000 series include a multi-purpose auxiliary I/O connection on the main detector units which can be used as a signalling output for non-safety-related external devices (e.g. relays, indicator lamps, PLCs, etc.).



Note: One of multiple floating beams can be selected using the parameterization /teach tool

PARAMETERIZATION / TEACH TOOL

The factory set guarding parameters can be changed. The MX series of units can be provided with two different models of hand-held easy to access and easy to use teach tool. The advantages of using this tool will be very apparent when compared to some competitive models that use tiny DIP switches located at the bottom of

detector units, often making it very inconvenient to access them; while other models require a laptop computer. All units are provided with an ON/OFF key switch selector and a ring guarded teach button. The button on the MX4000-PB has a built in indicator light, which turns on when the key selector is in the "ON" position.

AVAILABLE PARAMETERIZATION / TEACH TOOLS

MX4000-PB

This model is available in a rugged plastic enclosure with a 1.5 meter pre-wired 5 conductor cable ready to be plugged into any one of the junction blocks.



MX4100-PT & MX4200-PT (Pass Through)

This portable unit is designed to be connected when required. The 8 & 12 conductor cables are for the MX4100-PT and the MX4200-PT. These units are designed to float between the Detector column and the Cable connected to the detector.



TEACH-IN FUNCTIONS will allow the user to quickly introduce a part into the light curtain and, with a two-step procedure, block a portion of the L.C. which detects the part. This is a very quick and convenient way of creating and reactivating blanked areas for conveyors, part-ejection throughs or brackets.

EASY TO USE PARAMETERIZATION FUNCTIONS

- 1 Turn the selector switch to the ON position
- 2 Watch the segment display on the detector column for information on your settings
- 3 Press the teach button according to the instruction in your manual
- 4 Important, turn the selector to OFF position and remove key when not being used

FUNCTIONS

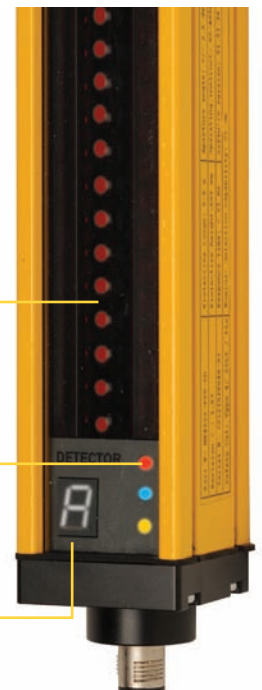
- Display orientation
- Scan code
- Interlock function
- EDM function
- Auxiliary output
- Muting function signaling
- Blanking tolerance, positive
- Blanking tolerance, negative
- Floating mode

Multiple indicators

The MX series of light curtains are designed with multiple indicators to facilitate its use and indicate the status of the unit at any given time.

- 3 Bright LED indicators
- Individual beam status indicators
- Red or Green for status
 - Blue solid indicates active blanking mode
 - Blue flashing indicates muting
 - Yellow solid indicating lock-out condition
 - Yellow flashing for interlock condition is engaged

7 Segment display is turned on when required for additional information and system errors






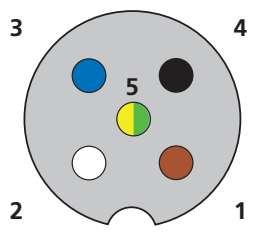

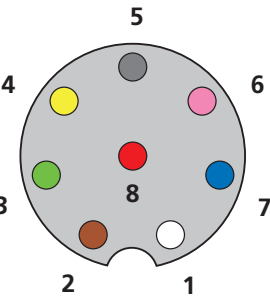

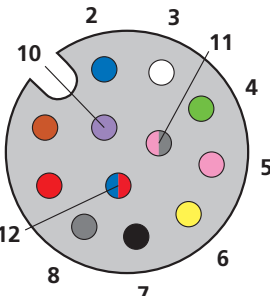
■ CABLES AND CONNECTORS MX4100 AND MX4200 SERIES

All MX cables are provided with M12 female IP65 rated connectors on one side. The other end has pig-tail termination to be wired to the machine controls or into the ISB supplied MXB4000-02 wiring box. Excess cable may be cut to meet the desired length.

MX extension cables

These are totally preassembled M12 IP65 Cables, male on one end female on the other. They are intended to be used with JB series junction blocks. For quick connectability to any input or output device such as power supply, OSSD outputs, mute sensors, teach tool, auxilliary output or EDM inputs.

CABLES		
LENGTH	PART #	
5 m	55-4013-05	
10 m	55-4013-10	
1.5 m	55-4004-015	
3 m	55-4004-03	
5 m	55-4004-05	
10 m	55-4004-10	

CONNECTORS		
LENGTH	PART #	PIN FEMALE
5 PIN CONNECTORS FOR MX4000 EMITTER UNITS		
5 m	55-4010-05	 5 PIN FEMALE 
10 m	55-4010-10	
15 m	55-4010-15	
8 PIN CONNECTORS FOR MX4100 DETECTOR UNITS		
5 m	55-4011-05	 8 PIN FEMALE 
10 m	55-4011-10	
12 PIN CONNECTORS FOR MX4200 DETECTOR UNITS		
5 m	55-4012-05	 12 PIN FEMALE 
10 m	55-4012-10	

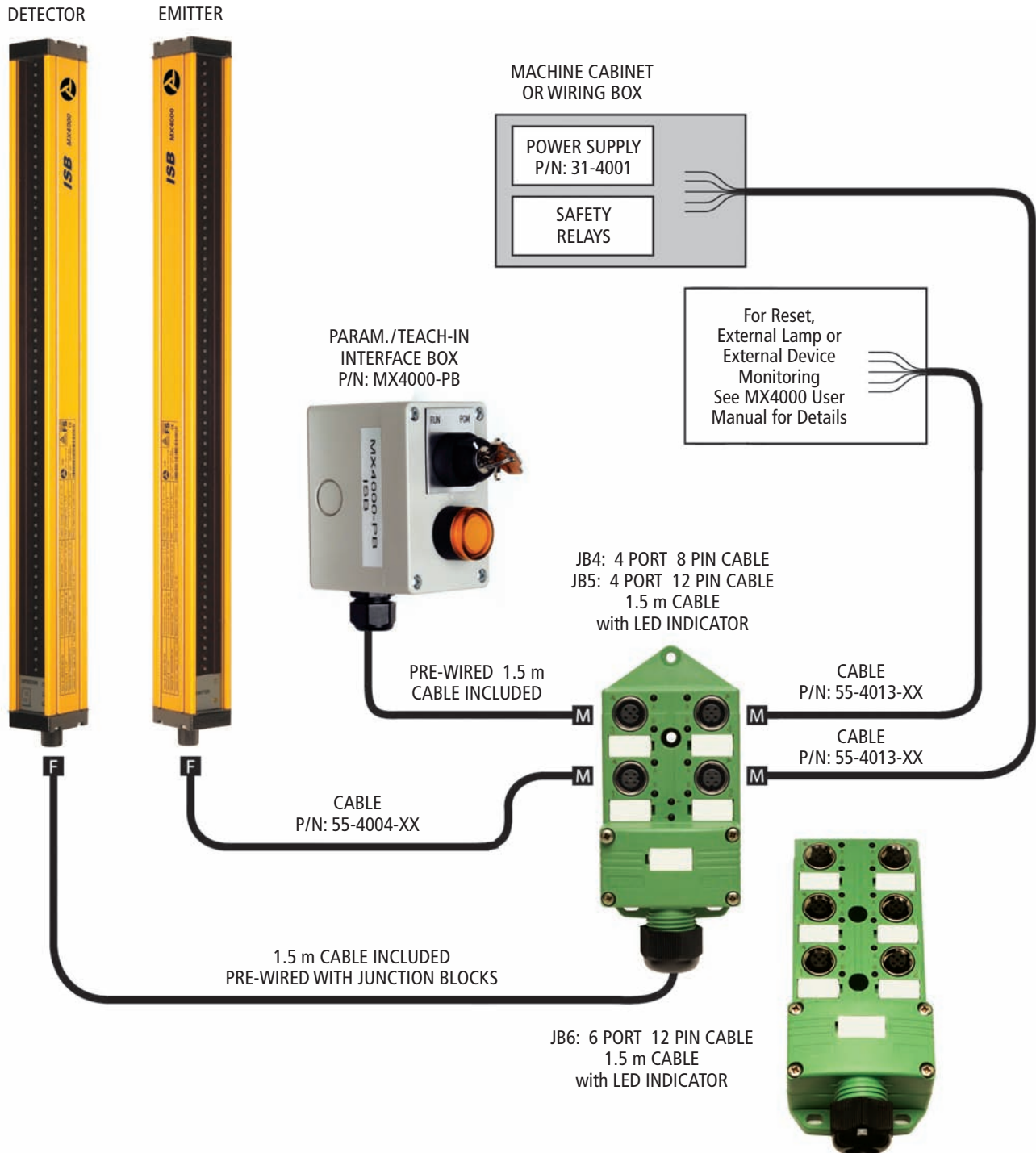
JUNCTION BLOCKS

With all pre-wired inputs and outputs for an easy installation

All you have to do is connect the 4 or 5 wires to your power source and connect the OSSD outputs. These JB junction blocks are invaluable tools that will make installing a pair of MX columns easier and less time consuming. They are available in a 4 or 6 port connections.

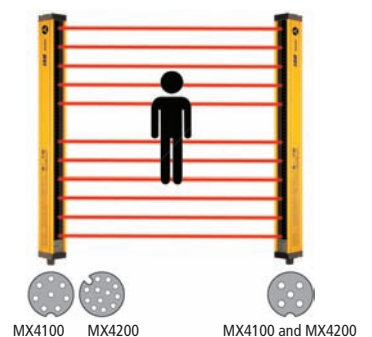
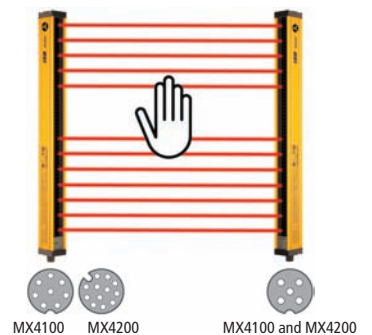
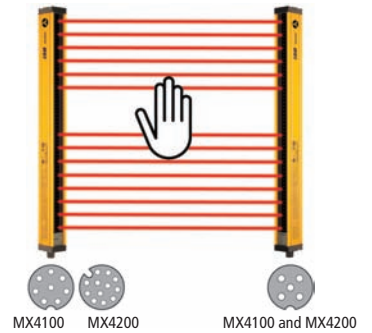
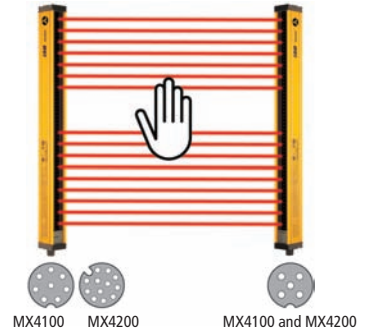
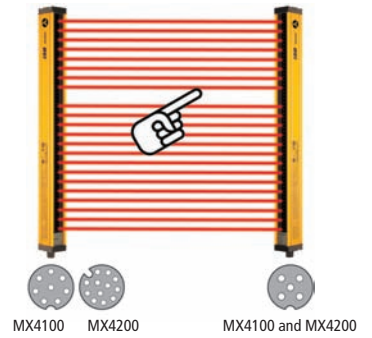
These junction blocks will also save you on the need to acquire the more costly larger cables required for a direct connection to your control box.

As well, adding or removing a function will be an easier task and will not require any rewiring work.



MX4100 & MX4200 SERIES

DETECTION CAPABILITY	FIELD HEIGHT (mm)	EMITTER P/N	DETECTOR P/N		RESPONSE TIME (ms)
			MX4100	MX4200	
14 mm (0.55")	300	MX4014-300	MX4114-300	MX4214-300	21
	450	MX4014-450	MX4114-450	MX4214-450	27
	600	MX4014-600	MX4114-600	MX4214-600	34
	750	MX4014-750	MX4114-750	MX4214-750	40
	900	MX4014-900	MX4114-900	MX4214-900	46
	1050	MX4014-1050	MX4114-1050	MX4214-1050	53
	1200	MX4014-1200	MX4114-1200	MX4214-1200	59
22 mm (0.87")	300	MX4022-300	MX4122-300	MX4222-300	15
	450	MX4022-450	MX4122-450	MX4222-450	18
	600	MX4022-600	MX4122-600	MX4222-600	21
	750	MX4022-750	MX4122-750	MX4222-750	25
	900	MX4022-900	MX4122-900	MX4222-900	28
	1050	MX4022-1050	MX4122-1050	MX4222-1050	31
	1200	MX4022-1200	MX4122-1200	MX4222-1200	35
	1350	MX4022-1350	MX4122-1350	MX4222-1350	38
	1500	MX4022-1500	MX4122-1500	MX4222-1500	42
	1650	MX4022-1650	MX4122-1650	MX4222-1650	45
30 mm (1.18")	300	MX4030-300	MX4130-300	MX4230-300	13
	450	MX4030-450	MX4130-450	MX4230-450	15
	600	MX4030-600	MX4130-600	MX4230-600	18
	750	MX4030-750	MX4130-750	MX4230-750	20
	900	MX4030-900	MX4130-900	MX4230-900	22
	1050	MX4030-1050	MX4130-1050	MX4230-1050	25
	1200	MX4030-1200	MX4130-1200	MX4230-1200	27
	1350	MX4030-1350	MX4130-1350	MX4230-1350	30
	1500	MX4030-1500	MX4130-1500	MX4230-1500	32
	1650	MX4030-1650	MX4130-1650	MX4230-1650	34
38 mm (1.50")	300	MX4038-300	MX4138-300	MX4238-300	11
	450	MX4038-450	MX4138-450	MX4238-450	13
	600	MX4038-600	MX4138-600	MX4238-600	15
	750	MX4038-750	MX4138-750	MX4238-750	17
	900	MX4038-900	MX4138-900	MX4238-900	18
	1050	MX4038-1050	MX4138-1050	MX4238-1050	20
	1200	MX4038-1200	MX4138-1200	MX4238-1200	22
	1350	MX4038-1350	MX4138-1350	MX4238-1350	24
	1500	MX4038-1500	MX4138-1500	MX4238-1500	26
	1650	MX4038-1650	MX4138-1650	MX4238-1650	27
82 mm (3.23")	300	MX4082-300	MX4182-300	MX4282-300	9
	450	MX4082-450	MX4182-450	MX4282-450	10
	600	MX4082-600	MX4182-600	MX4282-600	11
	750	MX4082-750	MX4182-750	MX4282-750	12
	900	MX4082-900	MX4182-900	MX4282-900	12
	1050	MX4082-1050	MX4182-1050	MX4282-1050	13
	1200	MX4082-1200	MX4182-1200	MX4282-1200	14
	1350	MX4082-1350	MX4182-1350	MX4282-1350	15
	1500	MX4082-1500	MX4182-1500	MX4282-1500	16
	1650	MX4082-1650	MX4182-1650	MX4282-1650	17
1800	MX4082-1800	MX4182-1800	MX4282-1800	18	



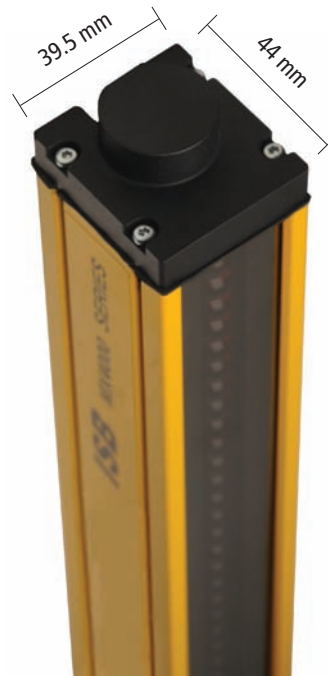
GENERAL SPECIFICATIONS

		MINIMUM	TYPICAL	MAXIMUM
Protective field height (depending on model)		300 mm	—	1800 mm
Detection capability (depending on model)		14 mm	—	82 mm
Detection range		0.1 m	8 m	10 m
Effective aperture angle		—	—	± 2.0°
Supply voltage (U _s)		19.2 V	24 V	28.8 V
Residual input voltage ripple		—	—	± 10 %
Safety	Type according to IEC 61496	—	Type 4	—
	SIL according to IEC 61508	—	SIL 3	—
	SILCL according to IEC 62061	—	SILCL 3	—
	Performance level ISO 13849-1	—	PL e	—
	Category as per ISO 13849	—	Cat. 4	—
	Service life	—	—	20 years
	Probability of a failure to danger PFH _d	—	5.5E-9 h ⁻¹	—
	Probability of a failure to danger PFD _{av} (T)	—	4.8E-4	—
	MTTF _d	—	1.5E6 h	—
Environmental	Enclosure rating (IEC 60529)	—	IP 65	—
	Protection class (IEC 50178)	—	III	—
	Operating ambient temperature	0 °C	—	50 °C
	Storage ambient temperature	-20 °C	—	60 °C
	Relative humidity	15 %	—	95 %
		Rigidity	5 g, 10..55 Hz as per IEC 60068-2-6	
	Shock	10 g, 16 ms, as per IEC 60068-2-29		
Material	Main body	Aluminium (epoxy coated, RAL 1021)		
	End caps	Aluminium (anodized, RAL 9004)		
	Front cover	Polycarbonate		
Standards	EMC	IEC 61000-4-3/4/5/6		
	Safety	IEC 61496-1 Type 4 ESPE		
		IEC 61496-2 Type 4 AOPD		
		IEC 61508 SIL3		

Mechanical Dimensions

OVERALL COLUMN HEIGHT

MODEL	HEIGHT	MODEL	HEIGHT
MX4000-300	368 mm	MX4000-1200	1268 mm
MX4000-450	518 mm	MX4000-1350	1418 mm
MX4000-600	668 mm	MX4000-1500	1568 mm
MX4000-750	818 mm	MX4000-1650	1718 mm
MX4000-900	968 mm	MX4000-1800	1868 mm
MX4000-1050	1118 mm		



MX ACCESSORIES

MX POWER SUPPLIES



P/N: 31-4001
24 V DC 42 W
100 - 240 V AC input
DIN rail mount
1.75 A



P/N: 31-4002
24 V DC 120 W
100 - 240 V AC input
DIN rail mount
5 A

MX SAFETY RELAYS



P/N: 22-4001
Main Safety Relay



P/N: 22-4002
Safety expansion

MX MOUNTING BRACKETS

P/N: 02-4006-02



MX TESTING RODS



P/N: 55-5000 14 mm



P/N: 55-5001 22 mm

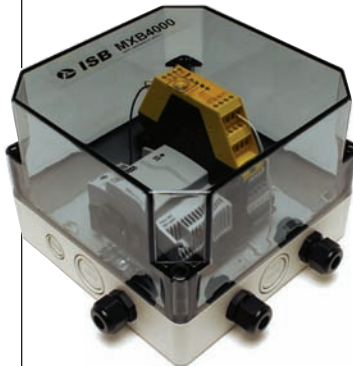


P/N: 55-5002 30 mm



P/N: 55-5003 38 mm

MX WIRING BOX



P/N: MXB 4000-02
With 42 W
power supply
and 1 safety relay

MX SIDE GUARDS

Polycarbonate



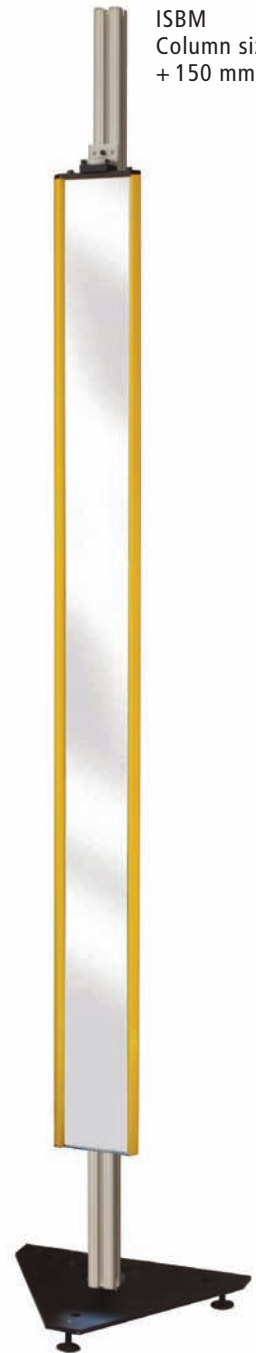
Horizontal bar



Consult factory for available size

MX MIRROR

ISBM
Column size
+ 150 mm



OTHER PRODUCTS OFFERED BY ISB

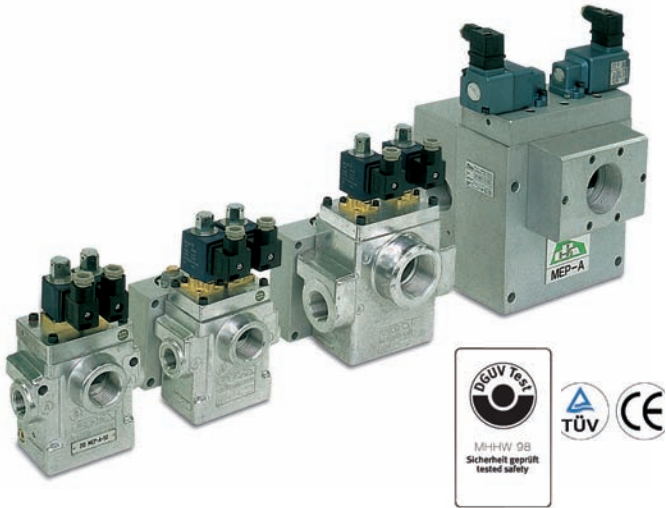
PRESS BRAKE GUARDING



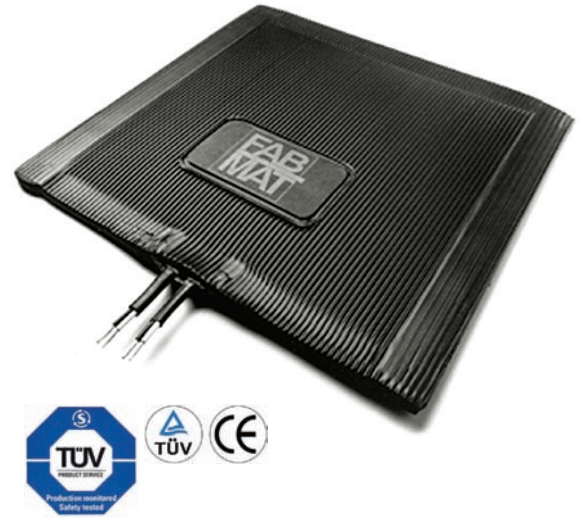
SOFTOUCH 2 ERGONOMIC BUTTONS OR PALM BUTTON STATION



SAFETY VALVES



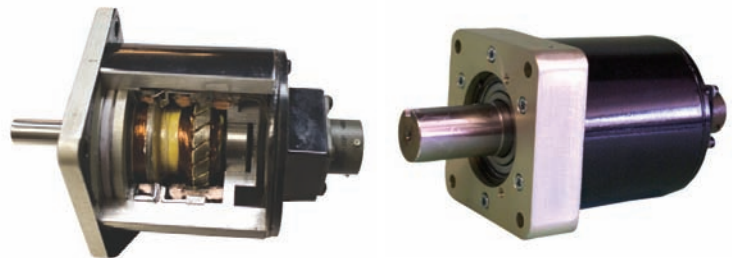
FAB MAT



RBPC RESOLVER BASED PRESS CONTROL



RESOLVER



RESOLVER 3/8"
30-0018-010

RESOLVER 3/4"
30-0018-020



Registration Certificate

This document certifies that the administration systems of
167811 Canada Inc o/a ISB
 2300 Victoria Avenue, Lachine, Quebec, H8S 1Z3

have been assessed and approved by QAS International
 to the following management systems, standards and guidelines:

ISO 9001:2008

The approved administration systems apply to the following:

*Design, development and manufacture of
 electronic controls for specific applications.*

Original Approval **1st November 2010**
 Current Certificate **1st November 2012**
 Certificate Expiry **1st November 2013**
 Certificate Number **A1718CAN**

On behalf of **QAS International**

www.qas-international.com
 This certificate remains valid while the holder maintains their quality administration systems in accordance
 with the standards and guidelines stated above, which will be audited annually by QAS International.
 The holder is entitled to display the above registration mark for the duration of this certificate.
 This certificate must be returned to QAS International on reasonable request.
 Issuing Office The Exchange Tower, PO Box 427, 130 King St. West, Suite 1800, Toronto, Ontario, M5X 1E2

© TÜV, TÜV and TÜV are registered trademarks. Utilization and application requires prior approval.



ZERTIFIKAT CERTIFICATE

EC Type-Examination Certificate

Reg.-No.: 01/205/5263/12

Product tested	Safety light curtain family (AOPD Type 4)	Certificate holder	167811 Canada Inc. dba ISB 2300 Victoria Avenue H8S 1Z3 Lachine, Quebec Canada
Type designation	MX4x00	Manufacturer	see certificate holder
Codes and standards forming the basis of testing	IEC 61496-1:2012 IEC 61496-2:2006 EN ISO 13849-1:2008 + AC:2009 EN 62061:2005 IEC 61508 Parts 1-7:2010	IEC 60204-1:2009 EN 50178:1997 ANSI B11.19:2010 ANSI/RIA R15.06:1999	
Intended application	Hazardous point, area and access protection at machines. The devices comply with the requirements of the relevant standards (Type 4 acc. IEC 61496-1/-2, Cat. 4 / PL e acc. to EN ISO 13849-1, SIL CL 3 acc. to EN 62061 / IEC 61508) and can be used in applications up to Cat. 4 / PL e acc. to EN ISO 13849-1 and SIL 3 acc. to EN 62061 / IEC 61508.		
Specific requirements	The instructions of the associated Installation and Operating Manual shall be considered.		
It is confirmed, that the product under test complies with the requirements for machines defined in Annex I of the EC Directive 2006/42/EC.			
This certificate is valid until 2017-10-30.			



The test report-no.: 968/M 266.01/12 dated 2012-10-30 is an integral part of this certificate.

The holder of a valid licence certificate for the product tested is authorized to affix the test mark shown opposite to products, which are identical with the product tested.



E. Frejno
 Dipl.-Ing. Eberhard Frejno

Berlin, 2012-10-30

Certification Body for Machinery, NB 0035

TÜV Rheinland, Notified Body, Berlin, Germany, CE, 11633, Germany, Germany, Tel.: +49 30 796210007, Fax: +49 30 796210000, E-Mail: info@tuev-berlin.com

The ISB MX Series complies with the following standards:
 IEC 61508 (SIL 3) IEC 61496 (Type 4) IEC 61062 (SILCL 3) EN ISO 13849 (PL e, Category 4)



ISB

CALL US TOLL FREE
1-866-ISBLITE

2300 Victoria Ave, Lachine
 Quebec, Canada H8S 1Z3
 Fax: 514-634-9868

www.isblite.com

DISTRIBUTED BY