Agenda

1   Product Overview

2   Typical Applications

3   Features & Benefits

4   Selection Guide

5   Accessories
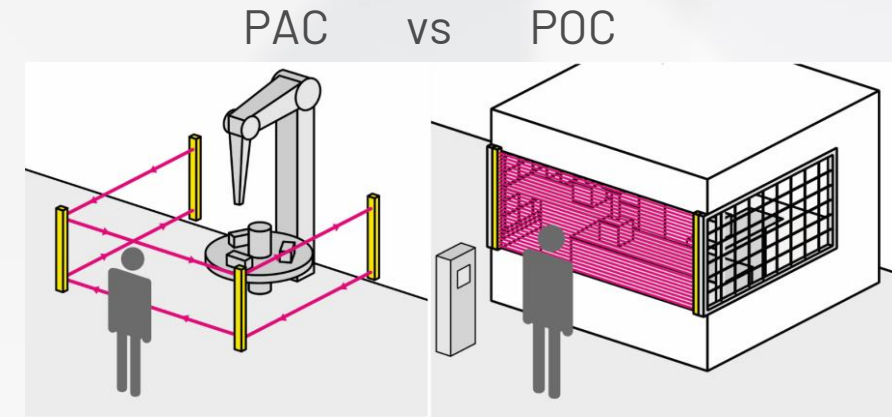
6   FAQs

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1) Product Overview

450L GuardShield™ PAC Safety Light Curtain

Introduction

PAC   vs   POC

What is it?

- A Perimeter Access Control (PAC) safety light curtain designed to help protect personnel from hazardous machinery

- PAC light curtains are placed around a hazard

- 450L PAC are designed for whole-body detection

What are the benefits?

- Eliminates the need for hard guarding and gates

- Allows frequent, easy and safe access to the hazardous area while enhancing productivity

- Single stick transceiver design

- Easy to install

  *subject to risk assessment

Where is it used?

- Palletizing / depalletizing

- Opto-electronic fences

- Robot cells

- Work cells

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450L GuardShield™ PAC Safety Light Curtain

Product Overview

Highest Safety Rating

Type4 (IEC 61496)
PLe (EN ISO 13849)
SIL 3 (IEC 61508)

Modern Compact Design

30 mm x 30 mm (**1.2 in. x 1.2 in**.)
IP65 rating

Available in either 1-, 2-, 3-, or 4-beam models with overall profile lengths of 150 mm, 600 mm, 900 mm & 1050 mm respectively with flexible mounting options

Universal Transceiver Design

Patented universal transceiver design **reduces inventory**

Unique Plug-in system

Plug-in modules provide application-specific functionality and versatility i.e. basic ON/OFF or muting

ILAS as standard

Integrated Laser Alignment System (ILAS) allows for quicker set up and alignment out of the box

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450L GuardShield™ PAC Safety Light Curtain

Product Overview (2)

Perimeter Access Control (PAC) for whole body detection

Allen-Bradley® GuardShield 450L PAC safety light curtains are unlike traditional PAC safety light curtains, which are based on separate transmitter and receiver units. Patented technology allows each transceiver to be used as a transmitter or receiver via innovative plug-in modules. The 450L PAC is based on the advanced 450L-E POC model and features integrated laser alignment as standard, with optional cascading, and integrated muting available via plug-in. TÜV certified PLe, Type 4 IEC 61496-1/-2, SILcl3 per EN ISO 13849-1 and IEC 62061.
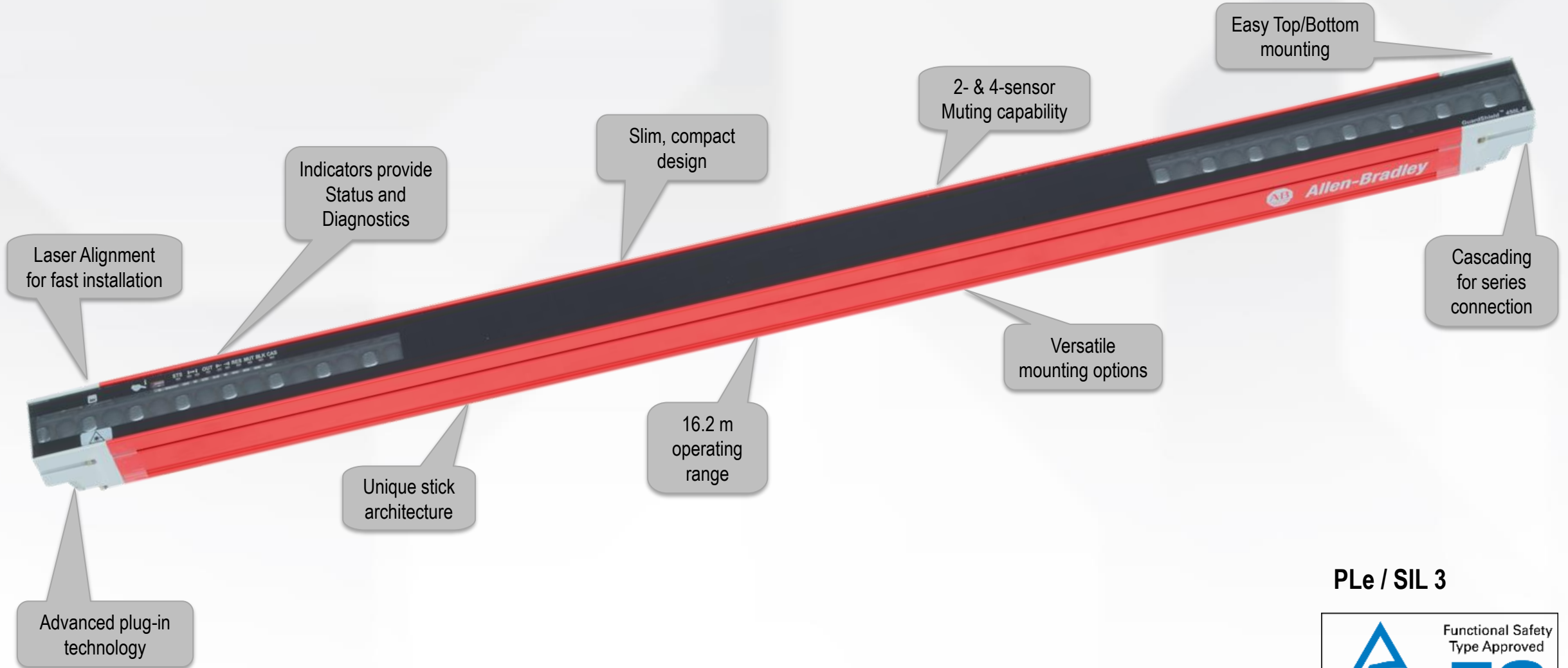
Typically positioned around an area or in front of a machine process entry or exit area. Multi-sided access control is attained through the use of corner mirrors. The integrated laser alignment tool makes the set up with mirrors most efficient.

GuardShield™ 450L PAC

- Innovative plug-in modules (available separately) enable basic (ON/OFF) or advanced (muting) functionality

- Cascading plug-ins for serial connection of safety light curtains

- Integrated Laser Alignment System (ILAS) helps provide quick and more reliable installation

- Available in 1-, 2-, 3-, or 4 beam models, with overall profile lengths of 150 mm, 600 mm, 900 mm or 1050 mm respectively

- Compact design 30 mm x 30 mm (1.18 in. x 1.18 in.)

- Versatile mounting options

- Configuration via plug-in DIP switches

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450L GuardShield™ PAC Safety Light Curtain

Product Overview (3)

Easy Top/Bottom mounting

2- & 4-sensor Muting capability

Slim, compact design

Indicators provide Status and Diagnostics

Laser Alignment for fast installation

Cascading for series connection

Versatile mounting options

Unique stick architecture

16.2 m operating range

Advanced plug-in technology

PLe / SIL 3

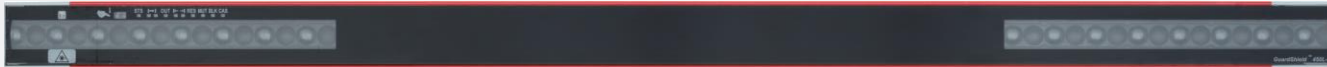TÜVRheinland® Functional Safety Type Approved FS®

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450L GuardShield™ PAC Safety Light Curtain

Product Overview (4)

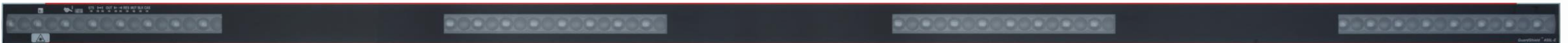450L-E4A1L0150YD 450L GuardShield™ 1-Beam PAC Transceiver

450L-E4A2L0600YD 450L GuardShield™ 2-Beam PAC Transceiver

450L-E4A3L0900YD 450L GuardShield™ 3-Beam PAC Transceiver

450L-E4A4L1050YD 450L GuardShield™ 4-Beam PAC Transceiver

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2) Typical Applications

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# 450L GuardShield™ PAC Safety Light Curtain

Target Customers

450L PAC is suitable for applications safeguarding personnel from hazardous equipment / machinery where fixed fencing or hard guarding has traditionally been used. It can be used in any industry or segment, and is particularly well suited for the following applications:
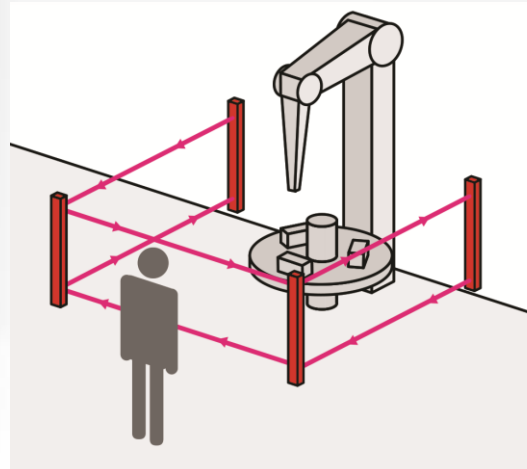
Target Applications
- ✓ Palletizing / depalletizing
- ✓ Opto-electronic fences
- ✓ Robot cells
- ✓ Work cells

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450L GuardShield™ PAC Safety Light Curtain
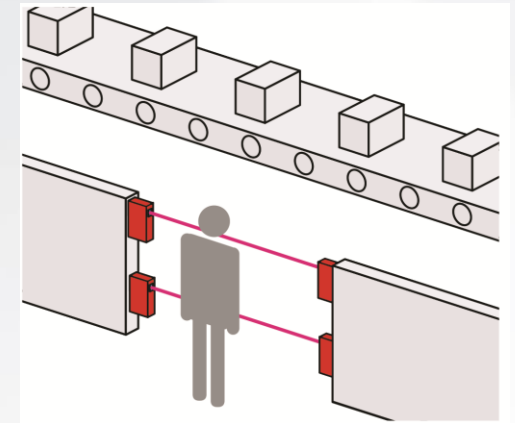
Typical Applications

AAC

PAC
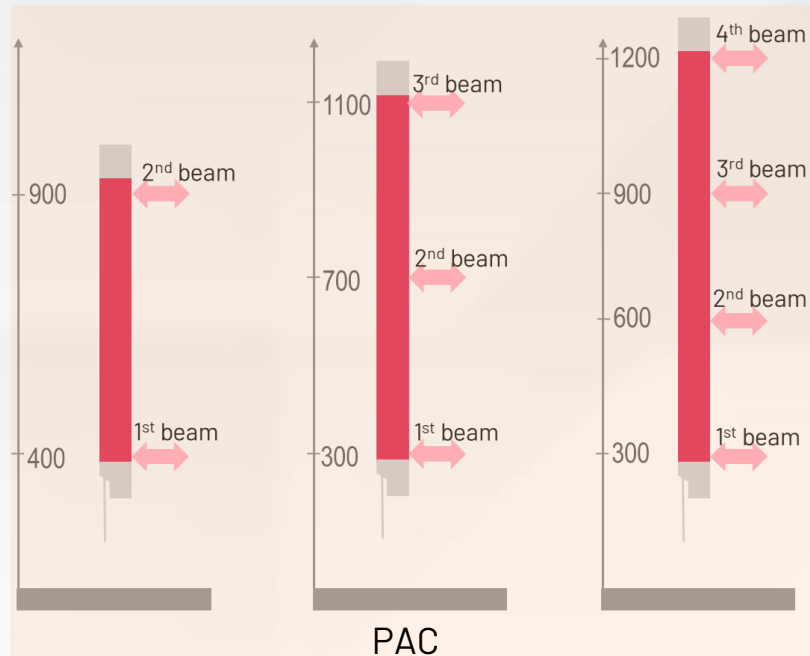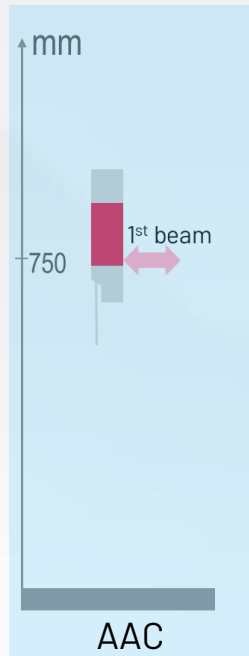
Perimeter Access Control (PAC)

- Opto-electronic fence with multiple sided protection
- Allows easy perimeter access, 16.2 m
- Must be manually reset, external to work cell
- Typically 2,3 or 4 beams for whole body detection
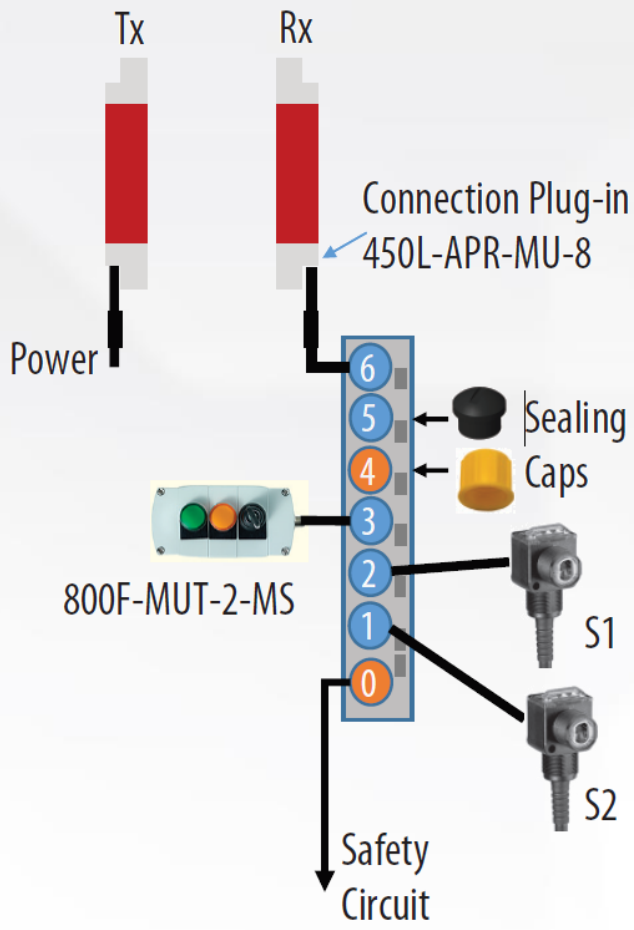
Area Access Control (AAC)

- Allows easy access.
- Single beam
- 16.2 m range
- Whole body detection

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450L GuardShield™ PAC Safety Light Curtain

Typical Applications - Muting

2-Sensor Muting*

2-Sensor Muting
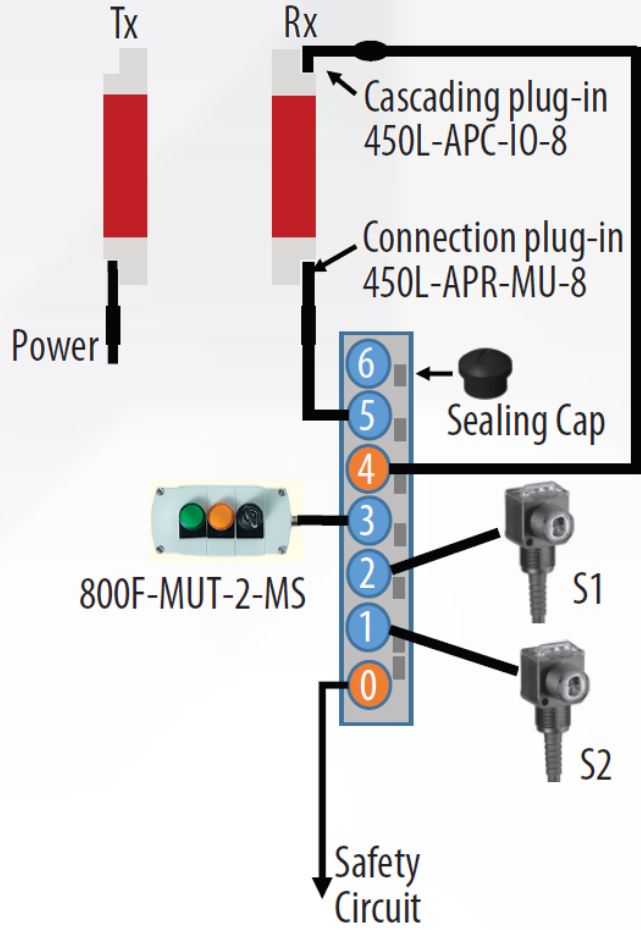
4-Sensor Muting
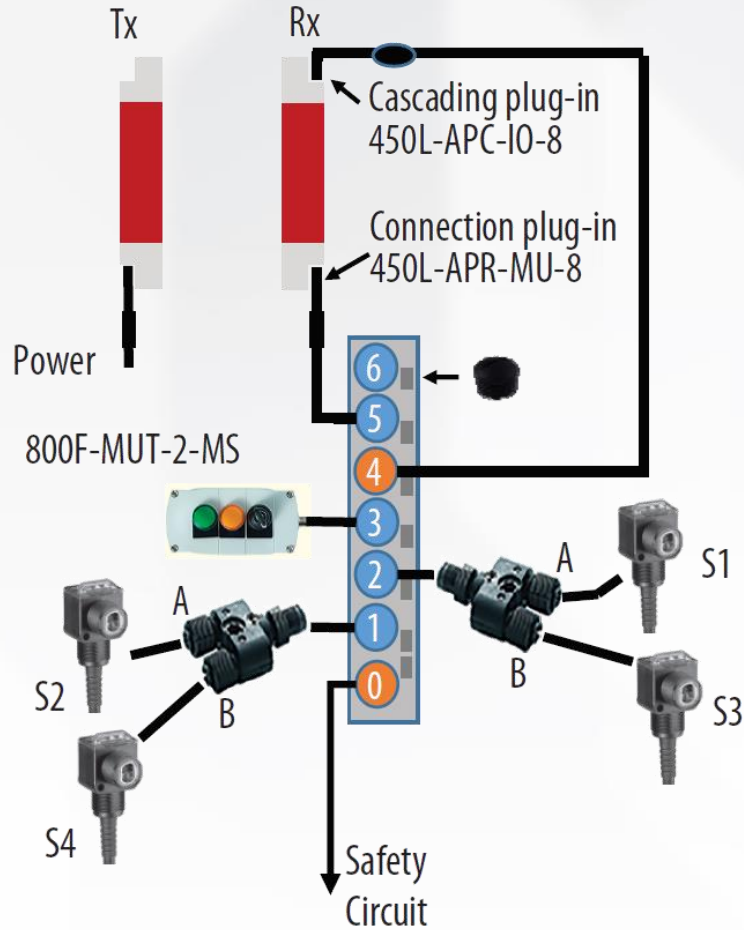
*Muting station functionality is limited in this configuration – only reset/MDO key enabled

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450L GuardShield™ PAC Safety Light Curtain

PAC Position Overview

Price

445L Safe 4 PAC will be discontinued

445L– Micro400 (5 m range)

445L – Safe 4 (18 / 30 m range)

440L GuardShield Type 4 (16 m range)

450L PAC (16.2 m range)

Functionality
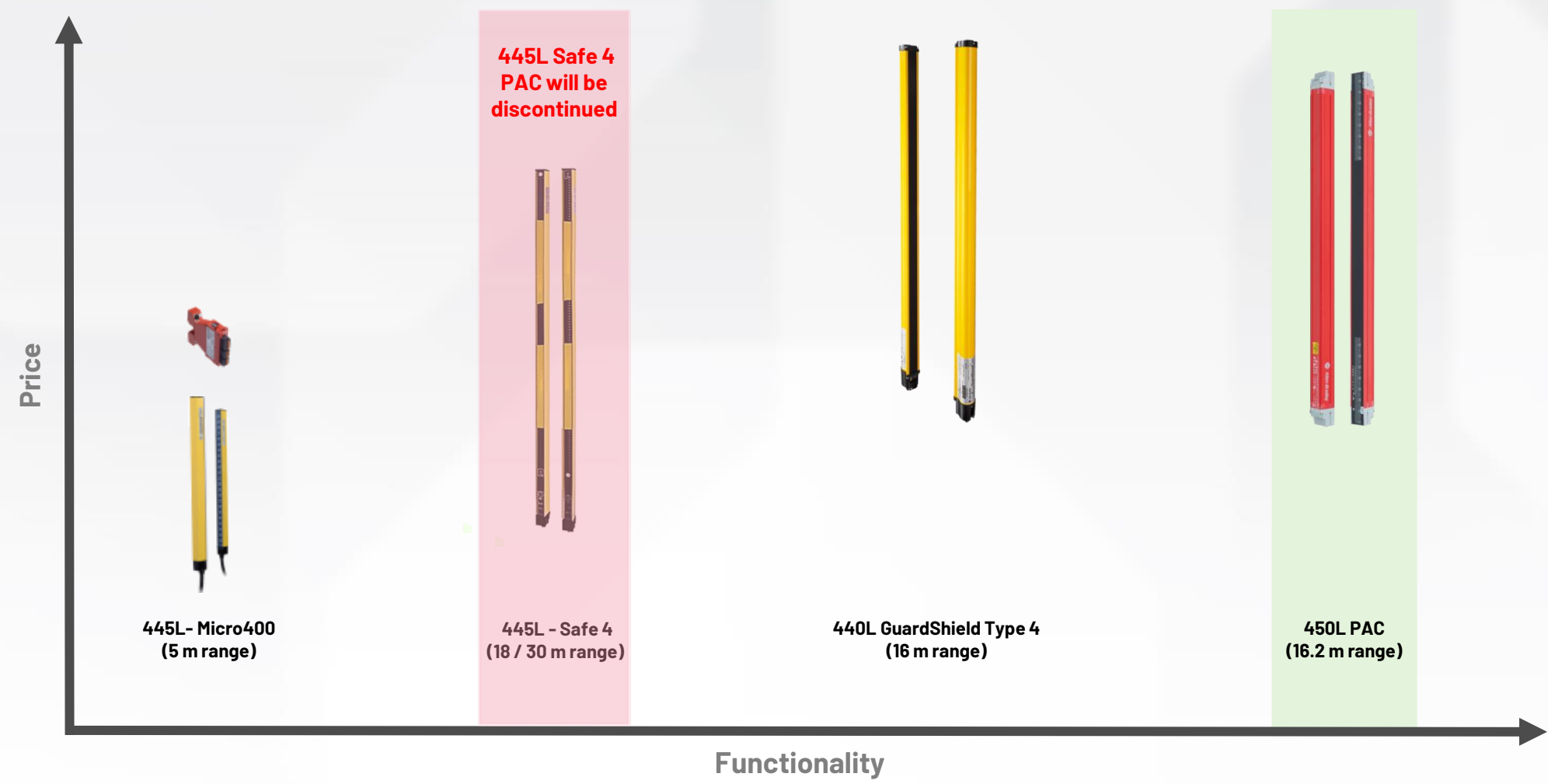
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3) Features & Benefits

450L GuardShield™ PAC Safety Light Curtain

User Interface - status and diagnostics

450L PAC features

Cascading
Blanking*
Muting
Restart

Regional intensity

OSSD

Tx / Rx

Status

Optical switch

ILAS laser

*Blanking is not supported in 450L PAC

450L GuardShield™ PAC Safety Light Curtain

User Interface – DIP Switch Configuration

450L PAC is a standalone system and has no software configuration capability in the initial release.

All functionality is set by adjusting the DIP switches. Only the receiver (450L-APR-*) & universal plug-ins have DIP switches – the number of DIP switches varies by plug-in type.

Cascading and transmitter plug-ins have no DIP switches and where the universal plug-in is used as a transmitter, the DIP switch settings are ignored.

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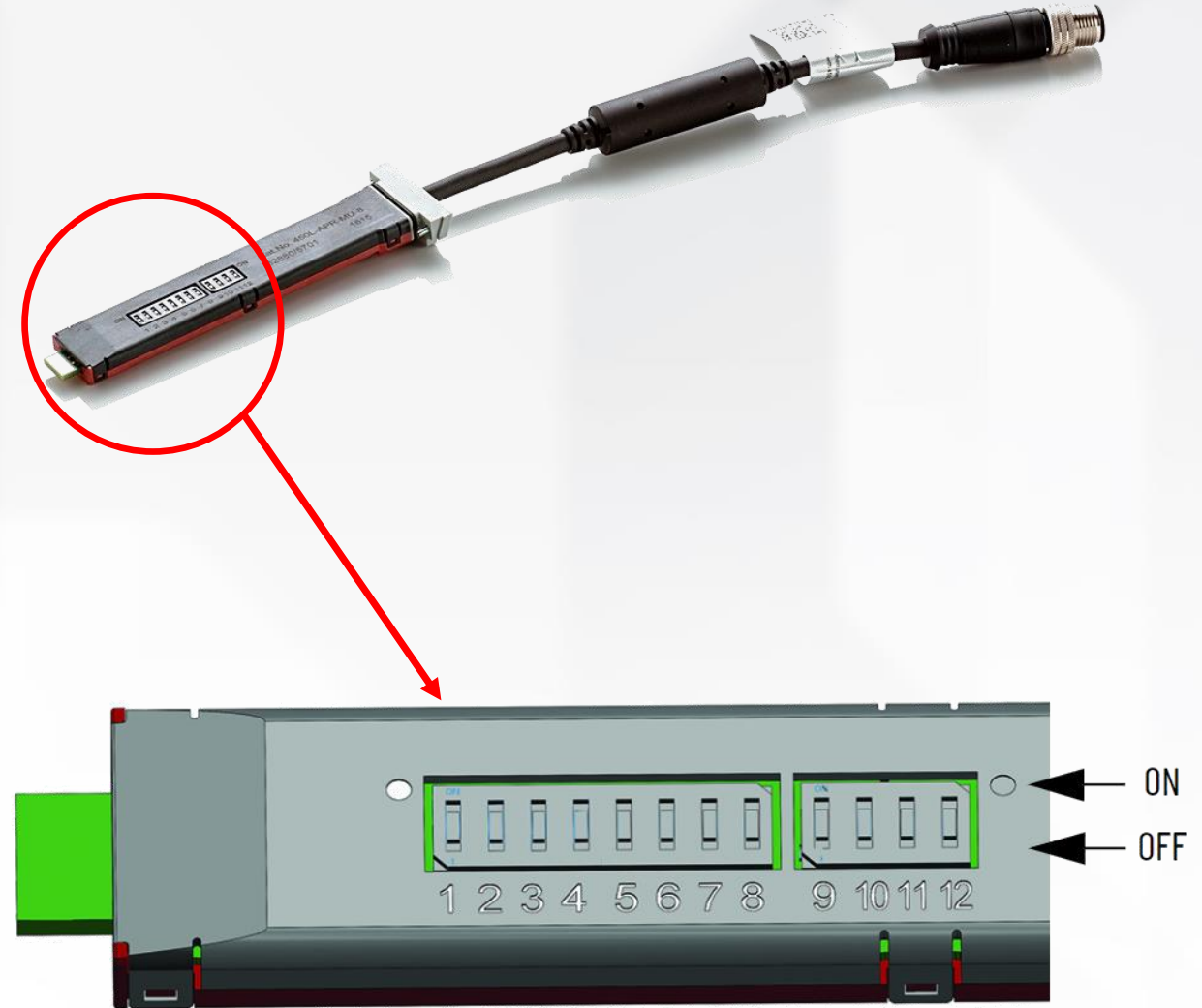
450L GuardShield™ PAC Safety Light Curtain

Plug-in and DIP switch selectable features

450L PAC	
Operating Range 0.9 … 16.2 m (2.95…53.15 ft)	
Plug-in selectable features: Reset	✔
External Device Monitoring	✔
Low Operating Range	✔
Muting	✔
Blanking	n/a
Cascading	✔
CIP Safety over EtherNet/IP™	n/a*

*not available in initial release

450L PAC

Advanced technology that reduces total cost of ownership

450L GuardShield™ PAC Safety Light Curtain

Plug-in compatibility

	Catalog	Pins	Function	450L PAC
Transmitter (Tx)	450L-APT-PW-5	5	Tx (transmitter)	✔
	450L-APT-PW-8	8	Rx (receiver)	✔
Receiver (Rx)	450L-APR-ON-5	5	Auto reset	✔
	450L-APR-ED-8	8	Reset, EDM, range	✔
	450L-APR-BL-5	5	Blanking, range	n/a
	450L-APR-MU-8	8	Muting & blanking* *Blanking features not supported in PAC	✔
	450L-APR-EN-8	8	CIP safety	n/a
Universal (Tx/Rx)	450L-APU-UN-8	8	Tx or Rx	✔
Cascading	450L-APC-IO-8	8	Cascading on top	✔

450L-E

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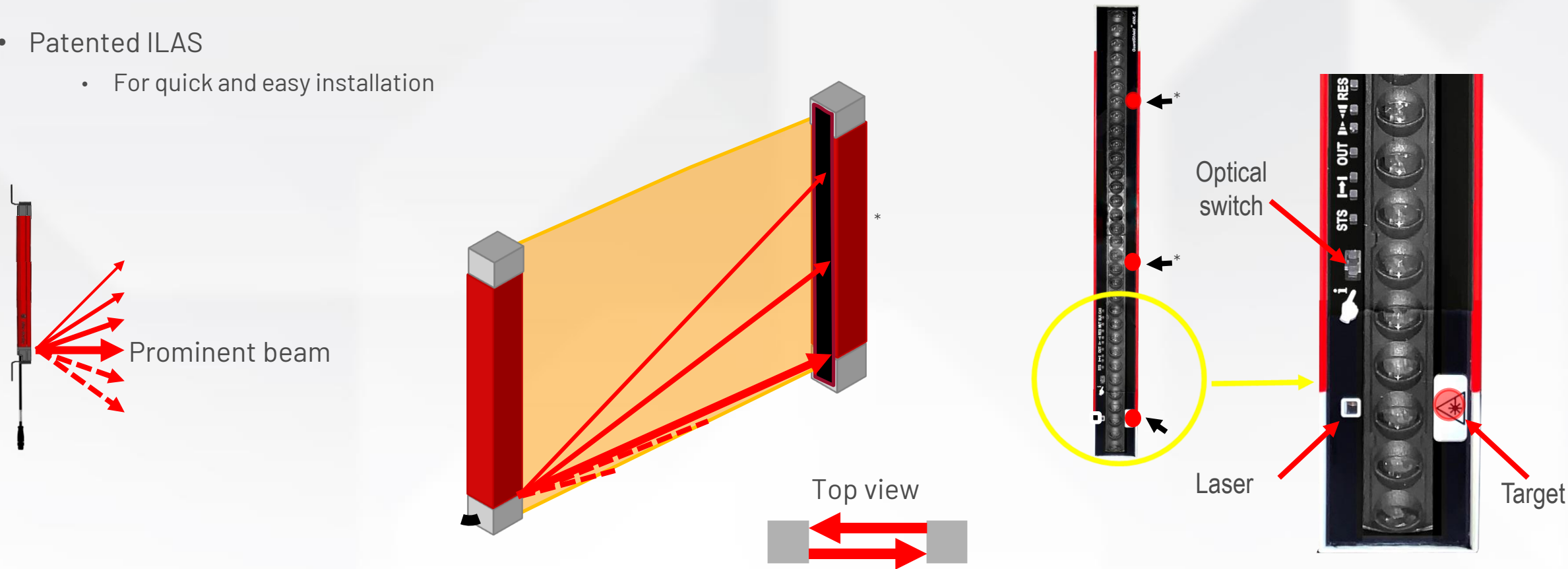# 450L GuardShield™ PAC Safety Light Curtain

Integrated Laser Alignment System (ILAS)

- Patented ILAS
  - For quick and easy installation

Prominent beam

Top view

Optical switch

Laser

Target

Designed to simplify alignment process

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*Position of laser spots is shown for illustrative purposes only and will vary depending on distance from opposite light curtain

4) Selection Guide

450L GuardShield™ PAC Safety Light Curtain

Selection Guide

1. Select required protection

- Number of beams or length
- For a system you will need 2 sticks
  (one stick of the same number of beams and length on
  each side of the protected area)

L: Integrated Laser Alignment System

Y: IP65
D: Default (will use 'X' in future for extended range 30 m
version

450L-E4AxLxxxxYD

All versions based on
450L-E

0150 mm (5.91 in.)
0600 mm (23.64 in.)
0900 mm (35.46 in.)
1050 mm (41.37 in.)

Number of
Beams
A1: 1
A2: 2
A3: 3
A4: 4
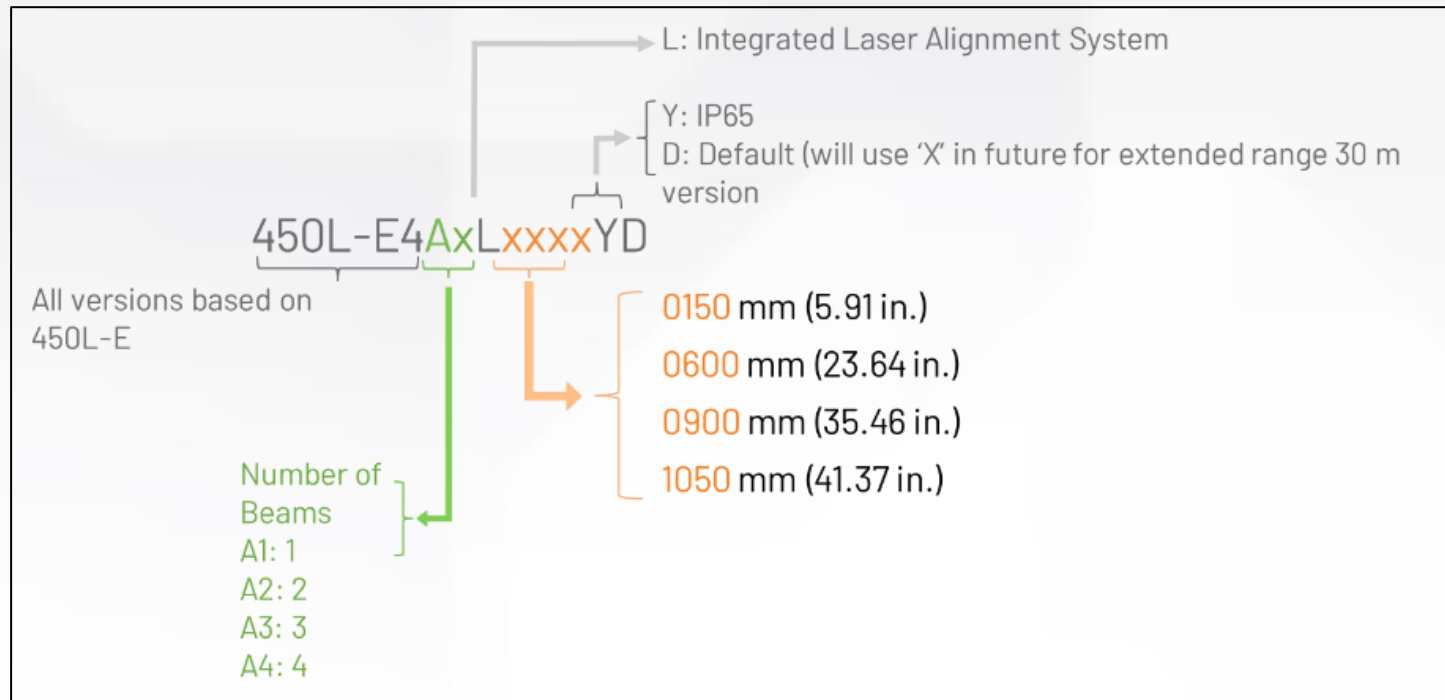
450L GuardShield™ PAC Safety Light Curtain

Selection Guide (2)

2. Select functionality with the connection plug-in

- Receiver plug-in determines available functionality
- System 'pair' requires <u>transmitter and receiver</u> plug-in or 2x universal plug-ins

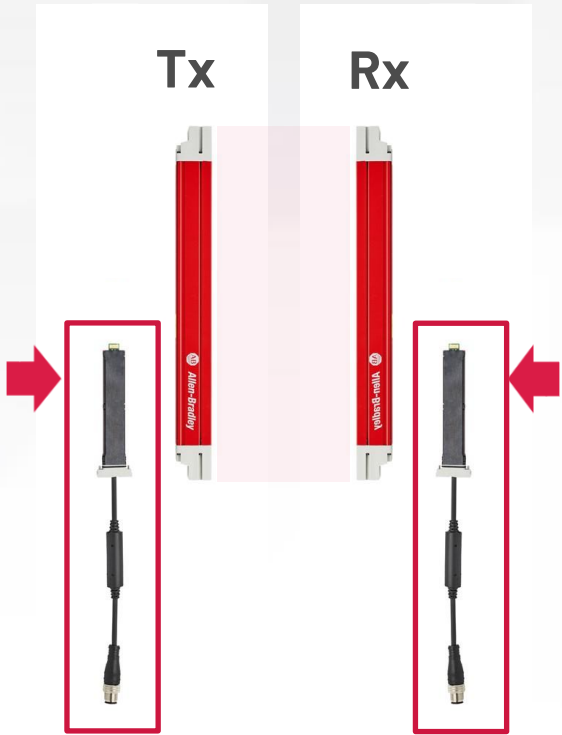| Pin	Transmitter (Tx)	450L PAC
5	450L-APT-PW-5	✔
8	450L-APT-PW-8	✔
8	450L-APU-UN-8	✔

Function	Pin	Receiver (Rx)	450L PAC
On/Off	5	450L-APR-ON-5	✔
EDM	8	450L-APR-ED-8	✔
Universal	8	450L-APU-UN-8	✔
Blanking	5	450L-APR-BL-5	n/a
Muting & blanking*	8	450L-APR-MU-8	✔
CIP safety**	8	450L-APR-EN-8	n/a

* Blanking features not supported in PAC
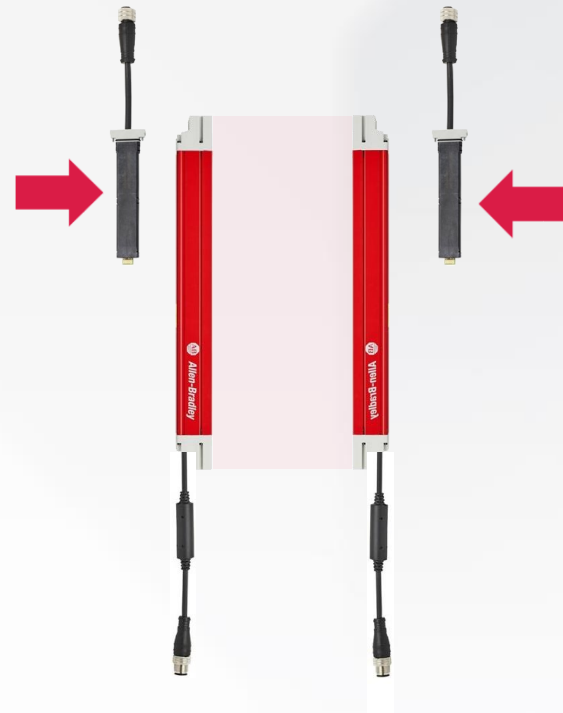** CIP Safety not available in initial release

450L GuardShield™ PAC Safety Light Curtain

Selection Guide (3)

3. OSSD cascading functionality

Pin	Receiver (Rx) Transmitter (Tx)	450L PAC
8	450L-APC-IO-8	✔

No minimum spacing distance requirement on 450L PAC

Cascade up to four pairs in series

5) Accessories

450L GuardShield™ PAC Safety Light Curtain

Accessories

450L PAC is based on the 450L-E technology platform, so any accessories suitable for the equivalent length light curtain stick from that range are also suitable for 450L PAC.

The only exceptions are:

- **450L-ENETR** & **450L-APR-EN-8** CIP safety module & receiver plug-in
  - 450L PAC is a standalone system (configuration is by DIP switch only) and has no software configuration capability in the initial release
- **450L-APR-BL-5** Blanking receiver plug-in
  - Blanking features not supported in PAC
    - 450L-APR-MU-8 Muting & blanking receiver plug-in <u>is compatible</u>, but the blanking features are not supported

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450L GuardShield™ PAC Safety Light Curtain

Accessories – Mounting

- **Top and Bottom**
  - 450L-AM-TBM (included)

- **Side mount**
  - 450L-AM-SM (optional)

Easy to install

450L GuardShield™ PAC Safety Light Curtain

Accessories – Mounting (2)

- **Competitor replacement kit**
  - 450L-AM-RK (optional)

Can also be used in combination with the default mounting bracket: 450L-AM-TBM

Provides high flexibility for using existing mounting holes

Existing GuardShield Safe 4 mounting brackets are also supported:

445L-AF6140   445L-AF6141   445L-AF6142

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450L GuardShield™ PAC Safety Light Curtain

Accessories – General

- **Optical interface device with USB**

  - 450L-AD-OID

    - Used to update stick firmware via ControlFLASH

- **Weld shield**

  - 450L-AW-XXXX

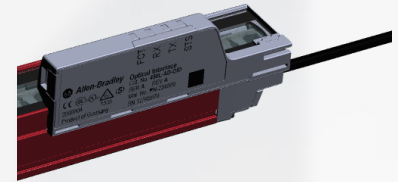   - 450L-E4A1L0150YD   =   450L-AW-0150
    - 450L-E4A2L0600YD   =   450L-AW-0600
    - 450L-E4A3L0900YD   =   450L-AW-0900
    - 450L-E4A4L1050YD   =   450L-AW-1050

- **Laser alignment tool adapter***

  - 450L-ALAT-C

  - Used in combination with 440L-ALAT

  *450L PAC features ILAS as standard, but is compatible with the clip-on laser alignment adapter if required

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450L GuardShield™ PAC Safety Light Curtain

Accessories – Muting

450L-AMOD-MUT-8

(PN-416930)

Muting distribution block

800F-MUT-2-MS

(PN-522752)

Muting station

450L-AMUT-IL

(PN-566375)

Muting lamp

450L GuardShield™ PAC Safety Light Curtain

Accessories – Muting (2)

Parameter	Default Value (DIP switch setup)
T(sense)	4 s
T(sense) min	50 ms
T(mute)	5 minutes
T(info)	5 s
T(espe)	5 s

Cascading plug-in

Existing products

MMS or other mechanical solution

450L Muting plug-in or

Distribution Box

To controller

Mounting Stand (445L-AMSTD2M)

Light Curtains—POC or PAC—

Reflector

Cantilever (445L-AMSTDMUT)

Muting Sensor
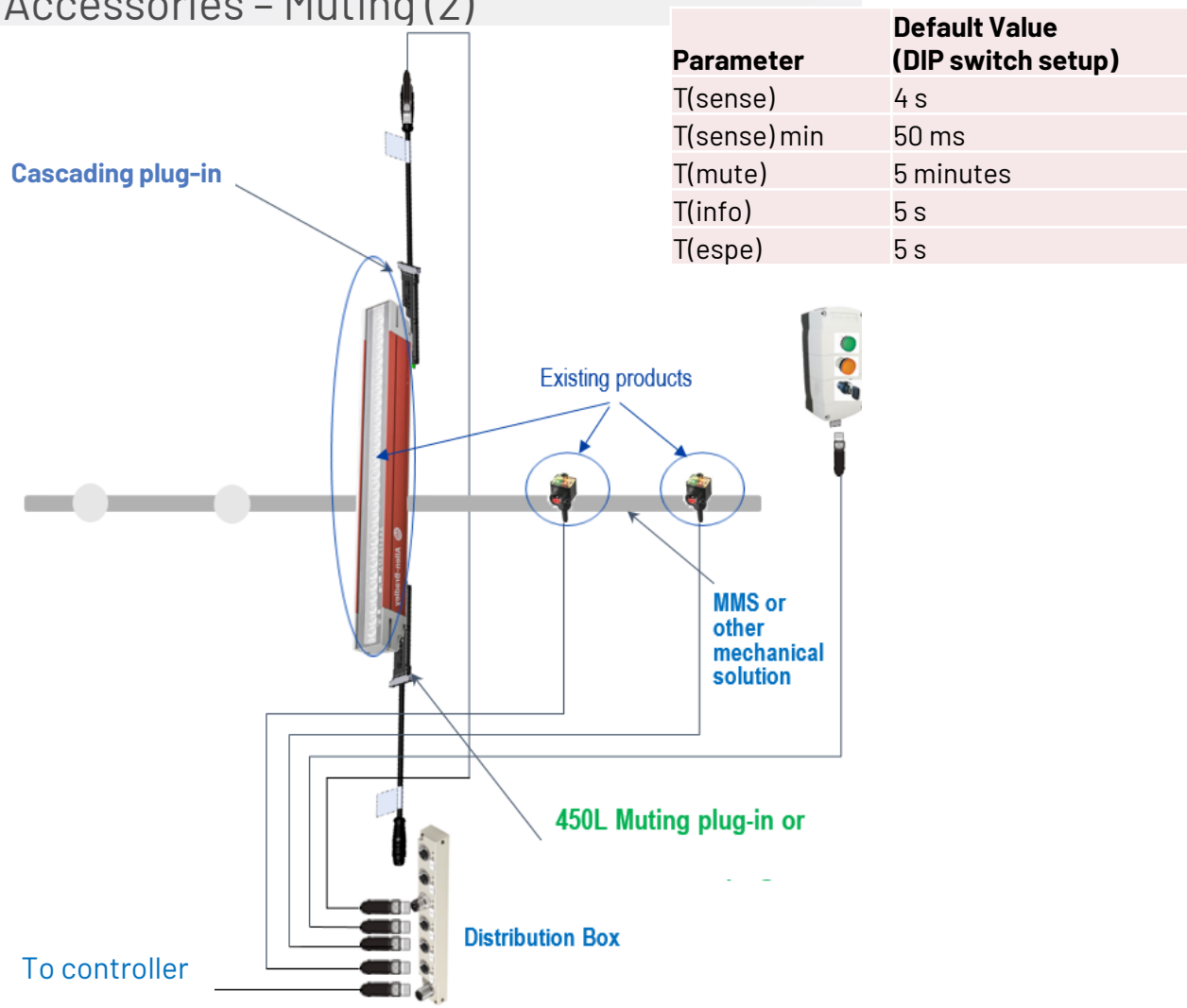
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5) FAQs

450L GuardShield™ PAC Safety Light Curtain

FAQs

What exactly do I have to buy to set up a complete system?
- For each system/pair, you need two identical sticks plus a plug-in for each stick. You can order transmitter and receiver plug-ins (one of each) or two universal plug-ins.

What is the minimum distance requirement between cascaded pairs?
- Unlike older 450L POC models (with firmware 5.003 or earlier), there is no requirement to maintain a minimum spacing distance between 450L PAC systems. Interference Rejection has been added and is permanently enabled. This greatly enhances resilience against optical interference and cross-talk.

What is the maximum length of a cascaded system?
- Up to four 450L GuardShieldPAC pairs can be cascaded in series, if required. The max cable length between two cascaded sticks shall not exceed 10m (32.8 ft). It is not possible to cascade mixed pairs i.e. 450L PAC with 450L-E or 450L-B.

What is the response time of the 450L GuardShield safety light curtain system?
- The standard response time (with no beam coding, muting or cascading configured) of all 4 models of 450L GuardShield PAC is <20 ms. Refer to the 450L-UM001 User Manual for more detailed information on how cascading systems affects response time.

Will my 450L POC plug-ins work with 450L PAC?
- All 450L plug-ins are supported apart from 450L-APR-BL-5 & 450L-APR-EN-8, and 450L-APC-IO-8 must have firmware 4.x or greater installed to be compatible. All others will work.

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450L GuardShield™ PAC Safety Light Curtain

FAQs (2)

What is the maximum operating range of 450L PAC?
- 450L PAC is based on the 450L-E4HL####YD models, so has an operating range of 0.9 to 16.2 m (or 1.2 to 8.0 m in reduced operating range mode).

What if my operating range is greater than 16.2 m?
- For any customer with an operating range requirement beyond 16.2 m, the 30 m models of 445L Safe 4 PAC are still available. However, we will be discontinuing these in the near future, as the component obsolescence that led to the phased discontinuation of Safe 4 means that we only have a limited number of the obsoleted components remaining. Exactly when the full discontinuation will occur is not known as it is dependant on uptake of the 450L PAC.

Are there any plans for a longer range 450L PAC?
- Yes, we have a Technical Investigation underway just now to evaluate what changes are required to produce an extended range version of 450L PAC. We will start a project on this at the earliest opportunity.

Do the 450L PAC light curtains use the same firmware as the 450L POC models?
- No. 450L PAC has a new firmware version starting at 1.001. However, it is a branch off the existing code, meaning that it shares all the common parts. You will not be able to load a PAC with POC firmware or vice versa – the hardware is also different, albeit based on the same technology platform.

GuardShield™ 450L PAC

FAQs (3)

Can I configure 450L PAC in Studio 5000® or Connected Components Workbench (Connected Components Workbench™)?
- The initial release of 450L PAC will be a standalone product (DIP switch configuration only) with no software configuration capabilities. It is not possible to use Studio 5000 or CCW (even for diagnostics). This capability will be added in a later project.

Is the CIP Safety module and plug-in compatible with 450L PAC?
- As per the response above, the initial release of 450L PAC will be a standalone product (DIP switch configuration only) with no software configuration capabilities. 450L-ENETR and 450L-APR-EN-8 are not compatible in the initial release, but this capability will be added in a later project.

How are the different functionalities set?
- The receiver plug-ins have DIP switches to set the required functionality. No software is required.

Can 450L PAC firmware be updated in the field?
- Yes, stick firmware can be updated in the field using ControlFLASH following the same procedure as for 450L POC. Any firmware updates for 450L PAC will be posted to the Rockwell Automation Product Compliance and Download Center (PCDC).

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