Safety Product Catalog

Hokuyo Safety product lineup

Safety laser scanner UAM-05LP series

- UAM-05LP-T301
- UAM-05LP-T301C (Connector model)

**UAM-05LP
Product website**

Safety laser scanner UAM-05LPA series

- UAM-05LPA-T301
- UAM-05LPA-T301C (Connector model)

**UAM-05LPA
Product website**

EtherCAT Safety laser scanner UAM-05LEC series

- UAM-05LEC-T301 (Scanner main module)
- UAM-5CUBO (Bottom facing connector module)
- UAM-5CUBA (Rear facing connector module)

COMING SOON

**UAM-05LEC
Product website**

Programmable safety controller HSC series

- HSC-A100ENC (EtherCAT support model)
- HSC-A100/M-ENC (Modbus TCP support model)

**HSC-A100
Product website**

Safety laser scanner
UAM-05LP series

HOKUYO

DESCRIPTION

One of the smallest safety laser scanners in the world with advanced functions for AGV &AMR applications.

· Small size and light weight
· Max. 5 meters protection range with 270° FoV
· Max. 20 meters warning range
· Max. 40m distance measurement data output
· AGV special functions (master-slave, encoder input)
· Certified as Type3 acc. to IEC 61496-1/3
   PLd acc. to EN ISO 13849-1
   SIL2 acc. to IEC 61508
· cULus approved

Benefits at a glance

» Small size and light weight
  The compact size and the light weight make the device suitable for the mobile robot applications.

» One scanner model for all safety applications
  On top of its compact size, the extensive safety functions of the UAM-05LP allows the user to use it for any type of safety applications such as mobile robotics, cobots, robotic cells and safeguarding of dangerous machines.

» AGV special features

· Master-salve control function:
  UAM-05LP provides a master/slave configuration where one unit is configured as a master and up to 3 units as slaves. The communication between the master and slave units is handled by two RS-485 wires. Each device has independent configuration. This feature saves caballing, harnesses and extra IO modules costs and also enables faster commissioning.

· Encoder input function (Dynamic field-set change):
  UAM-05LP has 1 pair of encoder inputs which allow users to connect encoder(s) directly and change the scanner's field-sets dynamically depending on the speed of AGV. When using encoder input function, max.128 field-sets can be configured.

· Distance measurement output
  UAM-05LP is equipped with Ethernet connection to maximize our offering. Distance, RSSI, IO state and internal state information are all accessible over Ethernet. The measurement data is suitable for natural navigation and detecting reflectors for precise localization. ROS package (urg_node) is available.
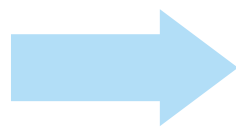
Specification overview

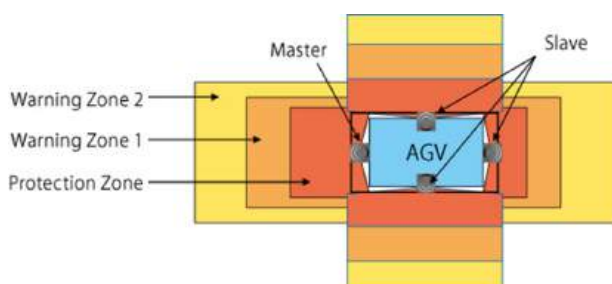|	
Protection range:	Max 5m
Warning range:	Max 20m
Distance tolerance:	+ 100mm
Detection capability:	From black sheet (1.8%) to retro-reflector sheet
Detectable range:	270°
Minimum detectable width:	∅30mm (1.8m), ∅40mm (2.5m), ∅50mm (max: 3.0m), ∅70/150mm (5.0m)
Scan frequency:	30ms (rotational speed 2000rpm)
Number of field-set:	Max .32 / Max. 128 when using encoder input mode
Number of zone per field-set:	Max. 3 (1 protection + 2 warning zones) / Max.2 protection zones (dual protection mode)
Response time:	OFF 60ms - 510ms │ ON 270ms - 510ms
Element:	Pulsed laser diode
Wave length:	905nm
Safety class:	Laser class 1
Type:	Type 3 (IEC 61496–1, IEC 61496–3)
Functional safety:	SIL 2 (Type B, HFT=1) (IEC61508)
PFHd:	7.8×10^{-8} (T1=20 year) : When master slave function is not in use.
PFHd:	1.6×10^{-7} (T1=20 year) : When master slave function is in use.
Size:	80mm x 80mm x 95mm (without cable)
Weight:	Approx. 800g (excluding cable)
Protection:	IP65
Power supply:	DC 24V ±10% : when operation using converter
Power supply:	DC 24V −30% / +20% : when operating using battery
Configuration:	USB2.0 (USB micro type-B connector)
Data output:	Ethernet 100BASE-TX

Function rich safety scanner

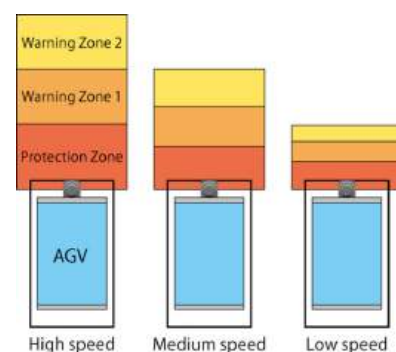• All standard and advanced safety functions are integrated into the compact scanner.

Standard Functions
■ Reference Monitor
■ EDM
■ Interlock
■ Muting
■ Area Sequence

Advanced Functions
■ Dual protection
■ Encoder input
■ Master-slave control
■ Configuration by SD card
■ Data output via Ethernet

Master-Slave control function

Encoder input (Dynamic field-set change)

High speed   Medium speed   Low speed

Safety laser scanner
UAM-05LPA series

HOKUYO

DESCRIPTION

High-end model from the UAM-05LP series boosting advanced features and enhanced availability

・Inherited the compact size and light weight from UAM-05LP series
・Drop-in replacement of the UAM-05LP and unified software
・Max. 5 meters protection range with 270° FoV
・Extended warning range of Max. 30 meters
・Max. 40m distance measurement output
・Upgraded AGV special functions (encoder input)
・Certified as Type3 acc. to IEC 61496-1/3
  PLd acc. to EN ISO 13849-1
  SIL2 acc. to IEC 61508
・cULus approved

Benefits at a glance

» 2-axis monitoring with 4 encoder inputs
  UAM-05LPA can directly connect to 2 safe incremental encoders.
  It enables UAM to support SDI on top of STO, SMS, SLS acc. EC61800-5-2 without the need of motion modules.

» Configuration through Ethernet connection
  UAM-05LPA allows configuration through Ethernet in addition to USB or SD card.
  Distance, RSSI, IO state and internal state information are all accessible over Ethernet.

» 3 different field-set switching methods
  On top of the conventional paired switching mode (Max. 32 field-sets) and encoder input mode (Max. 128),
  fixed switching mode is added with the Max. number of 128 field-sets. It enables higher flexibility for
  user's integration of the scanner.

» Higher environmental resistance
  A new data processing algorithm applied to UAM-05LPA makes the scanner even more robust in harsher conditions.
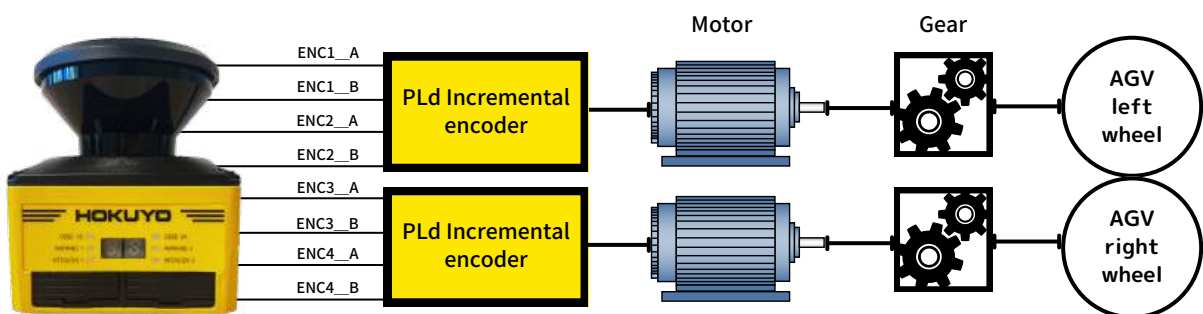
Backward compatibility to the UAM-05LP series

・The same configuration software and the project file of the UAM-05LP can be used also for the UAM-05LPA.
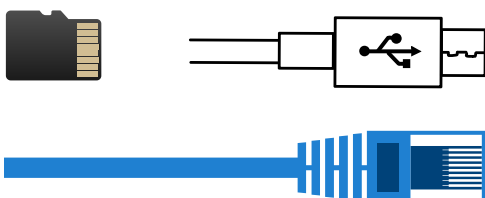・Both, the UAM-05LP and UAM-05LPA, can operate within the same master-slave network.

UAM-05LP　　UAM-05LP/LPA Configuration software　　UAM-05LPA

UAM
Project Designer

UAM-05LP　　　　　　　　　　UAM-05LPA

RS485+
RS485-

Master-Slave communication

Specification overview

Protection range:	Max 5m
Warning range:	Max 30m
Distance tolerance:	+ 100mm
Detection capability:	From black sheet (1.8%) to retro-reflector sheet
Detectable range:	270°
Minimum detectable width:	∅30mm (1.8m), ∅40mm (2.5m), ∅50mm (max: 3.0m), ∅70/150mm (5.0m)
Scan frequency:	30ms (rotational speed 2000rpm)
Number of field-set:	Max. 32 (Paired input), Max.128 (Fixed input), Max. 128 (Encoder input)
Number of zone per field-set:	Max. 3 (1 protection + 2 warning zones) / Max.2 protection zones (dual protection mode)
Response time:	OFF 60ms - 510ms | ON 270ms - 510ms
Element:	Pulsed laser diode
Wave length:	905nm
Safety class:	Laser class 1
Type:	Type 3 (IEC 61496–1, IEC 61496–3)
Functional safety:	SIL 2 (Type B, HFT=1) (IEC61508)
PFHd:	7.8×10^{-8} (T1=20 year) : When master slave function is not in use.
PFHd:	1.6×10^{-7} (T1=20 year) : When master slave function is in use.
Size:	80mm x 80mm x 95mm (without cable)
Weight:	Approx. 800g (excluding cable)
Protection:	IP65
Power supply:	DC 24V ±10% : when operation using converter
Power supply:	DC 24V −30% / +20% : when operating using battery
Configuration:	USB2.0 (USB micro type-B connector)
Data output:	Ethernet 100BASE-TX

Wiring example of 4 encoder inputs for the differential wheels
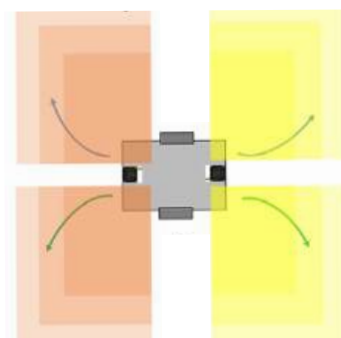

Device configuration interface

・Configuration via USB, SD-Card and Ethernet

Angular velocity monitoring

EtherCAT Safety laser scanner
UAM-05LEC series

DESCRIPTION

The smallest safety laser scanner with FSoE support!

・Small size and light weight
・Max. 5 meters protection range with 270° FoV
・Max. 20 meters warning range
・Max. 40m distance measurement output
・Fully networked scanner with supported EtherCAT profiles
・Max. 176 field-sets configurable
・Hybrid connectivity with hard wiring (optional)
・Certified as Type3 acc. to IEC 61496-1/3
　PLd acc. to EN ISO 13849-1
　SIL2 acc. to IEC 61508
・cULus approved

Benefits at a glance

» Small size and light weight
  The compact size: 80 x 104 x 95mm and the light weight make the device suitable for the mobile robot applications.

» Large number of field-sets
  Maximum number of zones in all field-set is 176. Each field-set can have a variable number and combination of up to 5 zones. A zone can be a protection zone (max. 5 meters) or a warning zone (max. 20 meters).

» Supported EtherCAT profiles
  UAM-05LEC supports FSoE, EoE, FoE and CoE which make the device usable in the fully networked EtherCAT environment. Raw measurement data, RSSI, IO state and internal state information are accessible through EoE from the IPC such as a navigation controller.
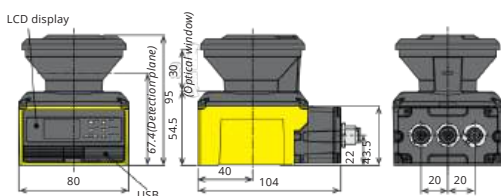
» Hybrid connectivity
  UAM-05LEC is equipped with physical I/Os in the same connector as the power supply. Muting, interlock, encoder inputs can be hard wired as an option and it gives more flexibility in the design of user's system.
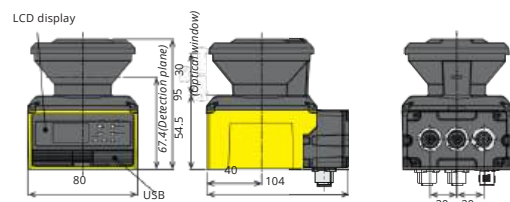
» Connector modules
   Depending on the system design requirements, users can chose from the 2 different connector modules.

UAM-5CUBA (rear facing connector module)
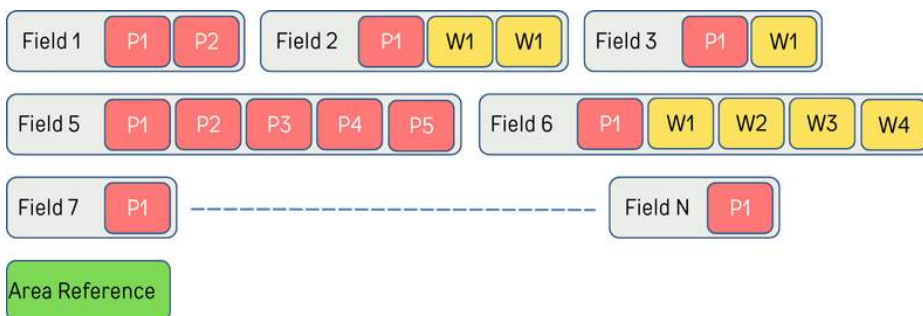

UAM-5CUBO (bottom facing connector module)

Specification overview

Part number:	UAM-05LEC
Protection range:	Max 5m
Warning range:	Max 20m
Distance tolerance:	+100mm
Detection capability:	From black sheet (1.8%) to retro-reflector sheet
Detectable range:	270°
Minimum detectable width:	∅30mm (1.8m), ∅40mm (2.5m), ∅50mm (max: 3.0m), ∅70/150mm (5.0m)
Scan frequency:	30ms (rotational speed 2,000rpm)
Number of field-set:	Max 176 patterns (when 1 zone per field set)
Zone per field-set:	Max 5
Response time:	OFF 80ms - 2,030ms | ON 270ms - 2,010ms
Element:	Pulsed laser diode
Wave length:	905nm
Safety class:	Laser class 1
Type:	TType 3 (IEC 61496–1, IEC 61496–3)
Functional safety:	SIL 2 (Type B, HFT=1) (IEC61508)
PFHd:	7.8 x 10 (TI = 20 year)
Size:	100mm x 80mm x 95mm (without cable)
Weight:	Approx. 400g (excluding cable)
Protection:	IP65
Connection:	3x M12-connector: EtherCAT IN/OUT, Power, IOs
Supply current:	7W (normal, without load), 20W (max, with load)
Configuration:	USB2.0 (USB micro type-B connector)
Data output:	Ethernet 100BASE-TX (EtherCAT IN)/ Ethernet 100BASE-TX (EtherCAT OUT)
Maximum range data output:	40m
Supported EtherCAT profiles:	FSoE, EoE, FoE,CoE

Large number of field-set and flexible zones configuration

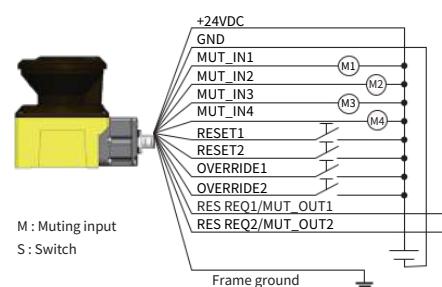• All standard and advanced safety functions are integrated into the compact scanner.

Max. 5 simultaneous safety zones	Hybrid connectivity

• max. 5m protection range and 270° FoV

M : Muting input
S : Switch

Programmable safety controller
HSC series

Safety PLC
ideal for AGV application

HSC-A100-ENC
HSC-A100/M-ENC

Description

Freely programmable and configurable safety controller with encoder interface

- Interface for up to 6 safety laser scanners
- 4 Encoder interfaces
- 16 safe digital inputs
- 10 safe digital outputs
- 2 relay outputs
- 2 pulse outputs
- Performance Level: PL e (EN ISO 13849-1)
- Safety Integrity Level
  one channel mode: Cat.3 (EN ISO 13849-1) / SIL2 (IEC61508)
  two channel mode: Cat. 4 (EN ISO 13849-1) / SIL3 (IEC61508)
- cULus approval

Benefits at a glance

» Safe logic processing of input, output, status and activation signals
» Easy and transparent programming and parameterization via HSC project designer
» Fast response time with integrated Fast Channel Task with guaranteed processing time of 2 ms
» Scanner master functions, activation of monitoring areas and computing of monitoring results
» Complete set of Drive monitoring
» Deterministic data communication and processing for safe position and speed functions
   via distributed sensor / multiple axes
» Storage of safe parameters in the base module
» Status- LEDs for IO
» Multi-function button (Quit, Start, Reset) front side
» Integrated communication interface:
   fieldbus interface and FSoE-Master stack for secure connectivity to higher levels of control or Modbus TCP/IP

Specification overview

Part number:	HSC-A100-ENC, HSC-A100/M-ENC
Number of safe digital input:	16
Number of safet digital output:	PNP switching* (6+2**+4), NPN switching 2*
Number of relay output:	2
Number of pulse output:	2
Number of encoder input:	4 (TTL/HTL, SINCOS, Resolver, SSI, Analog)
Max. connectable UAM:	6
Interface:	2 x RJ-45 (Ethernet), USB-C
Fieldbus:	Ethernet, EtherCAT/IO, Modbus TCP
External memory:	Micro SD card
Dimension:	124 x 95 x 76 mm
Weight:	413g
Ambient temperature:	-25 to 55°C
Protection class:	IP 20 (Connectors IP00 EN60529)
Type of connection:	Plug-in terminals with spring connection

*pn/pp are configurable via HSC Project designer
**configurable 2 pulse outputs or 2 pp switching

Connectivity with the safety laser scanners

・Maximum 6 units of UAM-05LP-T301 and UAM-05LPA-T301 are connectable.
・Compatibility with Hokuyo EtherCAT safety laser scanner.

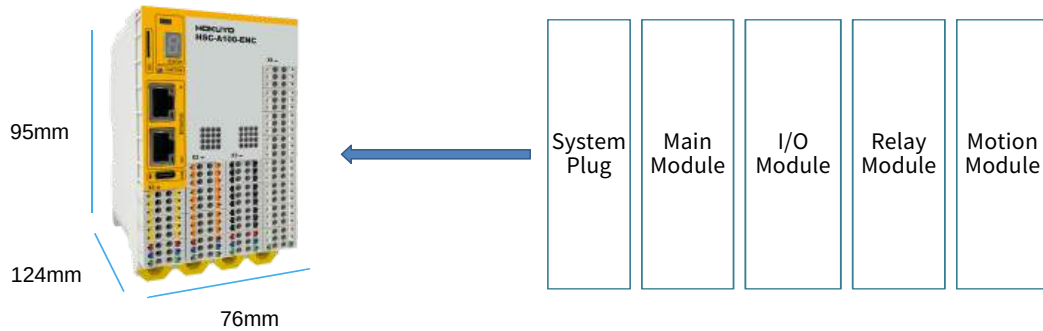## Complete set of encoder support and built-in SARC (Safe arithmetic library)

・Safe arithmetic library as well as safe motion blocks are available in the configuration software HSC designer.

・ Complete set of drive monitoring

- Incremental encoder HTL
- Incremental encoder TTL
- Sin/Cos
- SSI encoder
- Resolver
- Analog encoder

・Safe arithmetic library

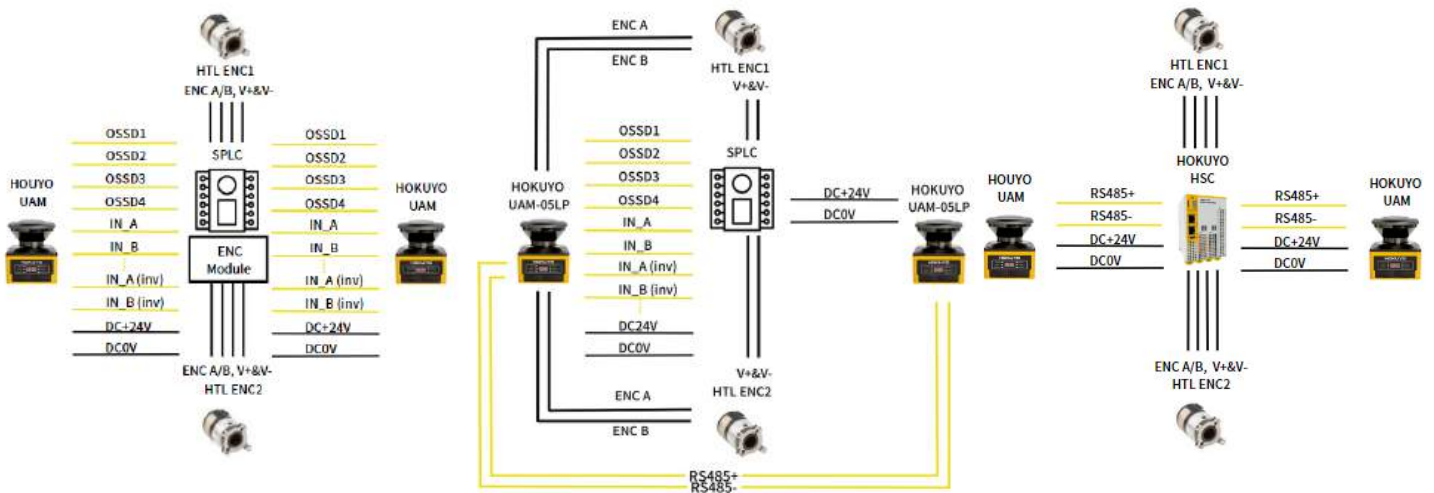・Safe monitoring function blocks

Built-in modules

· All the modules such as I/Os, relay, motion modules are built in one small device.

95mm
124mm
76mm

| System Plug | Main Module | I/O Module | Relay Module | Motion Module |

Wiring examples of an AGV application

· Wiring example images of an AGV application with Hokuyo safety products.

Scenario 1: UAM-05LP + 3rd party PLC	Scenario 2: UAM-05LP + 3rd party PLC (Master-Slave & Encoder input mode in use)	Scenario 3: UAM-05LP + HSC-A100
Max. number of field-set per scanner: 32 Supported Encoder : HTL incremental	Max. number of field-set per scanner: 128 Supported Encoder : HTL incremental	Max. number of field-set per scanner: 128 Supported Encoder : HTL,TTL incremental, Sin/Cos SSI encoder, Resolver, Analog encoder
Total number of wires: 40	Total number of wires: 28	Total number of wires : 16

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UNIQUE PRODUCT & BEST SENSING

⚠ Caution for safety use

- Read instruction manual carefully before use.
- Products published in this brochure are intended to be used under specific conditions.
- For product related questions or technical issues, please contact our offices.

ISO14001 Certified
JQA-EM3873

ISO9001 Certified
JQA-1742

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