KEYENCE

NEW **Safety Laser Scanner**

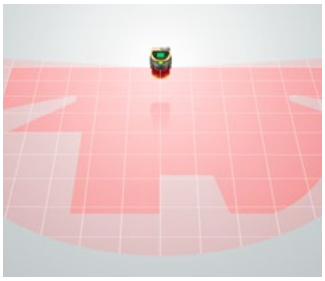
SZ-V Series

Maximum safety standard for scanners

Type3 | **SIL2** | **Category3** | **PLd**

Industry Leading Safety Laser Scanner

VERSATILE, EASY TO USE, AND TRULY SUPERIOR SAFETY SCANNER



VERSATILE

- Industry Leading Range
- Monitor Multiple Areas
- Protect Countless Hazards

EASY TO USE

- USB and Network Compatible
- Easy to Navigate Software
- Quickly Customized Zones

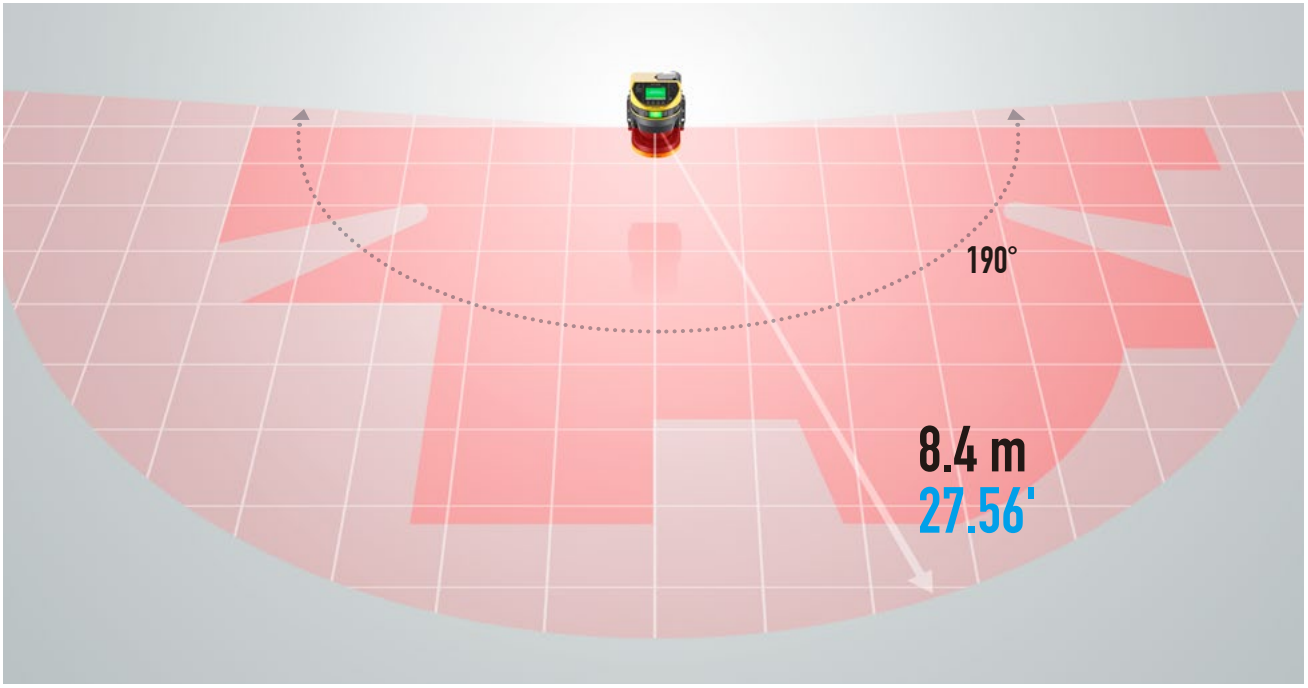
TRUE SUPERIORITY

- Advanced Features
- Unmatched Stability
- Visual Innovation

NEW Safety Laser Scanner **SZ-V Series**

VERSATILE

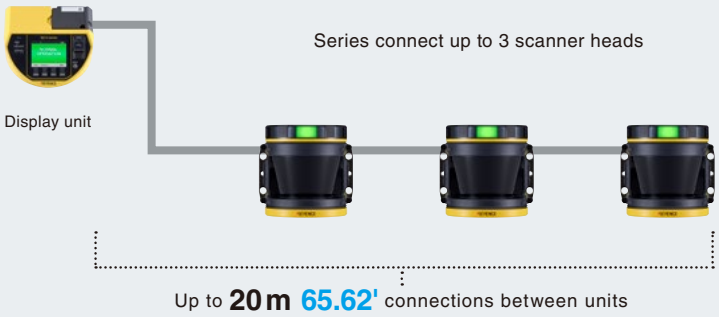
CUSTOMIZABLE ZONE WITH INDUSTRY LEADING RANGE



190° Field of View | **8.4 m 27.56'** Protection Zone | **26 m 85.30'** Warning Zone

Boasting one of the industries largest customizable zones, the SZ-V Series offers a truly unique safety solution compared to other types of safety equipment. The reflective nature of the scanner allows for versatile mounting, coupled with user-defined protection and warning zones, to cover any hazardous location.

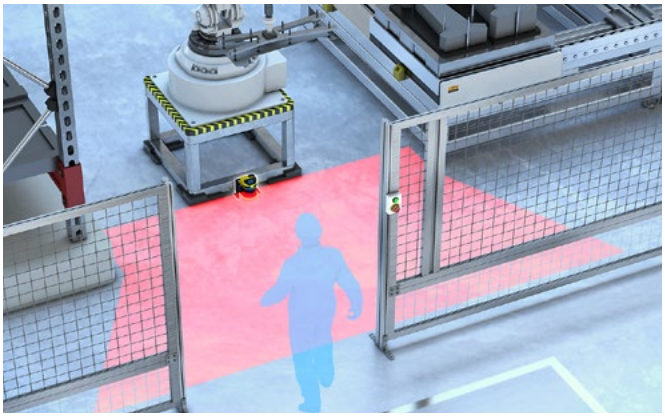
PROTECT MULTIPLE AREAS ON A SINGLE MACHINE



Connect Up To 3 Units

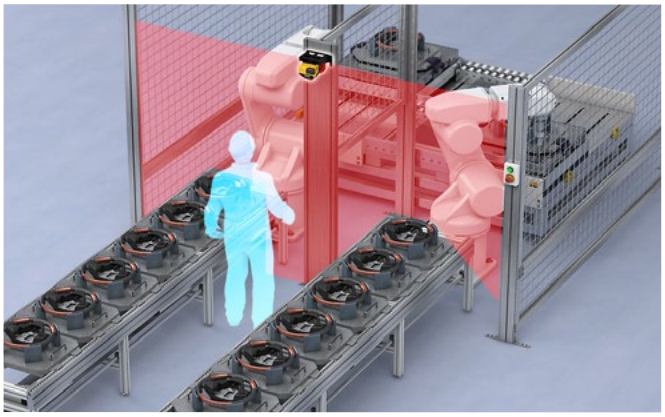
Expand machine protection by connecting multiple heads to a single display unit. Seamlessly monitoring multiple sections of a machine without the need for extensive or complicated wiring.

SAFELY PROTECT COUNTLESS TYPES OF HAZARDS



Area Protection

Safety scanners prevent hazards from operating when an unintended object or person is in a dangerous area. Unlike safety mats, safety scanners can be unobtrusively mounted to avoid damage or potential impact, while still protecting complex shaped areas.



Access Protection

The SZ-V also allows for vertical mounting to detect any undesirable entrances into a hazardous area. This is ideal in locations where it would be too difficult to effectively mount light curtains.

AGV/AGC

A safety laser scanner can be mounted on an automated guide vehicle to eliminate the risk of collisions with objects or people in the environment. The features of the SZ-V Series help to ensure proper operation without danger or unnecessary stoppage.

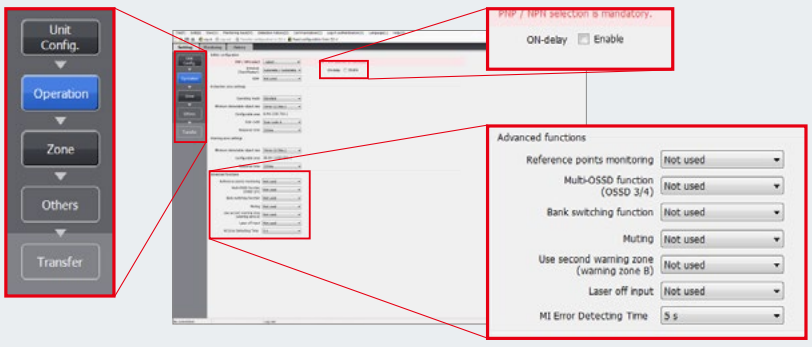
EASY TO USE

SIMPLE AND DIRECT COMMUNICATION

USB/Ethernet Direct Connection
PROFINET/EtherNet/IP™ Network Communication

Directly connect to SZ-V Series scanners through either USB or Ethernet to easily modify the units program, monitor the current status of the scanner, or check for recent interruptions. The Ethernet connection also allows for several different networking options including TCP/IP, UDP, PROFINET and EtherNet/IP™. *Ethernet only available on SZ-V(U)32N(X) models

EASY TO NAVIGATE SOFTWARE

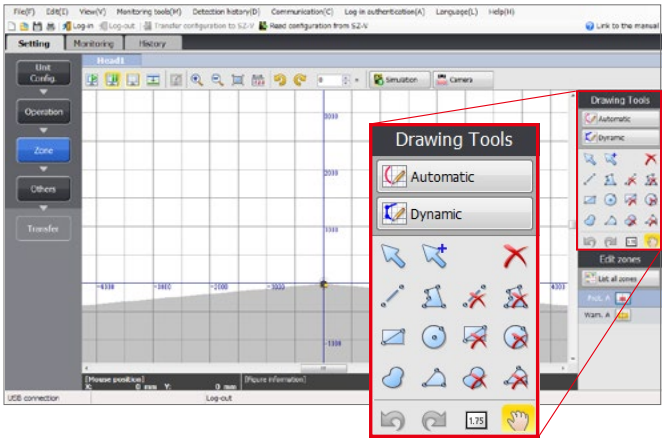


Simplified step-by-step menus.

Clean and concise page layouts provide a seamless flow between settings.

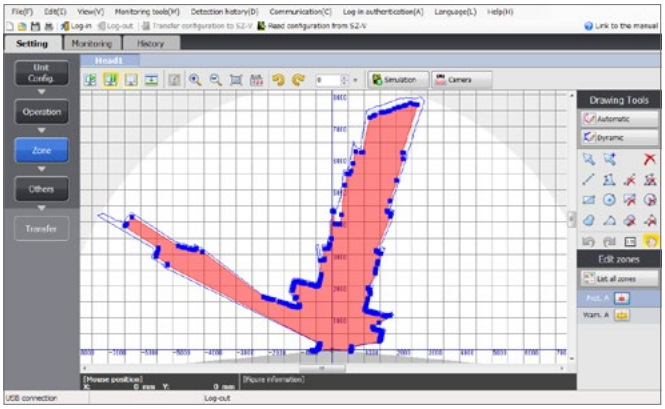
Drop-down menus and buttons make configuration faster than ever.

QUICKLY CUSTOMIZED DETECTION ZONES (3 Methods)



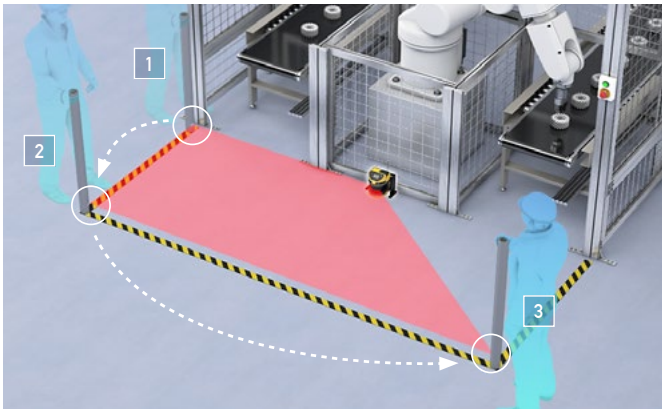
Familiar Tools and Landscape

An assortment of easy to use tools enable users to generate complex zones quickly and easily, without any special knowledge necessary. This landscape also offers real-time monitoring to locate physical objects in the environment (i.e. walls, pillars, etc.) and ensure proper zone creation.



Automatic Drawing Function

Instantly map out the protection zone with the push of a button! This innovative feature automatically draws around obstacles to ensure proper protection in complex environments.



Dynamic Drawing Function

Using a specialty reflector, simply mark the corners of the desired zone for a truly unmatched zone creation technique. This function can be used to generate simple square zones, as well as complex polygonal areas.

SUPERIORITY Advanced Functionality

IMPROVEMENTS

System Memory

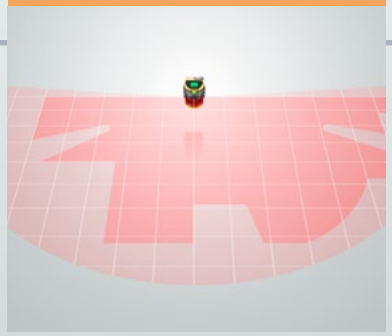
When replacing a unit, the original settings can be easily transferred by removing the system memory from the original unit and connecting it to the new unit.

Safety Laser Scanner
SZ-V Series

INNOVATIONS

8.4 m 27.56' Detecting Range

Several KEYENCE innovations work together to provide an unmatched 8.4 m 27.56' detecting range for flexible scanner usage.



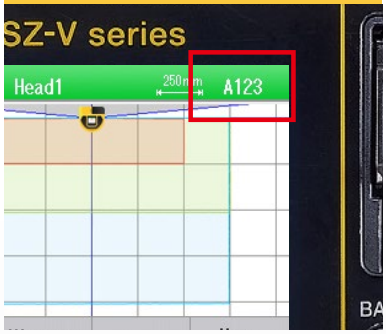
Network Compatibility

The SZ-V supports various networking options to enable remote monitoring.

SZ-V(U)32N(X)

CRC Code

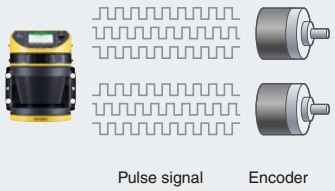
This 4 digit code is located in both the software and on the display unit, to verify that the settings have not been changed.



Encoder Inputs

The SZ-V can take encoder inputs directly from an AGV/AGC to enable smooth profile transitions.

SZ-V(U)32N(X) SZ-V(U)32(X)



2 Scanners in 1 Unit

With two sets of OSSD's, the SZ-V can protect two independent zones simultaneously, saving costs and wiring.

SZ-V(U)04(X)

Muting Function

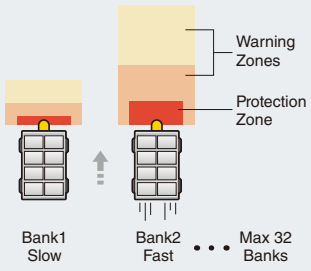
The built-in muting function ensures high productivity and efficiency, while still maintaining a safe working environment.

SZ-V(U)04(X) SZ-V(U)32N(X)

96 Programmable Profiles

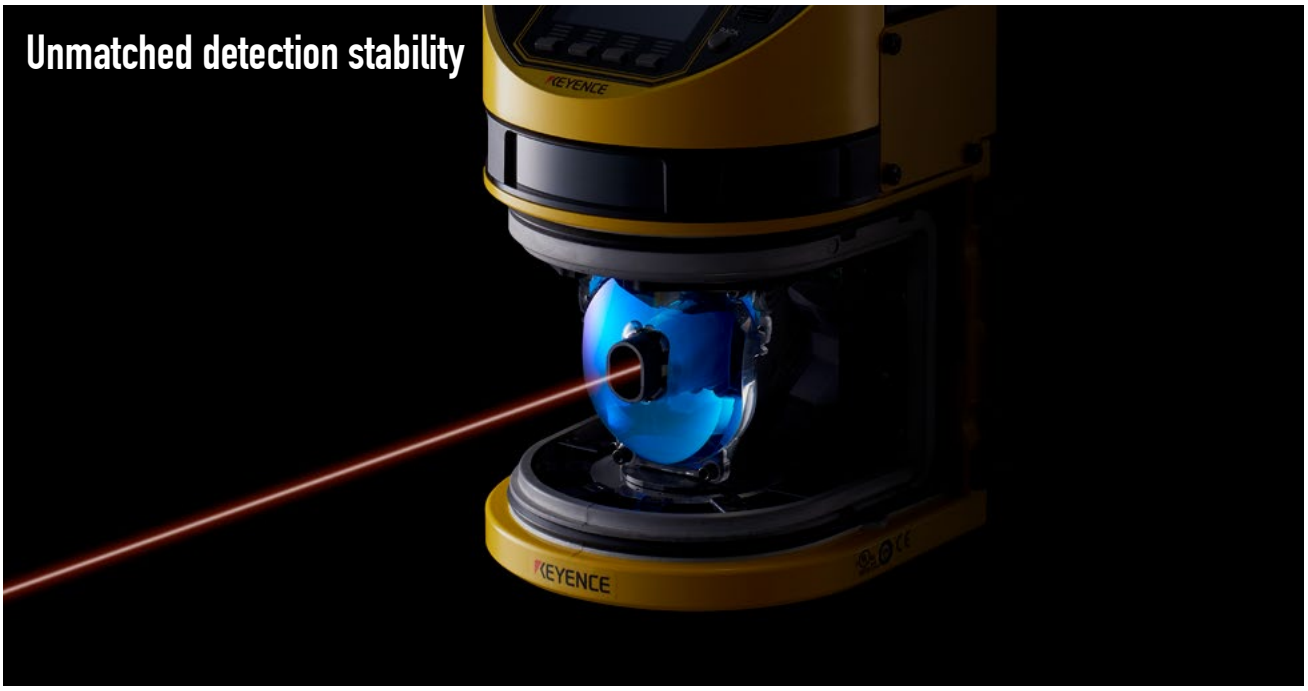
Provide precise and dynamic control of AGV/AGC operations using 32 banks, each containing 1 protection zone and 2 warning zones.

SZ-V(U)32N(X) SZ-V(U)32(X)



SUPERIORITY Unmatched Stability

IMPROVED ENVIRONMENTAL RESISTANCE

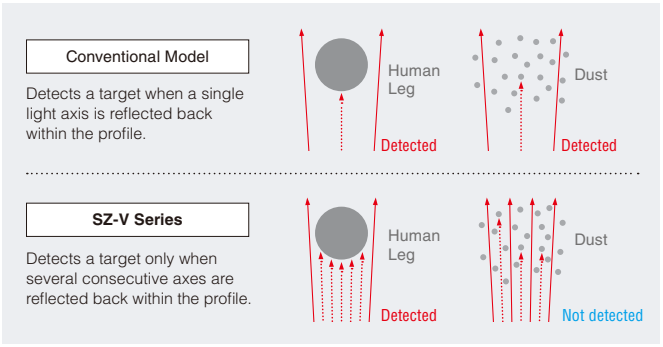


Enhanced Detection

0.1° Beam Pitch

Tight Beam Spot

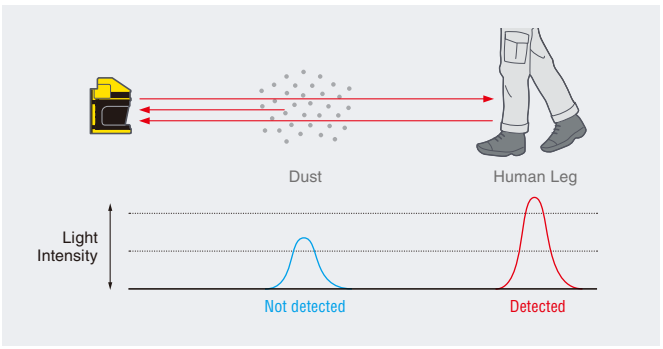
By reducing the spot diameter by 1/3* and increasing the number of beam axes almost 4X*, the SZ-V Series is able to stably detect targets while greatly decreasing the number of errant trips due to environmental factors. *Compared to conventional models.



Target Differentiation

Intensity Comparison Algorithm (I.C.A.)

The innovative Intensity Comparison Algorithm (I.C.A.) allows the scanner to analyze the amount of light returned to stably differentiate between people/objects and dust or mist.



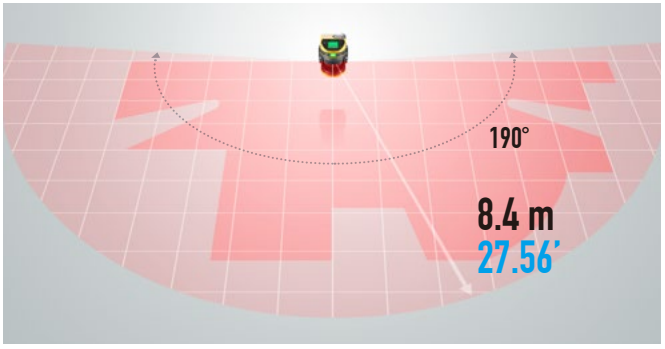
INCREASED FLEXIBILITY

More Coverage, Less Costs

8.4 m 27.56' Detection Zone

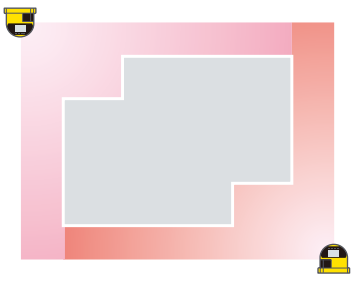
26 m 85.30' Warning Zone

By deploying the new "Canon Hole" structure, the SZ-V is able to detect further than ever before. This achievement eliminates the need for multiple scanners to cover the same location. This along with the intuitive customization provide for clear cost savings.



Before

Scanners are required at each corner to protect the zone.



After

The extended range reduces the number of necessary scanners to 2.

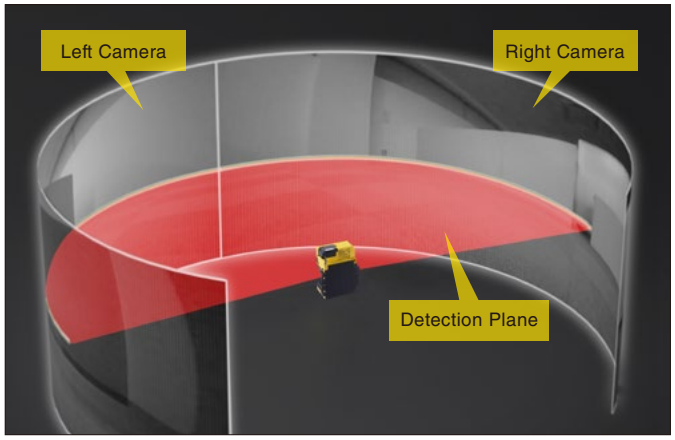
SUPERIORITY Visual Innovation

STEP 1

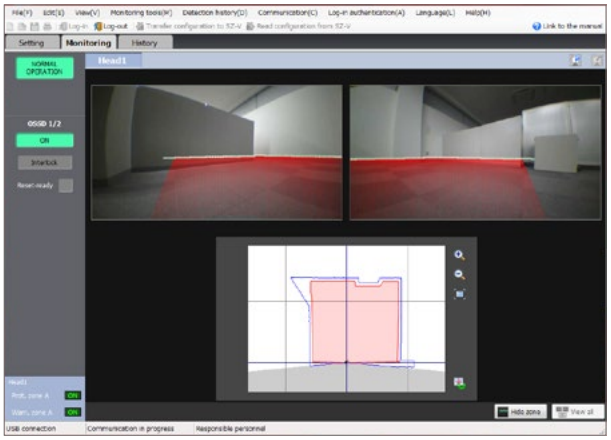
Installation

Built-in Camera

The SZ-V Series utilizes visualization in every aspect of scanner usage to provide a truly unique experience. Installation is now easier than ever with built-in cameras, available on specific models, to not only show what the scanner sees but also the actual detection plane.



The SZ-V camera models show real time images of what the scanner sees.



The software view combines the camera images and zone layout for a complete overview.

STEP 2

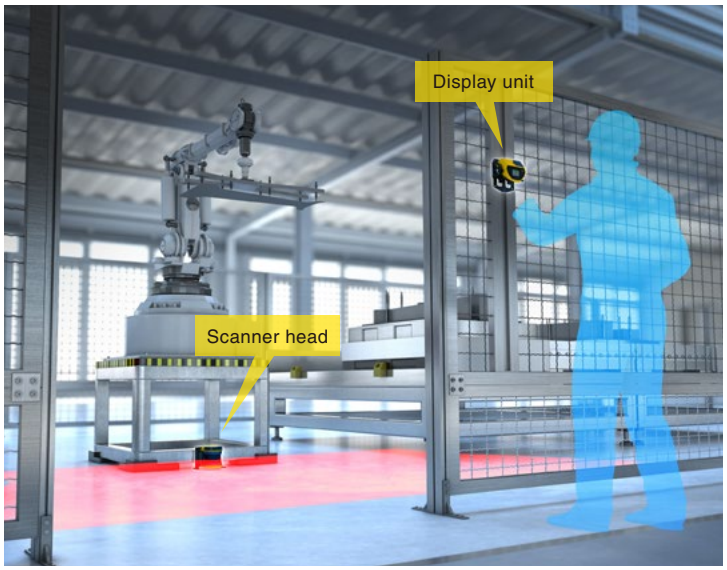
Operation

Separate Display

With conventional scanners, it was very difficult to monitor the scanner's status while the machine was operating. This is no longer a concern with the detachable SZ-V Display Unit which enables users to easily monitor the scanner at any time.

Quick checks through the Display Unit
Detailed setting information through a laptop

Ideal for mounting outside of the hazardous zone to prevent unnecessary machine stoppage.



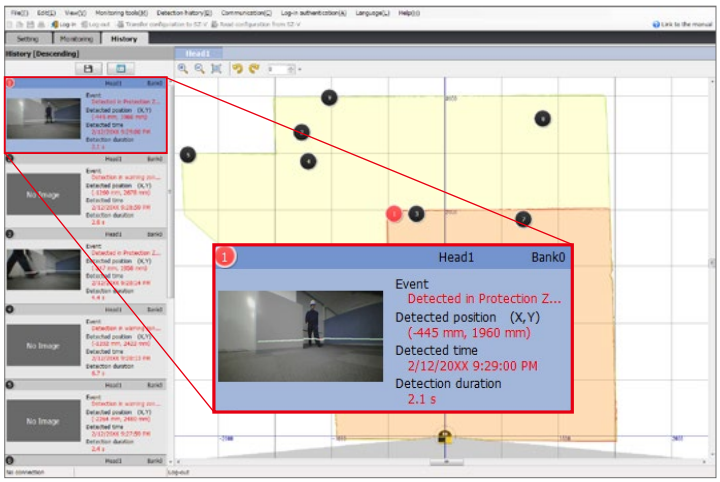
STEP 3

Maintenance

Built-in Camera | Software | Separate Display

The combination of the previous features, along with KEYENCE's innovative Detection History function, completely eliminate maintenance headaches. The SZ-V records WHEN and WHERE detections occur to provide a thorough archive of pertinent information that can be used to better understand scanner operations.

(1) Detection History



Detection History Content

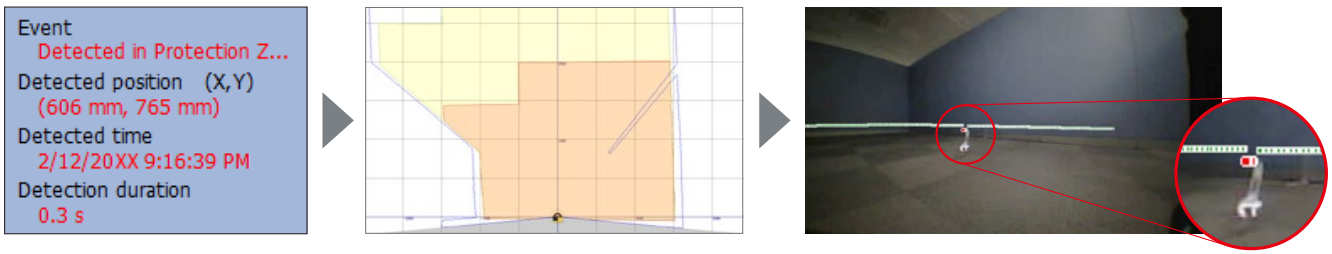
Time	Duration
Position	OSSD/Warning/Alert Status

The Detection History feature allows SZ-V users to clearly visualize WHEN, WHERE, and for HOW LONG detections are occurring. With up to 500 events that can be saved, this feature provides crucial details to better understand machine shut downs.

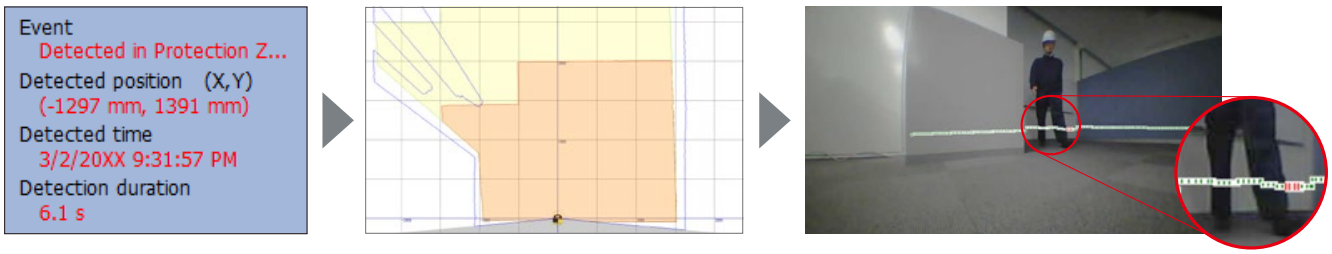
(2) Built-in Camera

With the built-in camera models, the SZ-V takes pictures or movies before and after the OSSD turn OFF. Now users can visually see the cause of trip and react accordingly.

Cause: Dropped Tool



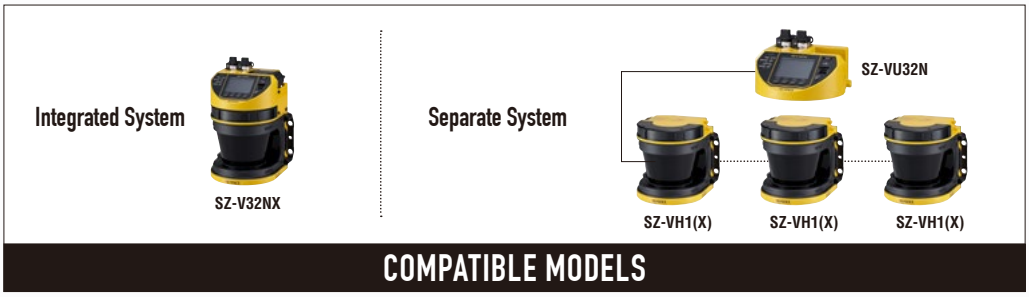
Cause: Worker In Zone



NETWORKING

EXTENSIVE NETWORKING OPTIONS

The SZ-V32N(X) and SZ-VU32N models contain an abundance of networking options that offer a wide variety of beneficial features. From programming the unit remotely to controlling machine stoppage through a Safety PLC, the SZ-V Series can adapt to almost any need.



COMPATIBLE MODELS

KEYENCE NETWORK ADVANTAGE

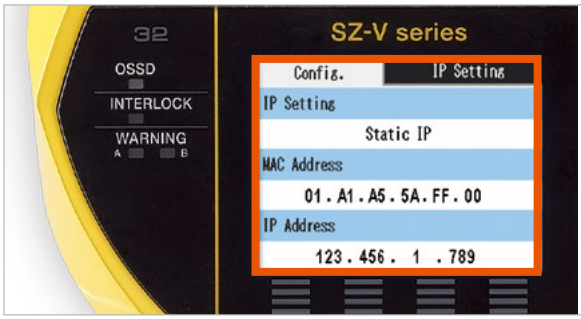
EtherNet/IP™ PROFINET® PROFIsafe UDP

1

Easily Accessible Information

Detachable and Detailed Display

The highly detailed display utilized by the SZ-V Series provides a perfect platform to view all network related settings directly on the unit. As an added benefit, the display unit can also be separated and mounted in an easily accessible location.



Quickly and Easily Check the Following:

- IP Setting
- IP Address
- MAC Address

All can be seen directly on the display unit!

SAFETY FUNCTIONS

- Control machine power through a safety PLC
- Check/protect different areas simultaneously
- Monitor the status of the scanner

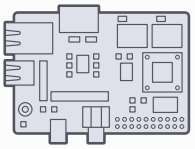
PROFIsafe PLC

PROFIsafe

NON-SAFETY FUNCTIONS

- Read measurement distance data
- Monitor the status of the scanner (AUX information)
- Send status information to an HMI

PLC or Industrial PC



AGV On-Board Computer

PROFINET

EtherNet/IP™

UDP

SZ-V CONFIGURATOR FUNCTIONS

- Change/view all settings remotely
- View the history of OSSD trips and errors
- Monitor the protection area in real-time

Desktop PC and Laptop PC

Ethernet

KEYENCE PROFIsafe ADVANTAGE

2

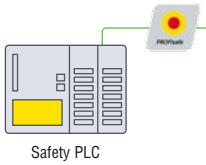
Reduced Cost and Wiring

Series Connection **Dual Zone Control**

By utilizing the SZ-V's PROFIsafe compatibility, series connection capability, and dual zone control, the SZ-V is able to provide an easier and more cost-effective solution for protecting multiple machines or areas.

BEFORE

Conventional PROFIsafe Scanners

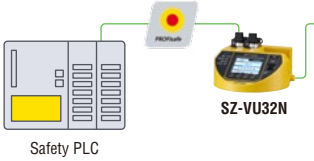


Safety PLC

REQUIRES: Minimum of 6 Full Safety Scanner Units to Protect 6 Different Zones

AFTER

SZ-V PROFIsafe Scanners



Safety PLC

SZ-VU32N

REQUIRES: Minimum of 1 Display Unit and 3 Scanner Heads to Protect 6 Different Zones

COST REDUCED BY 1/3

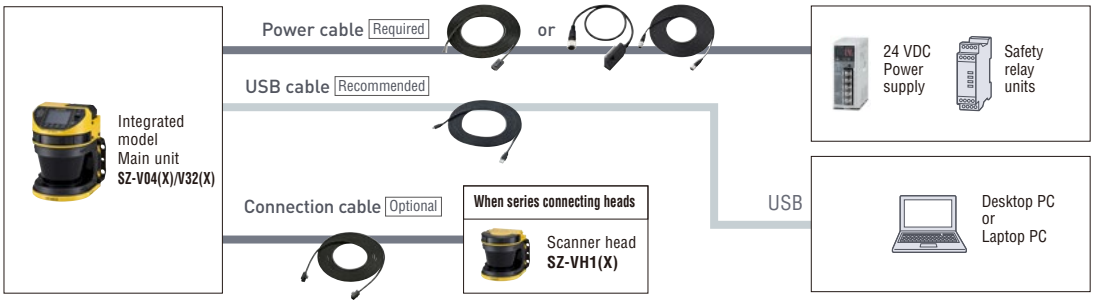
Step1 Select separate or integrated system and required functions.

1 Select system	2 Select functions	3 Select camera model or standard model		
Integrated system 	Multi-OSSD/ Muting	Camera		SZ-V04X
		Standard		SZ-V04
	Multi-bank	Camera		SZ-V32X
		Standard		SZ-V32
	Network Communication Multi-bank Muting	Camera		SZ-V32NX
		Standard		SZ-V32N
Separate system 	Multi-OSSD/ Muting 	Camera		Display unit: SZ-VU04 Scanner head: SZ-VH1X System memory: SZ-VSM
		Standard		Display unit: SZ-VU04 Scanner head: SZ-VH1 System memory: SZ-VSM
	Multi-bank 	Camera		Display unit: SZ-VU32 Scanner head: SZ-VH1X System memory: SZ-VSM
		Standard		Display unit: SZ-VU32 Scanner head: SZ-VH1 System memory: SZ-VSM
	Network Communication Multi-bank Muting 	Camera		Display unit: SZ-VU32N Scanner head: SZ-VH1X System memory: SZ-VSM
		Standard		Display unit: SZ-VU32N Scanner head: SZ-VH1 System memory: SZ-VSM

Step2 Select cables

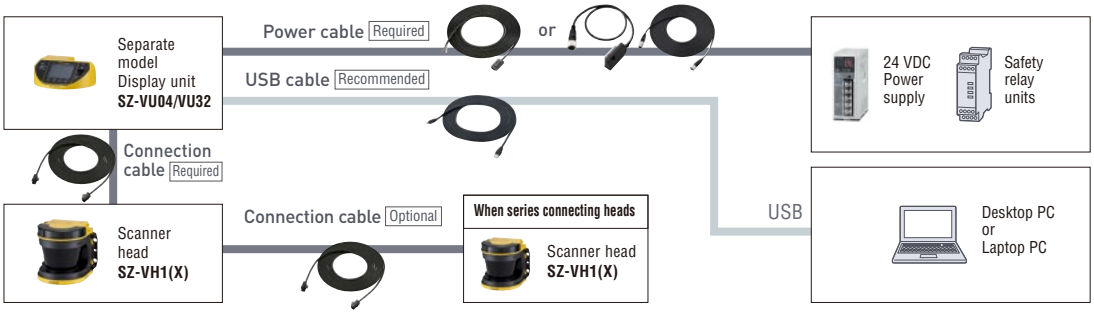
Integrated system

Required: Power cable
Recommended: USB cable
Optional: Connection cable (only if performing series connection)



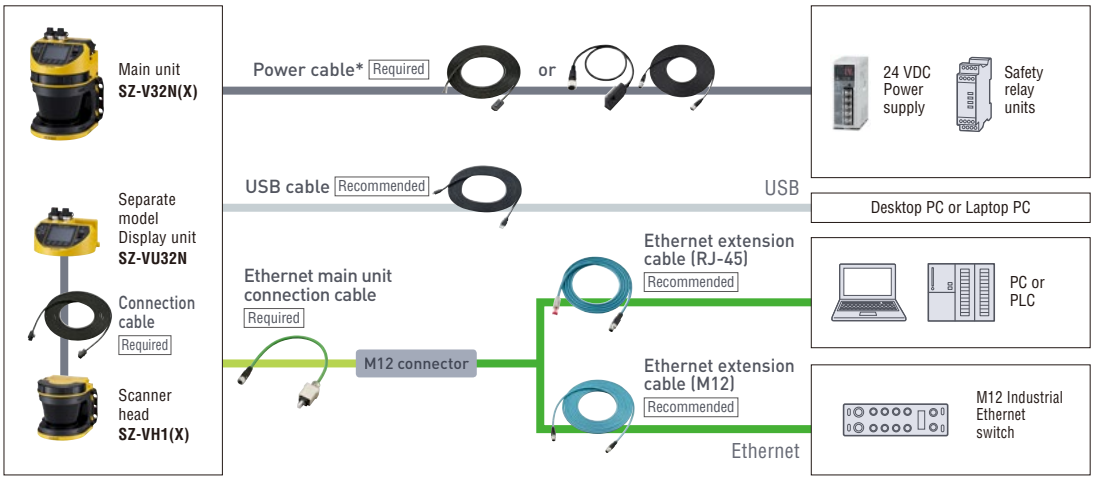
Separate system

Required: Power cable and Connection cable
Recommended: USB cable
Optional: Additional Connection cable (only if performing series connection)



Network communication type

Required: Power cable, Connection cable (if separate system), Ethernet main unit connection cable
Recommended: USB cable, Ethernet extension (M12) or Ethernet extension (RJ-45)
Optional: Connection cable (if performing series connection)



Power cable (Standard)

5 m 16.40'	SZ-VP5
10 m 32.81'	SZ-VP10
20 m 65.62'	SZ-VP20
30 m 98.43'	SZ-VP30

Power Cable Extension (M12)

0.3 m 0.98'	SZ-VPC03
10 m 32.81'	SZ-VCC10

Power Cable When Using PROFIsafe

10 m 32.81'	SZ-VP10PW

Connection cable

0.05 m 0.16'	SZ-VS005
5 m 16.40'	SZ-VS5
10 m 32.81'	SZ-VS10
20 m 65.62'	SZ-VS20

Ethernet extension cable (RJ45)

2 m 6.56'	OP-88086
5 m 16.40'	OP-88087
10 m 32.81'	OP-88088

*** Select Power Cables**

Model	Description	Safety Output	
		OSSD	PROFIsafe
SZ-VP5/10/20/30	Standard Cable	✓	—
SZ-VP10PW	Power Cable When Using PROFIsafe	—	✓
SZ-VPC03,SZ-VCC10	Power Cable Extension (M12)	▲*1	✓*2

✓: Possible ▲: Possible with limitations —: Impossible
*1 SZ-VPC03 is equipped with only 4 pins: 24 V, 0 V, OSSD1, OSSD2. *2 OSSD1, OSSD2 is disabled when using PROFIsafe.

Ethernet main unit connection cable

SZ-VNC03

USB cable

2 m 6.56'	OP-51580
5 m 16.40'	OP-86941

Ethernet extension cable (M12)

2 m 6.56'	OP-88089
5 m 16.40'	OP-88090
10 m 32.81'	OP-88091
20 m 65.62'	OP-88092

Step3 Select bracket [optional]

Direct mounting without a bracket is also possible

Adjustable angle mounting bracket (horizontal) **SZ-VB01**	Adjustable angle mounting bracket (vertical) **SZ-VB02**	Floor bracket **SZ-VB03**
Display unit standard bracket **SZ-VB11**	Display unit DIN rail mounting bracket (flat) **SZ-VB12**	Display unit DIN rail mounting bracket (slim) **SZ-VB13**

Parts list

Integrated models

Function			Model	Weight
	Multi-function type	Camera	**SZ-V04X**	Approx. 2100 g
		Standard	**SZ-V04**	Approx. 2100 g
	Multi-bank type	Camera	**SZ-V32X**	Approx. 2100 g
		Standard	**SZ-V32**	Approx. 2100 g
	Network type	Camera	**SZ-V32NX**	Approx. 2300 g
		Standard	**SZ-V32N**	Approx. 2300 g

* Integrated models include display unit, scanner head, system memory and a connection cable (SZ-VS005).

Display units

Function		Model	Weight
	Multi-function type	**SZ-VU04**	Approx. 420 g
	Multi-bank type	**SZ-VU32**	Approx. 420 g
	Network type	**SZ-VU32N**	Approx. 600 g

Scanner heads

Function		Model	Weight
	Camera type	**SZ-VH1X**	Approx. 1600 g
	Standard type	**SZ-VH1**	Approx. 1600 g

System memory

	Model	Weight
	**SZ-VSM**	Approx. 60 g

Protection cover

	Model	Weight
	**SZ-VB21**[*1]	Approx. 1000 g

Protection cover (visor)

	Model	Weight
	**SZ-VB22**[*1]	Approx. 660 g

*1 The SZ-VB21/SZ-VB22 protection covers can be mounted over a mounting bracket.

Replacement window

	Model	Weight
	**SZ-VHW**	Approx. 130 g

Configuration software

Configuration software <Safety Device Configurator> can be downloaded from the KEYENCE website for free.

Mounting brackets

Installation	Name · Model	Weight
	Adjustable angle mounting bracket (horizontal) **SZ-VB01**	Approx. 900 g
	Adjustable angle mounting bracket (vertical) **SZ-VB02**	Approx. 1800 g
	Floor bracket **SZ-VB03**	Approx. 1350 g
	Display unit standard bracket **SZ-VB11**	Approx. 700 g
	Display unit DIN rail mounting bracket (flat) **SZ-VB12**	Approx. 350 g
	Display unit DIN rail mounting bracket (slim) **SZ-VB13**[*2]	Approx. 350 g

*2 SZ-VB13 cannot be used with SZ-VU32N.

Power cable

	Type	Length	Model	Weight
	Standard	5 m 16.40'	**SZ-VP5**	Approx. 400 g
		10 m 32.81'	**SZ-VP10**	Approx. 800 g
		20 m 65.62'	**SZ-VP20**	Approx. 1500 g
		30 m 98.43'	**SZ-VP30**	Approx. 2200 g
	Power Cable When Using PROFIsafe	10 m 32.81'	**SZ-VP10PW**	Approx. 650 g
	M12 Quick Disconnect	0.3 m 0.98'	**SZ-VPC03**[*3]	Approx. 80 g

*3 SZ-VPC03 is equipped with only 4 pins: 24 V, 0 V, OSSD1, OSSD2.

Extension cable (for use with SZ-VPC03)

	Type	Length	Model	Weight
	Power Cable Extension (M12)	10 m 32.81'	**SZ-VCC10**	Approx. 750 g

Connection cable

	Length	Model	Weight
	0.05 m 0.16'	**SZ-VS005**	Approx. 80 g
	5 m 16.40'	**SZ-VS5**	Approx. 350 g
	10 m 32.81'	**SZ-VS10**	Approx. 700 g
	20 m 65.62'	**SZ-VS20**	Approx. 1300 g

Ethernet cable/USB cable

		Length	Model	Weight
	Main unit connection cable	0.3 m 0.98'	**SZ-VNC03**	Approx. 110 g
	Ethernet extension cable (RJ45)	2 m 6.56'	**OP-88086**	Approx. 160 g
		5 m 16.40'	**OP-88087**	Approx. 340 g
		10 m 32.81'	**OP-88088**	Approx. 660 g
	Ethernet extension cable (M12)	2 m 6.56'	**OP-88089**	Approx. 160 g
		5 m 16.40'	**OP-88090**	Approx. 340 g
		10 m 32.81'	**OP-88091**	Approx. 660 g
		20 m 65.62'	**OP-88092**	Approx. 1280 g
	USB cable	2 m 6.56'	**OP-51580**	Approx. 70 g
		5 m 16.40'	**OP-86941**	Approx. 200 g

Specifications

Model Name				SZ-V04(X)	SZ-V32(X)	SZ-V32N(X)
Type				Multi-function Type	Multi-bank Type	Network Type
Detection capability	Minimum detectable object size			Diameter 20, 30, 40, 50, 70, 150 mm 0.79", 1.18", 1.57", 1.97", 2.76", 5.91" (depends on the setting) Reflectance 1.8% min., Speed 1.6 m/s 5.25 ft/s max.*1		
	Detectable angle			190° (-5° to 185°)		
	Response time (ON to OFF)	Standard Mode*2	Scan Cycle A	160 ms (2scans) to 1280 ms (16scans)*3		
			Scan Cycle B	168 ms (2scans) to 1344 ms (16scans)*3		
			Scan Cycle C	176 ms (2scans) to 1408 ms (16scans)*3		
		High Speed Mode*2	Scan Cycle A	80 ms (2scans) to 640 ms (16scans)*3		
			Scan Cycle B	84 ms (2scans) to 672 ms (16scans)*3		
			Scan Cycle C	88 ms (2scans) to 704 ms (16scans)*3		
	Response time (OFF to ON)			Response time (ON to OFF) + 150 ms		
	Protection zone	Minimum detectable object size: 70 / 150 mm 2.76" / 5.91"		8.4 m 27.56' (Standard Mode) 5.7 m 18.70' (High Speed Mode)		
		Minimum detectable object size: 50 mm 1.97"		5.6 m 18.37' (Standard Mode) 3.8 m 12.47' (High Speed Mode)		
		Minimum detectable object size: 40 mm 1.57"		4.3 m 14.11' (Standard Mode) 2.9 m 9.51' (High Speed Mode)		
		Minimum detectable object size: 30 mm 1.18"		2.9 m 9.51' (Standard Mode) 2.0 m 6.56' (High Speed Mode)		
		Minimum detectable object size: 20 mm 0.79"		1.6 m 5.25' (Standard Mode) 1.1 m 3.61' (High Speed Mode)		
	Warning zone	Minimum detectable object size: 70 / 150 mm 2.76" / 5.91"		26 m 85.30' (Standard Mode) 23 m 75.46' (High Speed Mode)*4		
		Minimum detectable object size: 50 mm 1.97"		25 m 82.02' (Standard Mode) 21 m 68.90' (High Speed Mode)*4		
		Minimum detectable object size: 40 mm 1.57"		24 m 78.74' (Standard Mode) 20 m 65.62' (High Speed Mode)*4		
		Minimum detectable object size: 30 mm 1.18"		23 m 75.46' (Standard Mode) 18 m 59.06' (High Speed Mode)*4		
		Minimum detectable object size: 20 mm 0.79"		21 m 68.90' (Standard Mode) 15 m 49.21' (High Speed Mode)*4		
	Additional safety distance			100 mm 3.94"*5		
	Maximum measurement distance			60 m 196.85' *6		
Maximum number of banks				Max. 4 banks	Max. 32 banks	Max. 32 banks
Multiple scanner heads				Max. 3 scanner heads		
Camera monitoring area				Monitor area: over 190° (-5° to 185°)*7		
Display				QVGA 2.2inch color LCD		
Light source	Type, wavelength			Infrared laser diode, 905 nm		
	Laser Class	IEC		Class1 IEC/EN60825-1		
		FDA		Class1 FDA 21CFR 1040.10, 1040.11 (Laser Notice No.50)*8		
		JIS		Class1 JIS C6802		
Rating	Power voltage			24 VDC ±10% (Ripple P-P 10% or less): When using a converter power supply. 24 VDC +20%/-30%: When using a battery		
	Power consumption			11.8 W (without load), 55.0 W (with load)*9	11.8 W (without load), 55.0 W (with load)*9	13.4 W (without load), 50.8 W (with load)*9
Control output (OSSD)	Output			Transistor outputs (NPN or PNP is selected in the software)		
	Number of outputs			4 outputs	2 outputs	2 outputs
	Max. load current			500 mA*10		
	Residual voltage (during ON)			Max. 2.5 V (with a cable length of 5 m 16.40')		
	OFF-state voltage			Max. 2.0 V (with a cable length of 5 m 16.40')		
	Leakage current			Max. 1 mA*11		
	Max. capacitive load			2.2 µF (with a load resistance of 100 Ω)		
	Load wiring resistance			Max. 2.5 Ω		
Inputs	PNP			ON-voltage: 10 to 30 V, OFF-voltage: Open or 0 to 3 V, Short-circuit current: Approx. 2.5 mA (Approx. 10 mA for EDM)		
	NPN			ON-voltage: 0 to 3 V, OFF-voltage: Open or 10 V to Power voltage, Short-circuit current: Approx. 2.5 mA (Approx. 10 mA for EDM)		
Non-safety related output (AUX output)	Output type			Transistor outputs (NPN or PNP is selected by the dedicated PC software)		
	Number of outputs			6 outputs	4 outputs	4 outputs
	Max. load current			Max. 50 mA		
	Residual voltage (during ON)			Max. 2.5 V (with a cable length of 5 m 16.40')		
	Muting lamp			Incandescent lamp (24 VDC, 1 to 5.5 W) or LED lamp (load current: 10 to 230 mA) can be connected	—	Incandescent lamp (24 VDC, 1 to 5.5 W) or LED lamp (load current: 10 to 230 mA) can be connected
Interface	USB			USB2.0		
	Ethernet	Standard		—	—	IEEE802.3u (100 BASE-TX)
		Transmission rate		—	—	100 Mbps
		Cable		—	—	STP(Shielded Twisted Pair) cable or UTP(Unshielded Twisted Pair) cable. Category5 or higher.
		Connector		—	—	RJ45 (IP65) 2 ports
Network function				—	—	PROFIsafe, PROFINET, EtherNet/IP™ UDP
Environmental resistance	Enclosure rating			IP65(IEC60529)		
	Operating ambient temperature			-10 to +50°C 14 to 122°F (No freezing)		
	Storage ambient temperature			-25 to +60°C -13 to 140°F (No freezing)		
	Operating relative humidity			35% to 85% RH (No condensation)		
	Storage relative humidity			35% to 95% RH		
	Surrounding light			Incandescent lamp: 1500 lux or less*12		
	Vibration			10 to 55 Hz, 0.7 mm 0.03" compound amplitude, 20 sweeps each in X, Y, and Z directions		
	Shock			100 m/s^2 (Approx. 10 G) 16 ms pulse, in X, Y, Z directions 1000 times each axis		
Material	Scanner head	Main unit case		Magnesium		
		Window		Polycarbonate, PEI		
		Indicator part		Aluminum, PES		
	Display unit	Case		Magnesium, PPS, Polycarbonate		
	System memory	Case		Aluminum, PPE		
Cable length	Power and I/O cable			30 m 98.43' or less *13		
	Between scanner head and display unit			20 m 65.62' or less each *14		
	Ethernet cable			—	—	100 m 328.08' or less*15
Approved standards	EMC	EMS		IEC61496-1, EN61496-1, UL61496-1 (Type 3 ESPE)		
		EMI		EN55011 ClassA, FCC Part15B ClassA, ICES-003 ClassA		
	Safety			IEC61496-1, EN61496-1, UL61496-1 (Type 3 ESPE), IEC61496-3, EN61496-3 (Type 3 AOPDDR), IEC61508, EN61508, IEC62061, EN62061 (SIL2 / SILCL2), EN ISO13849-1, 2015 (PLd, Category3), IEC61784-3-3, UL508, UL1998, CSA C22.2 No.14, CSA C22.2 No.0.8		

*1 If the object to be detected moves perpendicular to the detection plane, SZ-V cannot detect the object moving at speed over 1.6 m/s 5.25 ft/s, regardless of the encoder setting. *2 The response time, protection zone, and warning zone are affected by the operation mode. *3 When PROFIsafe is used with the SZ-V32N, 6 ms is added to the response time. *4 20% or more reflectance is necessary for the minimum detectable object in the warning zone. *5 If there is a highly reflective background within 1.5 m 4.92' from the boundary of the protection zone, 200 mm 7.87" must be added as supplementary necessary distance to the protection zone when calculating the minimum safety distance. *6 Even when using the network data output, the maximum measured output distance is 60 m 196.85'. *7 Only applicable for the type with a camera. *8 The laser classification for FDA (CDRH) is implemented based on IEC60825-1 in accordance with the requirements of Laser Notice No.50. *9 When using the SZ-V with series connected sensor heads, it is necessary to add 9.4 W per scanner head. Also, power consumption may temporarily be higher (maximum 3.6 W). Power consumption will be within the specification after SZ-V moves to normal operation. *10 For the SZ-V04 type and the SZ-V32 type, the load current calculation of the OSSD output and AUX output is 1.5 A or less when using one scanner head, 1.0 A or less when using two scanner heads, and 0.5 A or less when using three scanner heads. For the SZ-V32N type, the load current calculation of the OSSD output and AUX output is 1.2 A or less when using one scanner head, 0.8 A or less when using two scanner heads, and 0.3 A or less when using three scanner heads. *11 Includes when the power is OFF. *12 An ambient light source should not be located within ±5° of the detection plane. *13 10 m 32.81' or less when supplying power from a battery. *14 When supplying power from a battery, the length of each connection cable should be 10 m 32.81' or less when using two scanner heads, and 5 m 16.40' or less when using three scanner heads. *15 Distance between SZ-V and Ethernet switch

Model		SZ-V04 (X)	SZ-V32 (X)	SZ-V32N (X)	
					
Type		Multi-function	Multi-bank	Network	
				Not using PROFIsafe	Using PROFIsafe
Detection capability	Protection zone	✓ 2 zones	✓ 1 zone	✓ 1 zone	✓ 2 zones
	Warning zone	✓ 2 zones	✓ 2 zones	✓ 2 zones	✓ 2 zones
	Minimum detectable object size	Diameter 20, 30, 40, 50, 70, 150 mm 0.79", 1.18", 1.57", 1.97", 2.76", 5.91"			
Camera		✓*1	✓*1	✓*1	✓*1
Interlock function		✓	✓	✓	✓*3
EDM function		✓	✓	✓	—
Bank function	Maximum number of banks	4	32	32	16
	Switching through wiring inputs	✓	✓	✓	—
	Switching through encoder inputs	—	✓	✓	—
	Monitoring multiple banks via network	—	—	—	✓
Multi-OSSD function		✓	—	—	✓
Muting function		✓	—	✓	—
Reference points monitoring function		✓	✓	✓	✓
Number of AUX outputs		✓ 6 outputs	✓ 4 outputs*2	✓ 4 outputs*2	—*3
State information output		✓	✓	✓	—*3
Detection history		✓	✓	✓	✓
Ethernet Communication		—	—	✓	✓
Cascading scanner heads		Max. 3 units			

*1 Only when using a scanner head with a camera.

*2 The number of usable AUX outputs varies depending on the settings.

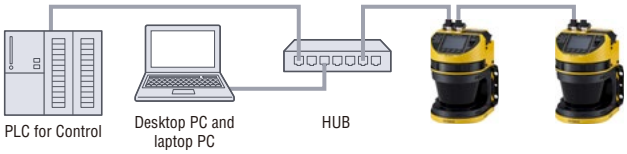
*3 When using PROFIsafe, all physical I/O wires will be deactivated. Corresponding information can be read/written over PROFIsafe/PROFINET communication.

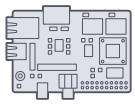
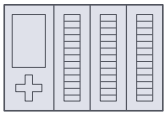
Reference: Depending on the settings, some functions cannot be used simultaneously. For details, refer to the SZ-V Series user's manual.

Ethernet communication details

Ethernet communication

SZ-V32N(X)/U32N can exchange data with a PC or PLC via Ethernet cable.
Depending on the device to be connected, multiple communication options are available.



Functions available via communication	Communication to SZ-V Configurator	UDP Command*1	EtherNet/IP™, PROFINET*1*4	PROFIsafe*4
Configure SZ-V protection zones	✓	—	—	—
Configure SZ-V functions	✓	—	—	—
Check detection status with monitor view	✓	—	—	—
Read distance measurement data	—	✓	▲	▲*3
Read error status of SZ-V	✓	✓	✓	✓*3
Read error history of SZ-V	✓	—	—	—
Check configuration code (CRC)	✓	✓	✓	✓*3
Monitor camera image of SZ-V	✓*2	—	—	—
Use OSSD status for safety related controls	—	—	—	✓
Monitor multiple banks	—	—	—	✓
Send interlock reset signal to SZ-V	—	—	—	✓
Typical devices to be connected	 Desktop PC and laptop PC	 Original program on board computers	 PLC or industry PC	 Safety PLC
Application examples	Monitor remote SZ-V	AGV control using measurement data	Show scanner status on HMI	Safety related control

✓ Possible ▲ Possible with limitations — Impossible or not realistic

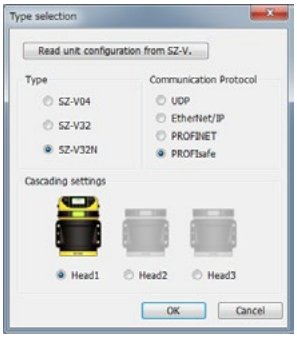
*1 Information read through UDP Command Communication, EtherNet/IP™ Communication, and PROFINET communication cannot be used for safety related part of the control system.

*2 Only when using a scanner head with a camera.

*3 Can be read by PROFINET communication. PROFINET communication can be used simultaneously with PROFIsafe communication.

*4 Only available with version 2 or later of Network Type models.

Communication functions that can be used simultaneously



When using network communication, it is necessary to select one of the following communication protocols.
The relation between a selected communication protocol and the communication functions that can be used is shown in the following table.

Selected communication protocol	Communication functions that can be used at the same time				
	Communication to SZ-V Configurator	UDP Command	EtherNet/IP™	PROFINET	PROFIsafe
UDP	✓	✓	—	—	—
EtherNet/IP™	✓	✓	✓	—	—
PROFINET	✓	✓	—	✓	—
PROFIsafe	✓	✓	—	✓	✓

Network specifications

Ethernet General Specifications

Standard	IEEE 802.3u (100BASE-TX)
Transmission rate	100 Mbps
Cable	Category5 or higher STP (Shielded Twisted Pair) or UTP (Unshielded Twisted Pair) cable
Connector	RJ45 (IP65 connector) 2 ports

EtherNet/IP™ Specifications

Compatible functions	Cyclic communication
	Compatible with UCMM and Class 3 messaging (Explicit messaging)
Number of connections	16
RPI (Transmission cycle)	5 to 10000 ms (0.5 ms unit)
Tolerable communication bandwidth for cyclic	3000 pps
Conformance Test	Conform to CT12

PROFINET Specifications

Compatible Network		PROFINET IO Communication
Basic Specifications	Compatible functions	Cyclic communication (Data I/O Communication)
		Acyclic communication (Record I/O Communication)
	Conformance Class	Conformance Class B
	GSDML version	Version 2.32
	Conformance Test Version	Based on version 2.33
	MRP	Available as client
	Applicable Protocols	LLDP, SNMP, MRP, DCP
	Netload	Class 3
Cyclic Specification	Update time	1 to 512 ms

PROFIsafe Specification

PROFIsafe Version	V2

Data available with PROFIsafe communication

INPUT (from SZ-V to Safety PLC)

Byte offset	Details	bit	Description
0	Zone Detection State / SZ-V Status	0	Protection Zone A State (OSSD 1/2)
		1	Protection Zone B State (OSSD 3/4)
		2	Warning Zone A State
		3	Warning Zone B State
		4	Interlock-Reset-Ready A
		5	Interlock-Reset-Ready B
		6	Normal Operation State
		7	Error State
1	SZ-V Status	0	Bank Number (A)
		1	Bank Number (B)
		2	Bank Number (C)
		3	Bank Number (D)
		4	Bank Number valid
		5	Laser off state
		6	Reserved
		7	Reserved
2	Window Pollution Information / Head1 State	0	Head1 Window Pollution State
		1	Head2 Window Pollution State
		2	Head3 Window Pollution State
		3	Reserved
		4	Head1 Protection Zone A State
		5	Head1 Protection Zone B State
		6	Head1 Warning Zone A State
		7	Head1 Warning Zone B State
3	Head2 State / Head3 State	0	Head2 Protection Zone A State
		1	Head2 Protection Zone B State
		2	Head2 Warning Zone A State
		3	Head2 Warning Zone B State
		4	Head3 Protection Zone A State
		5	Head3 Protection Zone B State
		6	Head3 Warning Zone A State
		7	Head3 Warning Zone B State
4	Protection Zone A State for each Bank	0	Protection Zone A State for Bank0
		…	…
		15	Protection Zone A State for Bank15
6	Protection Zone B State for each Bank	0	Protection Zone A State for Bank0
		…	…
		15	Protection Zone A State for Bank15
8	Warning Zone A State for each Bank	0	Warning Zone A State for Bank0
		…	…
		15	Warning Zone A State for Bank15
10	Warning Zone B State for each Bank	0	Warning Zone B State for Bank0
		…	…
		15	Warning Zone B State for Bank15

OUTPUT (from Safety PLC to SZ-V)

Byte offset	Details	bit	Description
0	Output	0	Reset A
		1	Reset B
		2	Reserved
		3	Reserved
		4	Reserved
		5	Laser OFF
		6	Reserved
		7	Return to Normal Operation
1	Bank Number	0	Bank Number
		1	
		2	
		3	
		4	Bank Number (reverse) For each bit, specify opposite value of bit 0-3
		5	
		6	
		7	
2	Reserved	0	Reserved
		…	…
		15	Reserved
…		…	…
10		0	Reserved
		…	…
		15	Reserved

* Protection Zone States on Byte offset 4 to 10 may be easily affected by mutual interference or other environmental factors, compared to states in Zone Detection Status (Byte offset 0)

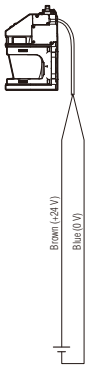
DANGER Please do not use information other than Protection Zone States for control related to safety.

PROFIsafe / PROFINET diagnostics

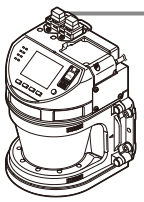
SZ-V is compatible with PROFINET Diagnostics function. The following information can be sent to a safety PLC as PROFINET Diagnostic alert information.

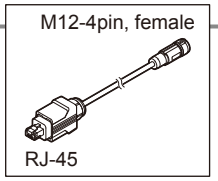
Alert notification item	PROFINET	PROFIsafe
PROFIsafe Parameter Error	—	✓
PROFIsafe Transmission Error	—	✓
Window pollution Alert	✓	✓
Window pollution Error	✓	✓
MI Error	✓	✓
Bank Input Error	✓	✓
Bank Sequence Error	✓	✓
Configuration Error	✓	✓
System Error	✓	✓
AUX Error	✓	—
EDM Error	✓	—
Encoder Error	✓	—
OSSD Error	✓	—
Other Error	✓	✓
Other Alert	✓	✓

Wiring and cables for PROFIsafe

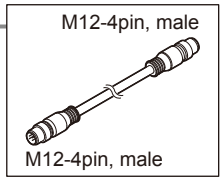


* When PROFIsafe communication is used, all physical I/O wires (OSSDs, EDM, Reset, AUX, etc.) will be deactivated.
* For Ethernet cable selection, please refer to the selection guide on p.16 as well as the figure below.

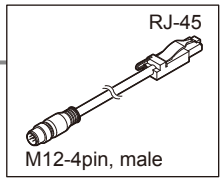




0.3 m 0.98': SZ-VNC03



2 m 6.56': OP-88089
5 m 16.40': OP-88090
10 m 32.81': OP-88091
20 m 65.62': OP-88092



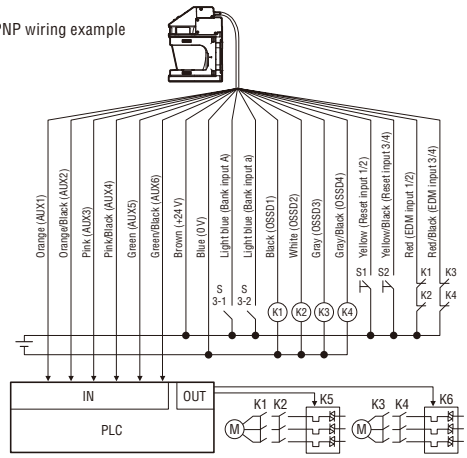
2 m 6.56': OP-88086
5 m 16.40': OP-88087
10 m 32.81': OP-88088

Examples of wiring

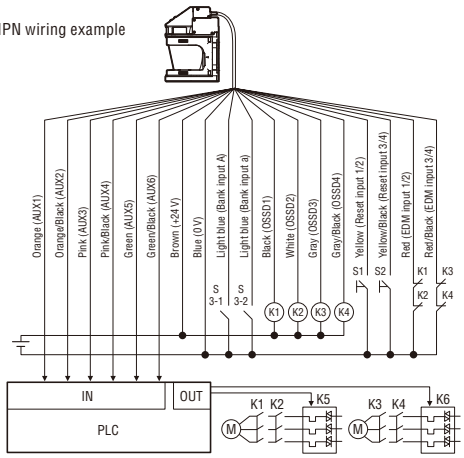
SZ-V04 Type

OSSD3/4: Multi-OSSD
Bank switching: Used
Muting: Not used (usage not possible)
Interlock: Used
EDM: Used

PNP wiring example



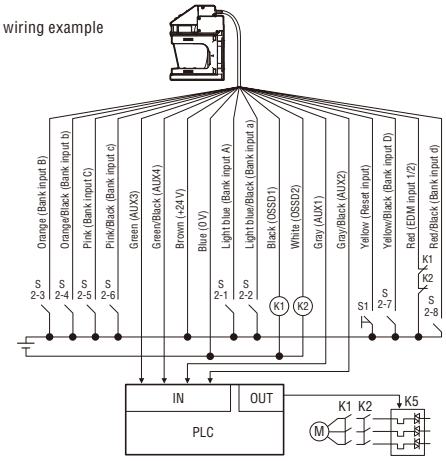
NPN wiring example



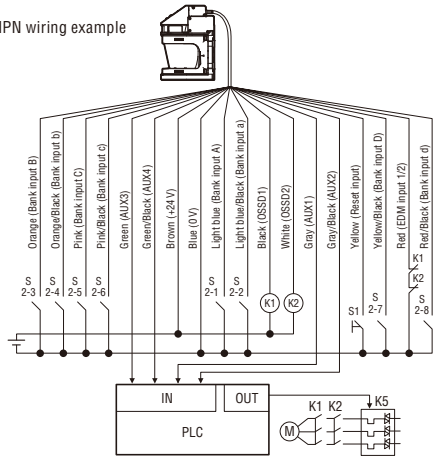
SZ-V32 Type

Bank switching: Used
Bank switching method: Single or binary
No. of banks: Used
Single: 8 or less, Binary: 16 or less
Interlock: Used
EDM: Used

PNP wiring example



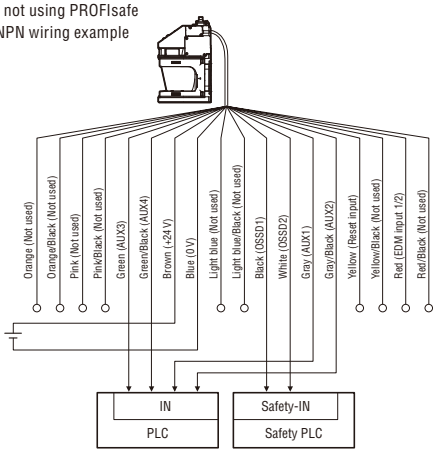
NPN wiring example



SZ-V32N Type

Bank switching: Not used
Muting: Not used
Interlock: Not used
EDM: Not used

When not using PROFIsafe
PNP/NPN wiring example

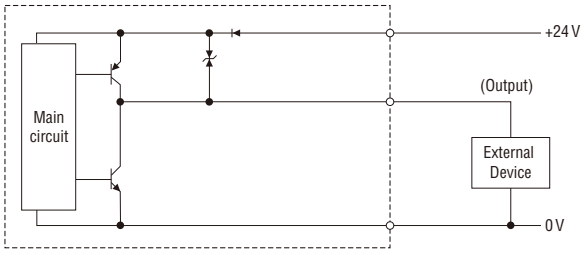


Symbols

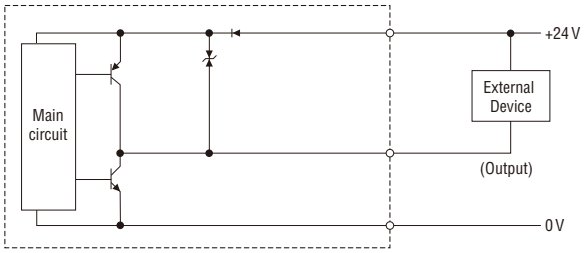
K1, K2, K3, K4: External device
(Safety relay, magnet contactor, etc.)
K5, K6: Solid state contactorS1: Switch for resetting OSSD1/2 (N.O.)
S2: Switch for resetting OSSD3/4 (N.O.)
PLC: Used for monitoring, not for control systems related to safety.
Safety PLC: Control systems related to safety.
S2-1, S2-2, S2-3, S2-4, S2-5, S2-6, S2-7, S2-8: Switch for bank switching.
M: 3-phase motor

OSSD output circuit (Safety output)

PNP output

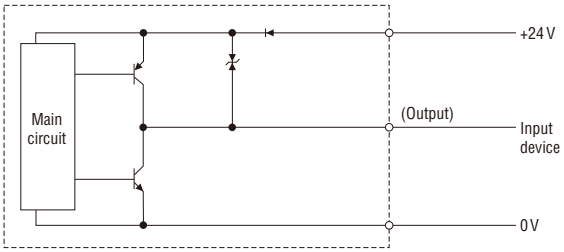


NPN output



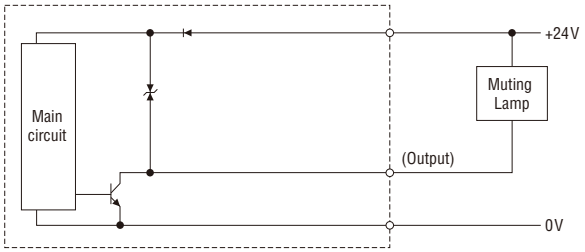
AUX output circuit

Common for both PNP and NPN output



Muting lamp output circuit

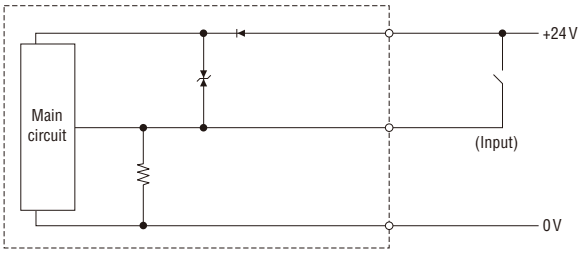
NPN output*



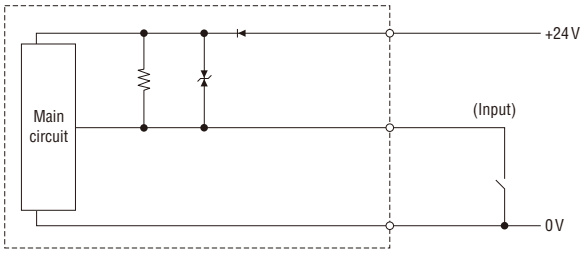
*Muting lamp output will always be an NPN output regardless of what input and output polarity is selected.

Input circuit

PNP input



NPN input

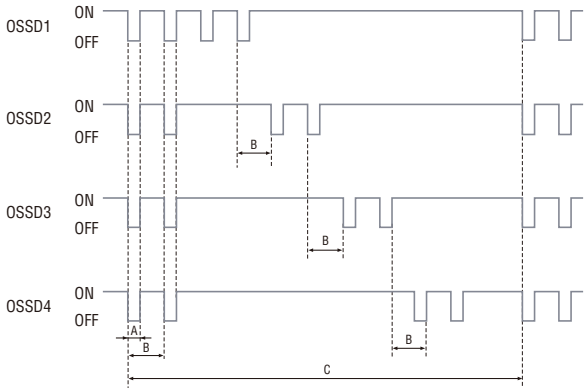


OSSD output

The OSSD is a safety output for the safety-related part of a machine control system. When the SZ-V detects an object (someone or something) in the protection zone, the OSSD goes to the OFF-state.
OSSD 1/2 is a pair of safety outputs that are redundant. Similarly, OSSD 3/4 is also a pair of safety outputs that are redundant.
The SZ-V generates self-diagnosis signals on its internal control circuit to perform diagnostics on the OSSD. These signals periodically force the OSSD into a temporary OFF-state when the OSSD is in the ON-state (when the SZ-V detects no objects in the protection zone.).
The internal control circuit receives a feed-back signal (OFF-signal) based on the self-diagnosis, the SZ-V determines that its OSSD is operating normally. If the OFF-signal is not returned to the internal control circuit, the SZ-V determines that there is a problem with the OSSD or wiring and goes to an error state.

Note:
The devices connected to the OSSD, such as safety relay or contactors, should not respond to these temporary, self-diagnostic OFF-signals.

Self-diagnosis pulse

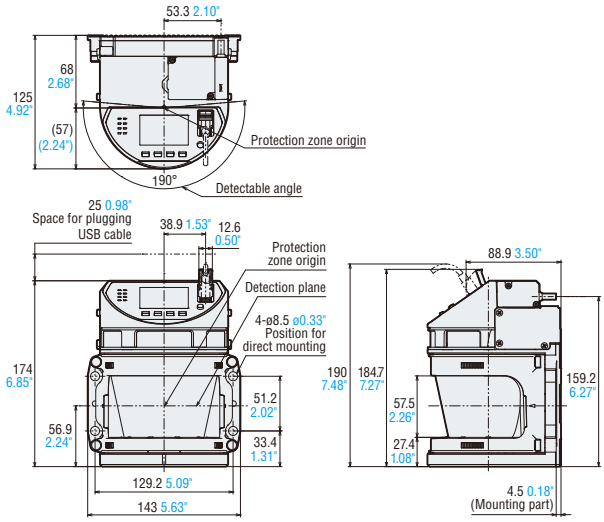


A: 50 µs (If a capacitive load is connected, max. 250 µs can apply.)
B: Approximately 60 ms
C: Approximately 920 ms

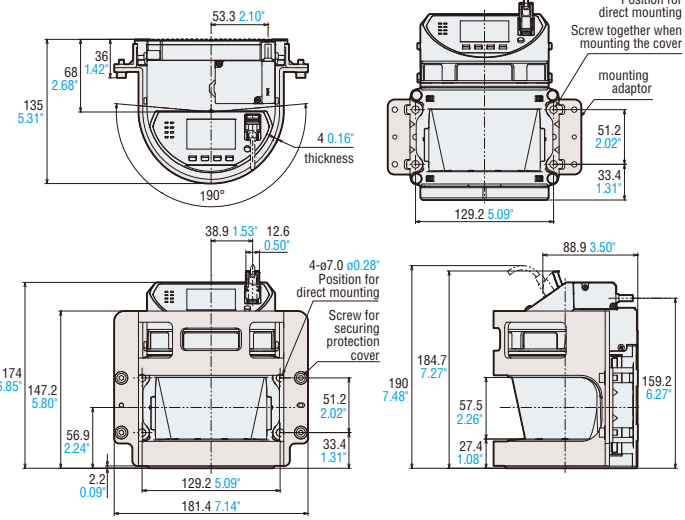
Dimensions

Unit: mm inch

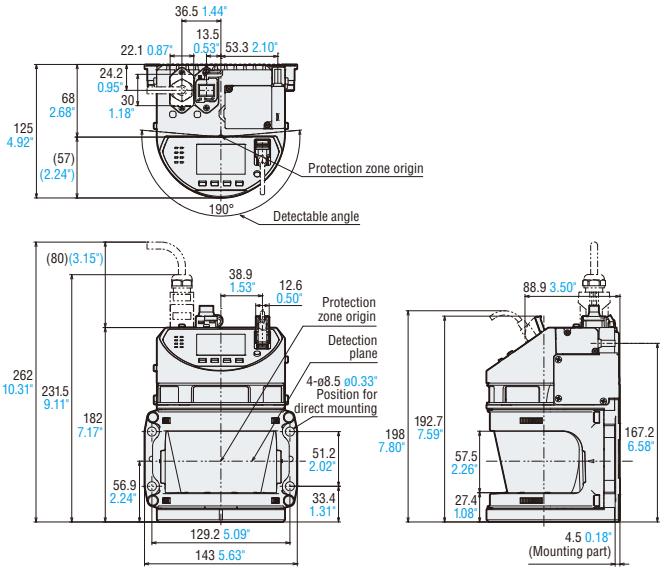
SZ-V04(X) / V32(X)



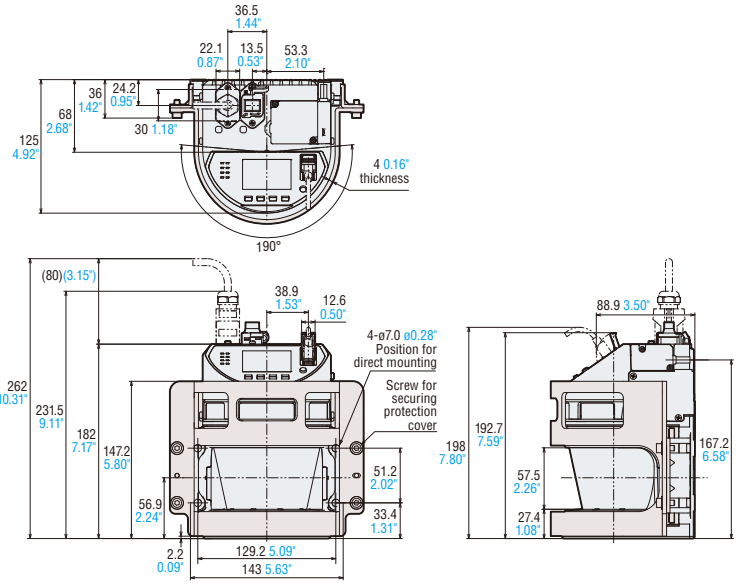
SZ-V04(X) / V32(X) + SZ-VB21



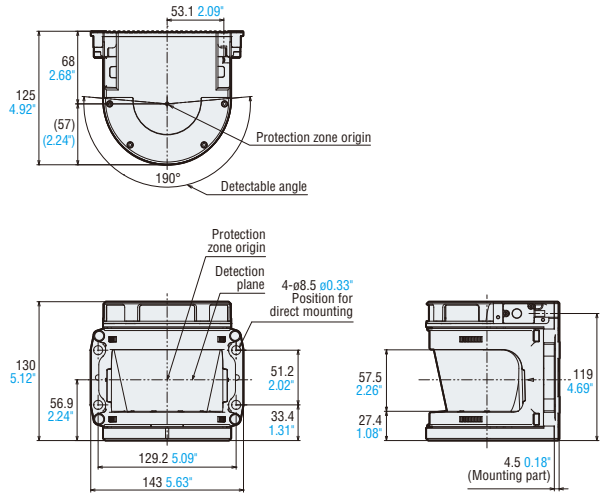
SZ-V32N(X)



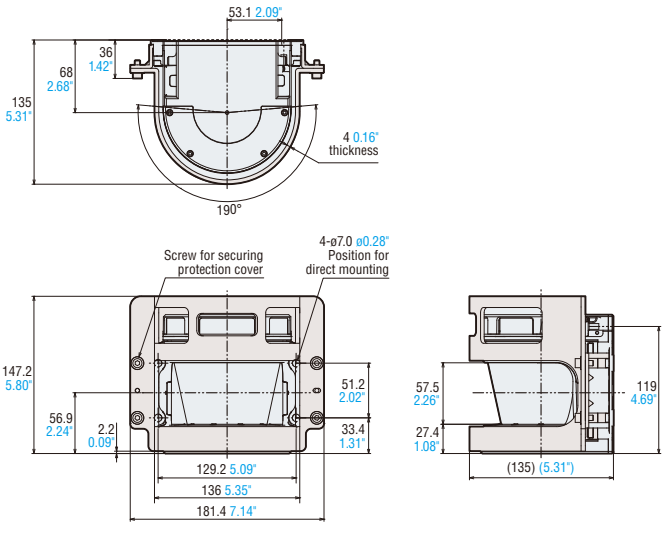
SZ-V32N(X) + SZ-VB21



SZ-VH1(X)

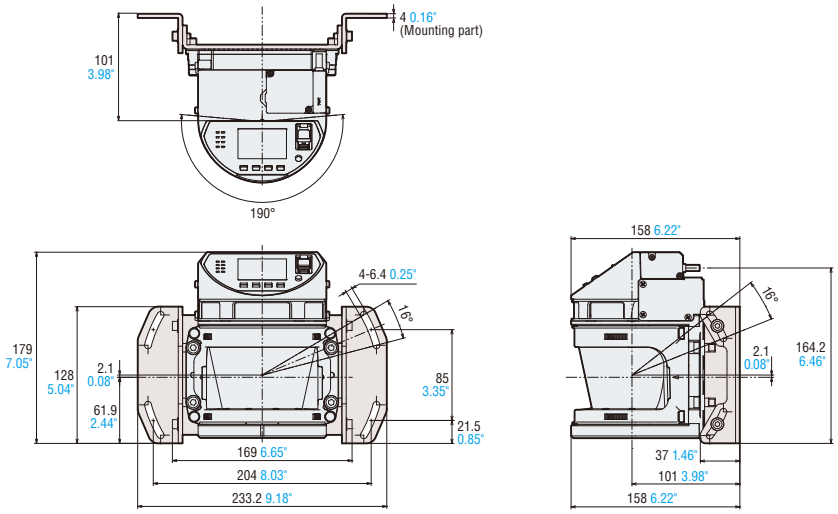


SZ-VH1(X) + SZ-VB21

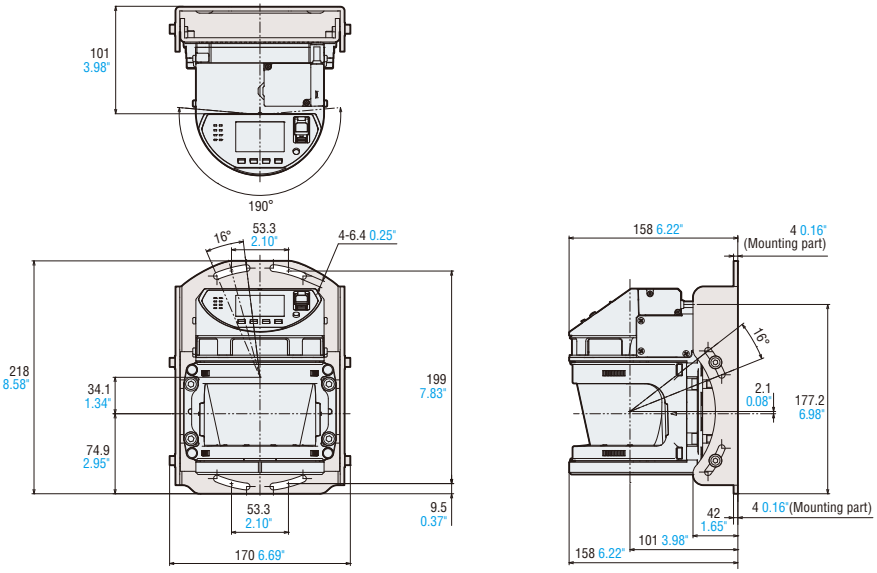


Dimensions

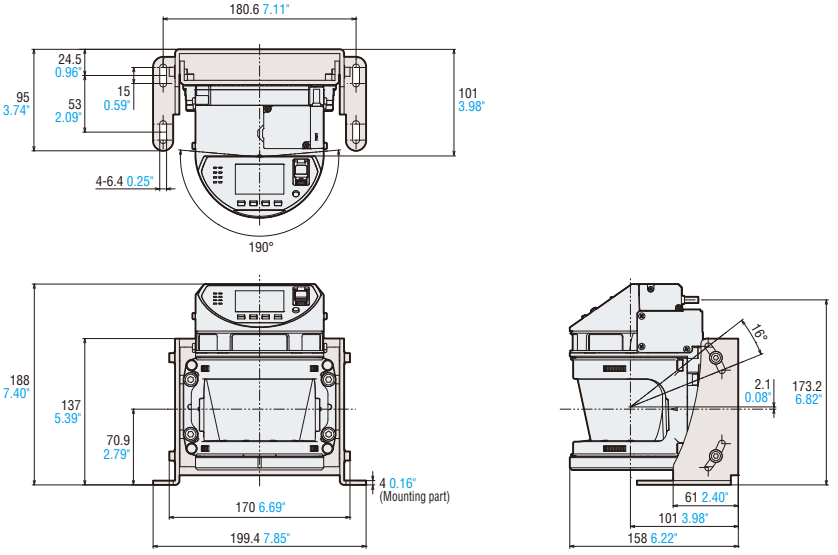
SZ-VB01 + SZ-V04(X) / V32(X)



SZ-VB02 + SZ-V04(X) / V32(X)

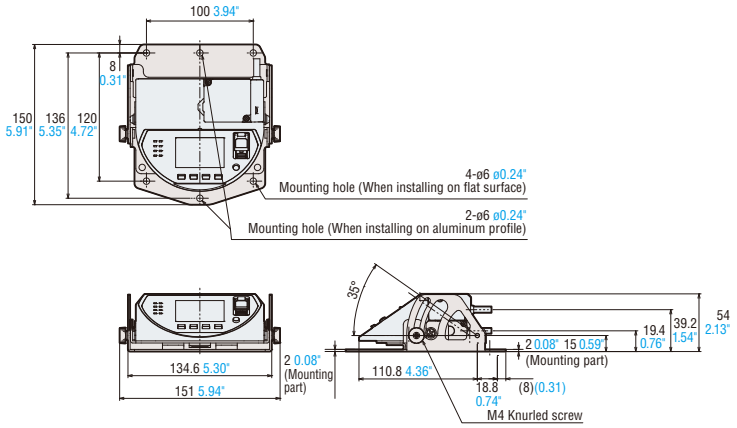


SZ-VB03 + SZ-V04(X) / V32(X)



SZ-VB11 + SZ-VU04 / VU32

Horizontal installation



Vertical installation

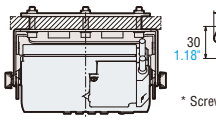
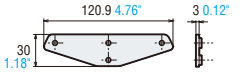
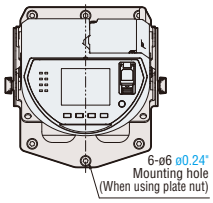
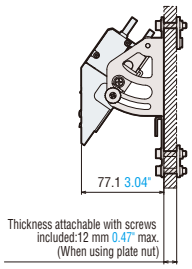


Plate nut (2 pieces included with SZ-VB11)



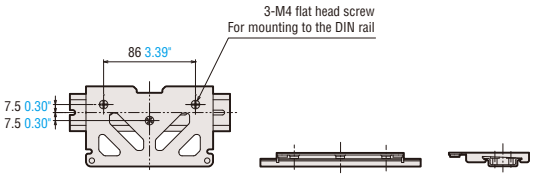
* Screw included: M5 × L25 0.98", 6 pieces



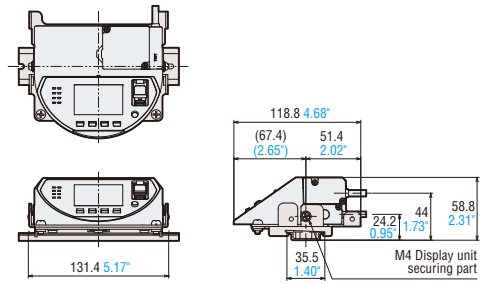


SZ-VB12 + SZ-VU04 / VU32

When installing DIN attachment

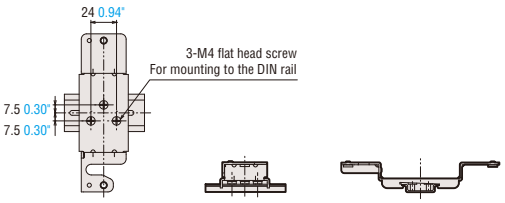


When installing display unit

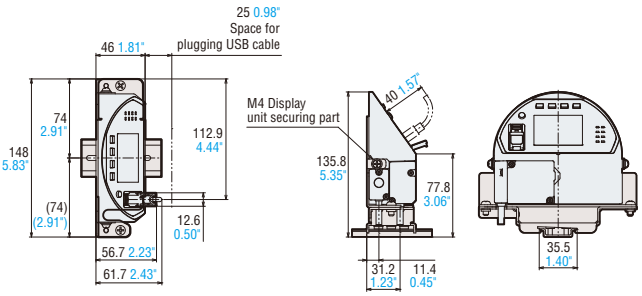


SZ-VB13 + SZ-VU04 / VU32

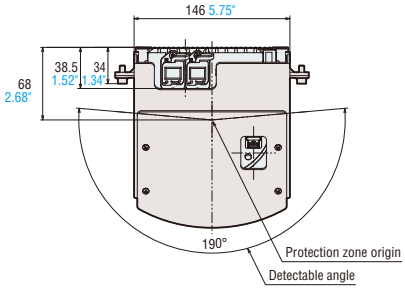
When installing DIN attachment

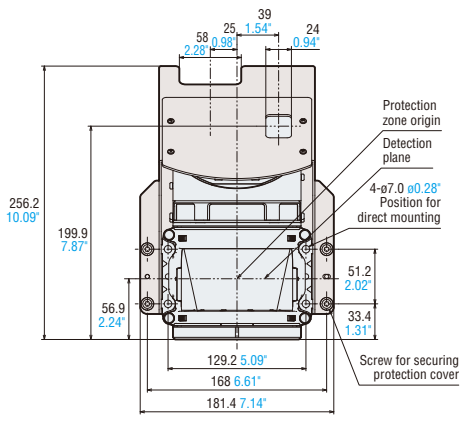


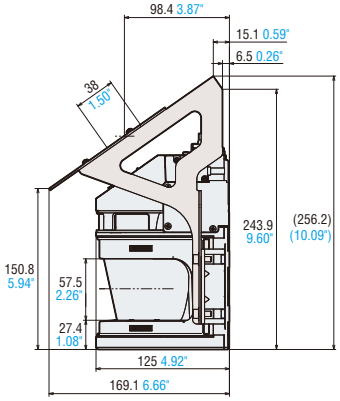
When installing display unit



SZ-V32N(X) + SZ-VB22



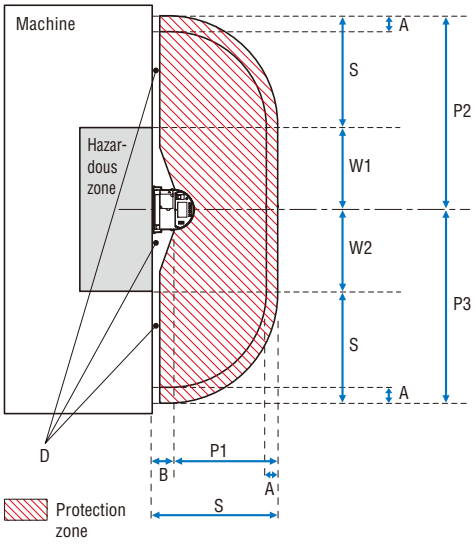




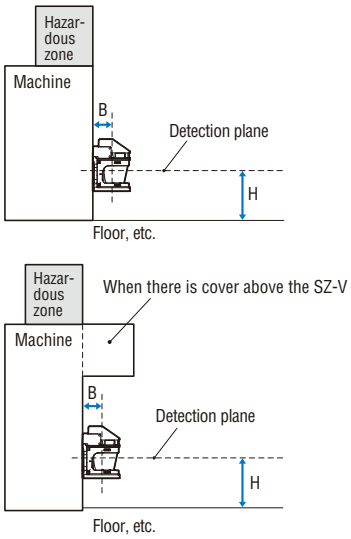
CAD DATA DOWNLOAD
www.keyence.com/sz-v_cad

Example of area protection (Direction of approach parallel to the protection zone)

Top view of the machine



Side view of the machine



Ds = K × T + Dpf + A [ANSI B11.19]

Ds: Safety distance

K: The maximum speed that an individual can approach the hazard

T: The total time that it takes for the hazardous motion to stop, or for the hazardous portion of the machine cycle to be completed. This value varies depending on machine type and/or the safeguarding device applied.

Dpf: Additional distance for horizontal sensing field applications without vertical sensing: 1200 mm / 48".

A: Additional safety distance (mm)

P1, P2, P3: Protection distances to be configured as the protection zones
W1, W2: Width of the hazardous area
B: Distance between the edge of the hazardous area and protection zone origin on the SZ-V
D: Unprotected space

Example of safety distance calculation

K = 1600 mm/s 62.99 inch/s

T = t1 + t2 = 0.82 s Overall response time

t1 = 0.32 s SZ-V response time (Changeable)

t2 = 0.5 s Max. time required to stop the machine after receiving the OSSD signal from SZ-V*

Dpf = 1200 mm / 48"

A = 100 mm 3.94" Additional safety distance of SZ-V

B = 68 mm 2.68" Distance between the edge of the hazardous area and protection zone origin on the SZ-V

W1 = W2 = 1000 mm 39.37" Width of the hazardous area

* When using PROFIsafe, please add communication and processing time required for the stop signal to reach the machine after SZ-V protection zone state turns OFF.

Safety Distances

S = K × T + Dpf + A = 1600 × 0.82 +1200 + 100 = 2612 mm

Protection distances to be configured as the protection zones

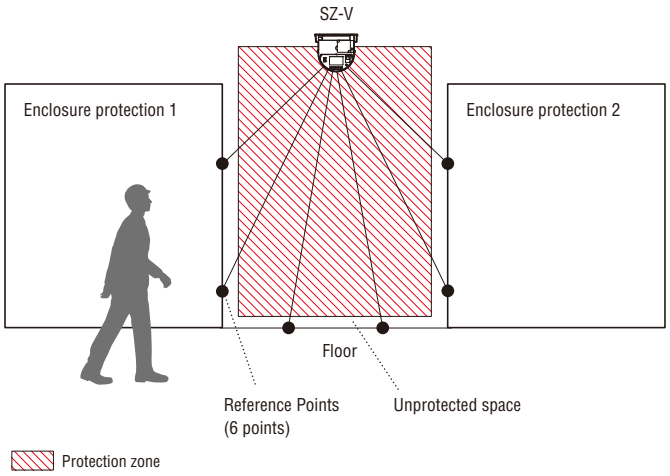
P1 = S - B = 2544 mm 100.16"
P2 = S + W1 = 3612 mm 142.20"
P3 = S + W2 = 3612 mm 142.20"

DANGER

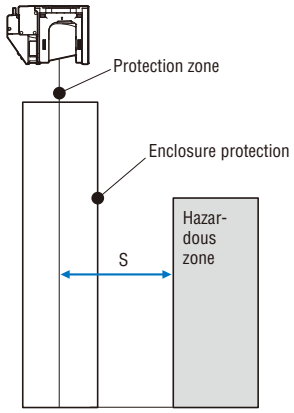
- The unprotected space (D) between the protection zone and the protective structure must be less than the minimum detectable object size when the SZ-V is installed, in order to prevent the machine operators from approaching into the hazardous area through this space (D). Additional countermeasures for protection must be provided if there is a space (D) between the protection zone and the protective structure that the minimum detectable object is not detected by the SZ-V.
- There is a risk of inadvertent undetected access beneath the detection plane (protection zone), if the height "H" of detection plane (protection zone) is greater than 300 mm 11.81" (200 mm 7.87" for non-industrial application, for example in the presence of children). The responsible personnel must perform the risk assessment with taking into account this factor in case of installation of the SZ-V. If necessary, the additional countermeasure must be taken by the responsible personnel.
- In the protection zone setting, you cannot select the object size of 150 mm 5.91" when "H" (Height of detection plane) is 1000 mm 39.37" or less. You must select the object size of 70 mm 2.76" or smaller if you want to use SZ-V for area protection (direction of approach is parallel to the protection zone.)
- If there is a highly reflective background within 1.5 m 4.92' from the boundary of the protection zone, another 200 mm 7.87" must be added as supplementary necessary distance to the P1, P2 and P3 respectively.
- We recommend you should have a marking on the floor for indicating the specified protection zone.

Example of access protection (Direction of approach normal to the protection zone)

Front view of the machine



Side view of the machine



S = K × T + C [ISO13855 and IEC61496-3]

S: Minimum safety distance (mm)

K: Approach speed of the body or parts of the body (mm/s)

T: Overall Response time (t1 + t2) (s)

t1: SZ-V response time (s)

t2: Max. time required to stop the machine after receiving the OSSD signal from SZ-V (s)*

C: Additional distance, taking into accounts the intrusion prior to actuation of protective equipment (mm).

* When using PROFIsafe, please add communication and processing time required for the stop signal to reach the machine after SZ-V protection zone state turns OFF.

Example of safety distance calculation

K = 1600 mm/s 62.99 inch/s Approach speed of the body or parts of the body

T = t1 + t2 = 0.58 s Overall response time

t1 = 0.08 s SZ-V response time (Changeable)

t2 = 0.5 s Max. time required to stop the machine after receiving the OSSD signal from SZ-V

C = 850 mm 33.46" (Constant)

d = 70 mm 2.76" Minimum detectable object size (Changeable)

Safety Distance

S = K × T + C = 1600 × 0.58 + 850 = 1778 mm
62.99" 33.46" 70.00"

DANGER

- Reference points monitoring function must be applied when the SZ-V is used for the access protection specified in IEC61496-3: 2008 Annex A.12 and A.13 (the application where the angle of the approach exceeds ±30° to the detection plane). In this case, the tolerance for reference points must be ±100 mm 3.94" or less and the response time must be 90 ms or less.
- The unprotected space between the protection zone and the protective structure must be less than the minimum detectable object size when the SZ-V is installed, in order to prevent the machine operators from approaching into the hazardous area through this space. Additional countermeasures for protection must be provided if there is a space between the protection zone and the protective structure that the minimum detectable object is not detected by the SZ-V.
- According to GB 19436.3-2008, "if the maximum distance between the AOPDDR and the reference boundary is greater than 4.0 m 13.12', displacement of the detection zone greater than 100 mm 3.94" shall be detected." In order to comply with this requirement for SZ-V, this may be achieved by limiting the width of the objects of the reference point to ≤200 mm 7.87". For the case where the maximum protection distance of the protection zone is over 4.0 m 13.12', this limitation must be followed.

Safety laser scanner **SZ Series**

Protection zone **4.2 m** 13.78' Detectable angle **270°**

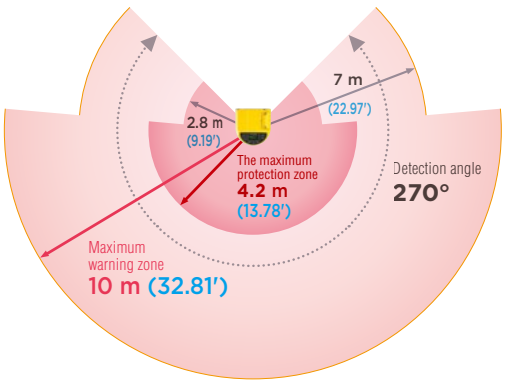
Maximum **48** zones

Compact die-cast body

Small size for flexible mounting

Protection zone 4.2 m 13.78'
Detectable angle 270°

4.2 m 13.78' Protection zone with 270° field of view.
Warning zone up to 10 m 32.81'.



* For dimension of each models, see p. 31.

Product Lineup

Main unit * Cables and brackets not included. Select separately.

Appearance	Type	# of zone sets (# of banks)	Model	Weight
	Simple function type 	1	**SZ-01S**	Approx. 1.6 kg
	Multi-function type 	4	**SZ-04M**	
	Multi-zone sets (banks) type 	16	**SZ-16V**	
	Measurement data output type 	16	**SZ-16D**	

Cables

Appearance	Compatible with	Length	Output	Model	Weight
	**SZ-01S**	5 m 16.4'	PNP	**SZ-P5PS**	Approx. 280 g
			NPN	**SZ-P5NS**	
		10 m 32.81'	PNP	**SZ-P10PS**	Approx. 530 g
			NPN	**SZ-P10NS**	
		20 m 65.62'	PNP	**SZ-P20PS**	Approx. 1040 g
			NPN	**SZ-P20NS**	
		30 m 98.43'	PNP	**SZ-P30PS**	Approx. 1550 g
			NPN	**SZ-P30NS**	
	SZ-04M SZ-16V SZ-16D	5 m 16.4'	PNP	**SZ-P5PM**	Approx. 360 g
			NPN	**SZ-P5NM**	
		10 m 32.81'	PNP	**SZ-P10PM**	Approx. 720 g
			NPN	**SZ-P10NM**	
		20 m 65.62'	PNP	**SZ-P20PM**	Approx. 1400 g
			NPN	**SZ-P20NM**	
		30 m 98.43'	PNP	**SZ-P30PM**	Approx. 2080 g
			NPN	**SZ-P30NM**	
	**SZ-16D**	5 m 16.4'	—	**SZ-C5D**	Approx. 360 g

* Connector colors; PNP:Black, NPN:Gray

Mounting brackets (Optional) Standard mounting brackets

Appearance	Type	Model	Weight
	Horizontal mounting bracket	**OP-86935**	Approx. 250 g
	Vertical mounting bracket	**OP-86936**	Approx. 180 g

Mounting brackets (Optional) Mounting brackets with angle alignment

Appearance	Type	Model	Weight
	Horizontal mounting bracket with angle alignment	**OP-86937**	Approx. 690 g
	Vertical mounting bracket with angle alignment	**OP-86938**	Approx. 850 g
	L-shaped mounting bracket with angle alignment	**OP-86939**	Approx. 960 g

Detection capability specification

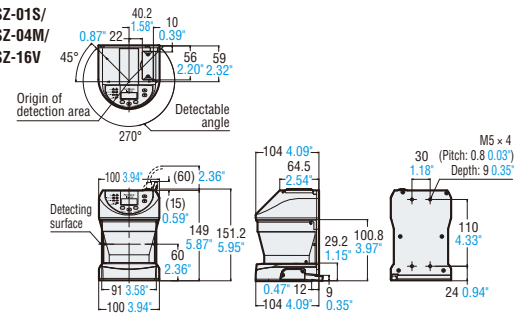
Detection capability	Minimum detectable object size		Diameter 30 mm 1.18"/40 mm 1.57", 50 mm 1.97", 70 mm 2.76", 150 mm 5.91" (depends on the setting) Reflectance 1.8% min., Speed 1.6 m/s 5.25 ft/s max.
	Detectable angle		270° (-45° to 225°)
	Response time (ON to OFF)	General scan cycle (Scan cycle A)	60 ms (2 scans) to 480 ms (16 scans)
		Specific scan cycle (Scan cycle B)	66 ms (2 scans) to 528 ms (16 scans)
	Response time (OFF to ON)	General scan cycle (Scan cycle A)	Response time of ON to OFF + 125 ms
		Specific scan cycle (Scan cycle B)	
	Maximum protection zone	Minimum detectable object size: 70 mm 2.76"/150 mm 5.91"	4.2 m 13.78' (-5° to 185°), 2.8 m 9.19' (-45° to -5°, 185° to 225°)
		Minimum detectable object size: 50 mm 1.97"	3.0 m 9.84' (-5° to 185°), 2.0 m 6.56' (-45° to -5°, 185° to 225°)
		Minimum detectable object size: 40 mm 1.58"	2.4 m 7.87' (-5° to 185°), 1.6 m 5.25' (-45° to -5°, 185° to 225°)
		Minimum detectable object size: 30 mm 1.18"	1.8 m 5.91' (-5° to 185°), 1.2 m 3.94' (-45° to -5°, 185° to 225°)
	Maximum warning zone*1 (non safety related)	Minimum detectable object size: 70 mm 2.76"/150 mm 5.91"	10.0 m 32.81' (-5° to 185°), 7.0 m 22.97' (-45° to -5°, 185° to 225°)
		Minimum detectable object size: 50 mm 1.97"	7.5 m 24.61' (-5° to 185°), 5.0 m 16.4' (-45° to -5°, 185° to 225°)
		Minimum detectable object size: 40 mm 1.57"	6.0 m 19.69' (-5° to 185°), 4.0 m 13.12' (-45° to -5°, 185° to 225°)
		Minimum detectable object size: 30 mm 1.18"	4.5 m 14.76' (-5° to 185°), 3.0 m 9.84' (-45° to -5°, 185° to 225°)
	Additional safety distance		100 mm 3.94" *2

*1 20% or more reflectance is necessary for the minimum detectable object in the warning zone. *2 If there is a high reflective background within 1.5 m 4.92' from the boundary of the protection zone, 200 mm 7.87" must be added as supplementary necessary distance to the protection zone in case

Dimensions

Unit: mm inch

SZ-01S/ SZ-04M/ SZ-16V



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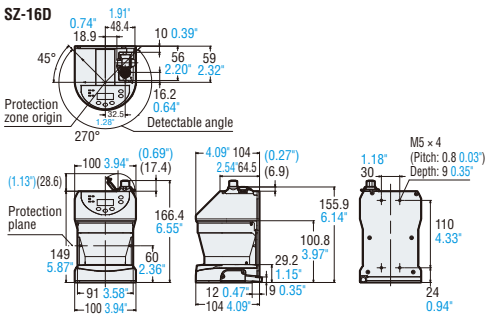
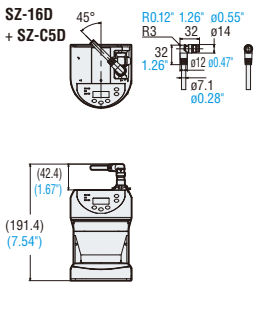


SZ-16D + SZ-C5D



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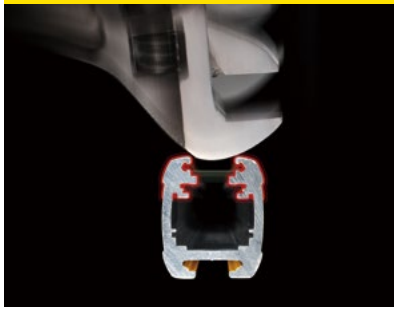
STRONG



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