

KEYENCE

Value
Priced



New Standard! All-Purpose Laser Photoeye



NEW INNOVATIVE
MODELS FEATURING
I-DATUM

Self-contained
CMOS Laser Sensor

**LR-Z
SERIES**

Self-contained
CMOS Laser Sensor

LR-Z SERIES



Introducing a more versatile Laser Sensor

Detection is often difficult with reflective sensors for a variety of reasons, including target colour, material, surface finish, and environment. In order to solve these issues, the stability of a CMOS laser has been combined with the versatility of a self-contained sensor in a heavy duty metal body to create a more stable and user friendly general purpose sensor.

BEST DETECTION ABILITY in its class

CMOS laser and DATUM detection

DURABLE & LONG LIFE

High enclosure rating and Stainless steel body (SUS316L)

SIMPLIFIED OPERATION

One-touch setup and Digital display

**Value
Priced**

BEST DETECTION ABILITY in its class

CMOS laser and DATUM detection

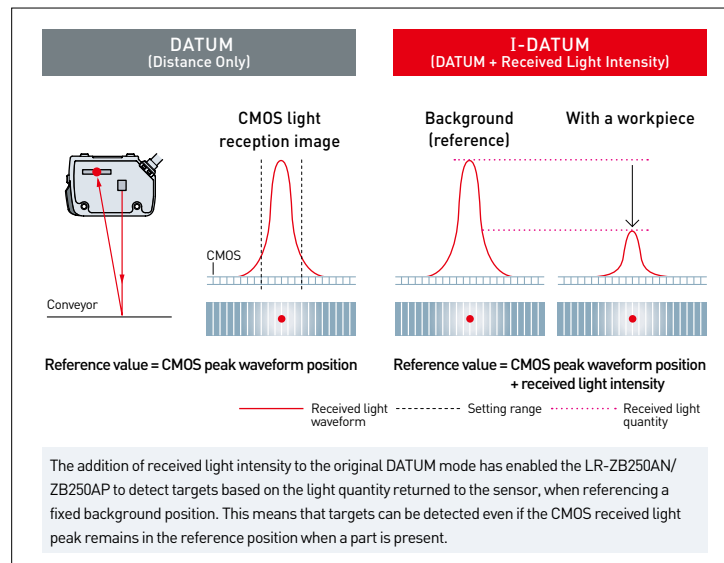


I-DATUM enables an even wider range of uses

$$\text{DATUM} + \text{Received light intensity} = \text{I-DATUM}^*$$

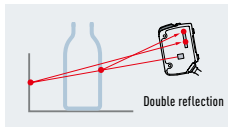
* Only available on the LR-ZB250AN/ZB250AP models.

This innovative feature expands the detection capabilities of the LR-ZB250AN/ZB250AP sensors beyond that of the normal DATUM mode. I-DATUM combines the stability of distance based detection with the sensitivity of received light intensity. By using a stable background as a reference surface, I-DATUM can be used to reliably detect transparent and translucent targets by recognising small changes in the received light quantities returned to the sensor.



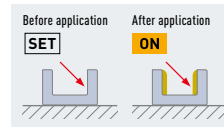
Note: LR-ZB250AN/ZB250AP models contain the same features as all LR-Z models; however these models also feature the innovative I-DATUM function.

Transparent workpieces with multiple reflections



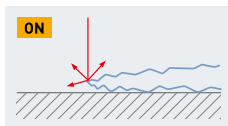
Transparent or translucent targets that generate multiple reflections can be stably detected using the I-DATUM feature.

Grease application confirmation



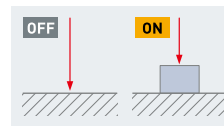
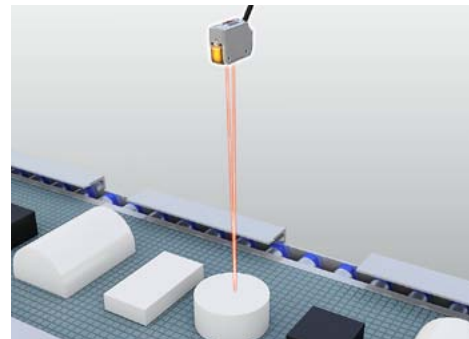
Translucent liquids, such as grease or adhesives, can be easily detected using I-DATUM mode. Simply use the external calibration input to set the part background, and the sensor will quickly output once the liquid is applied.

Packaging materials



Packaging materials can be easily detected using I-DATUM mode, regardless of colour, transparency, or package content.

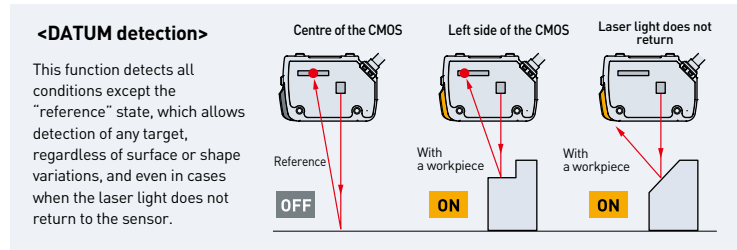
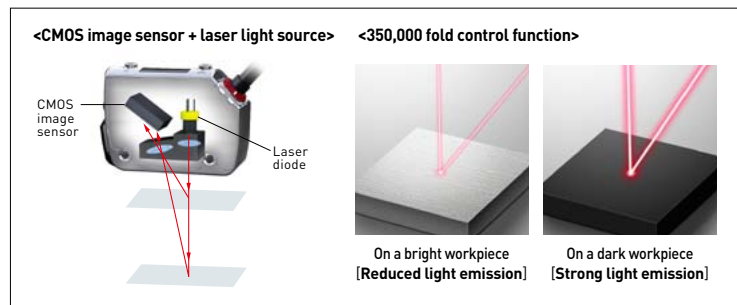
Use as a general-purpose laser sensor



Sensors containing the I-DATUM feature can still utilise the standard DATUM mode for all-purpose detection.

Best detection ability by a self-contained sensor in its class

The LR-Z Series provides uncompromised detection ability while maintaining the easy operation of a self-contained design. This sensor monitors and automatically adjusts its sensitivity up to 350,000× using a control function made possible by combining the benefits of a CMOS receiving element with a laser light source. This allows for stable detection to be achieved, regardless of colour or angle. The built-in background and foreground suppression functions allow the LR-Z to achieve the best detection ability of any self-contained sensor in its class.



Cover: PES (Polyethersulfone)
Food grade hygiene in addition to
high chemical resistance

Case: SUS316L (stainless steel)
Extremely high chemical
resistance among corrosion
resistant stainless steels

**Packing: FKM
(Fluoro-rubber)**
High chemical /
oil resistance

DURABLE & LONG LIFE

High enclosure rating and Stainless steel body (SUS316L)

The SUS316L stainless steel body of the LR-Z resists damage, even when overtightened or experiencing impact from tools or other equipment, hence no additional protective cover is needed. In addition, the heavy duty body is highly resistant to oil, acid, and alkaline detergents and can be used in harsh environments due to its NEMA and IP rated enclosure.

Optical plate: PMMA (Acrylic resin)
High transparency and chemical resistance with
scratch resistant coating

Sealant: Silicone
Resistant against
high pressure / high temperature water flow



Resists damage, even when
over-tightened



Resistant to impact
[Approx. 3 times more resistant
compared to our conventional model]



Meets NEMA Type 4x, 6P, 13 and
IP68/69K requirements

SIMPLIFIED OPERATION

One-touch setup and Digital display

The LR-Z is designed to provide reliable, yet simple operation for any user. Its large indicator ensures outstanding visibility, even from long distance. Operation is simplified through the addition of a digital 7-segment display and one-touch teaching method. Sensitivity settings are easily performed while monitoring the digital display for proper operation. The LR-Z is also equipped with a key lock function to prevent unexpected or accidental changes.



Large indicator
(Approx. 6 times larger compared to our conventional model)



Digital 7-segment display



Easy setup with one touch teaching

Versatile for use in a large variety of applications and industries

Black targets

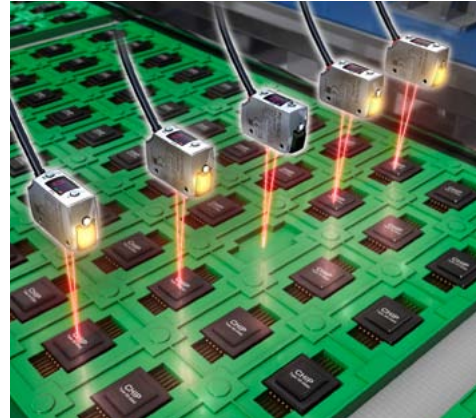
Inspecting press fit anti vibration rubber bushings on an index table



350,000 fold power control enables reliable detection even on a black workpiece with low reflectivity.

Printed workpiece

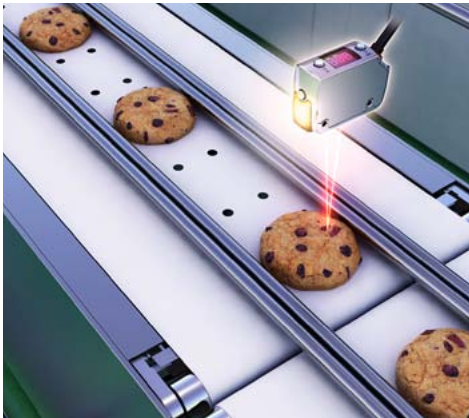
Detecting presence/absence of IC components



The light intensity control function of the CMOS image sensor enables stable detection even when the intensity changes due to printing conditions.

Irregular surfaces

Detecting presence / absence in food processing and packaging



Reliable detection is possible regardless of irregular surfaces or background colour.

Printed targets

Confirming package presence



The LR-Z Series performs reliable detection even on printed packaging with a glossy finish.

Improvement application

Confirming workpiece ejection in oil-contaminated environments

Before



A thrubeam photoelectric sensor was used. Production was temporarily stopped due to a large amount of oil buildup.



After

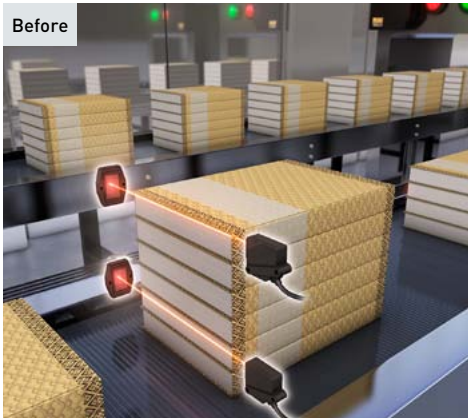


Downtime can be reduced by installing a sensor away from oil splash in order to eliminate malfunctions.

Improvement application

Confirming product quantity

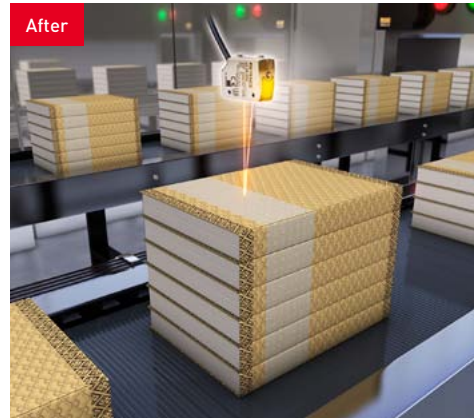
Before



Previously, confirming product quantity required manual adjustment of the sensors at product changeover to account for different product heights.











After






By installing the LR-Z sensor above the target and using the external calibration input, product changeover time is reduced and precise operation is ensured.




Lineup

Type	Detecting distance	Spot diameter	Standard detectable deviation	Connection method	Output	Model	Weight
 Rectangular w/ cable	 35 to 100 mm	 2 mm At detecting distance of 100 mm	1.5 mm (35 to 50 mm) 3 mm (50 to 100 mm)	2 m cable	NPN	LR-ZB100N	110 g
					PNP	LR-ZB100P	
 Rectangular w/ M8 connector				M8 4-pin	NPN	LR-ZB100CN	55 g
				M8 3-pin	PNP	LR-ZB100CP LR-ZB100C3P	
 Rectangular w/ cable *Includes I-DATUM feature	 35 to 250 mm	 2.4 mm At detecting distance of 250 mm	9 mm (35 to 180 mm) 25 mm (180 to 250 mm)	2 m cable	NPN	LR-ZB250AN	110 g
					PNP	LR-ZB250AP	
 Rectangular w/ M8 connector				M8 4-pin	NPN	LR-ZB250CN	55 g
				M8 3-pin	PNP	LR-ZB250CP LR-ZB250C3P	

Mounting bracket

Type	Model	Material/Weight
 Standard mounting bracket (M3 screw × 2 supplied)	OP-87408 ¹	SUS316L 30 g
 Rear mounting bracket (M3 screw × 2 supplied)	OP-87409	SUS316L 30 g
 Robust mounting bracket (t = 3) (M3 screw × 2 supplied)	OP-87410 ²	SUS316L 170 g

Mounting bracket (adjustable bracket)

Type	Model	Material/Weight
 Adjustable bracket for rectangular type (M3 screw × 2 supplied)	OP-87404	Zinc nickel plating 95 g
 Screw length	Screw length: 45 mm OP-87406	Iron nickel plating 70 g
 Locking screw for adjustable bracket	Screw length: 65 mm OP-87407	Iron nickel plating 80 g

New adjustable bracket

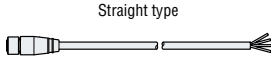
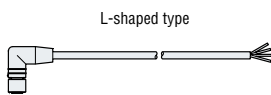


Adjustable bracket for rectangular type

¹ This bracket is dedicated to the cable type. Use OP-87409 or OP-87410, when installing the connector type.

² This can be used only in combination with an L-shaped connector cable, when installing the connector type.

■ Cable

Specifications	Material	Appearance	Connection method	Length	Model	Weight
Standard	Cable: PVC Connector: Brass nickel plating	 <p style="text-align: center;">Straight type</p>	M8 4-pin	2 m	OP-73864	55 g
				10 m	OP-73865	220 g
Oil resistant	Cable: PVC Connector: Zinc nickel plating		M8 3-pin	2 m	OP-87627	80 g
				M8 4-pin	2 m	OP-87628
Chemical resistant	Cable: PVC Connector: SUS316L		M8 4-pin		10 m	OP-87629
				2 m	OP-87621	75 g
Standard	Cable: PVC Connector: Brass nickel plating	 <p style="text-align: center;">L-shaped type</p>	M8 4-pin	2 m	OP-85497	55 g
				2 m	OP-87631	65 g
Oil resistant	Cable: PUR Connector: Zinc nickel plating		M8 4-pin	2 m	OP-87632	55 g
				10 m	OP-87633	260 g
Chemical resistant	Cable: PVC Connector: SUS316L		M8 4-pin	2 m	OP-87619	70 g
				M8 3-pin	2 m	OP-87620

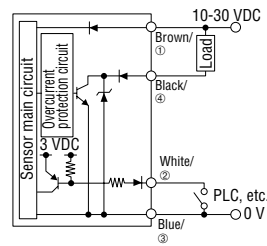
■ Enclosure ratings for each cable type

Enclosure rating	Standard cable	Oil resistant cable	Chemical resistant cable
IP67 IEC60529	✓	✓	✓
IP68 IEC60529	-	✓	✓
IP69K DIN40050-9	-	-	✓
ECOLAB, Diversey	-	-	✓*

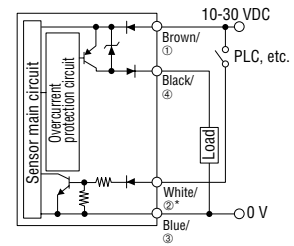
* Have passed resistance tests with cleaning agents from multiple manufactures.

■ I/O circuit diagram

NPN type (LR-ZBxN)



PNP type (LR-ZBxP)



* Cable type and M8 connector 4 pin type only

M8 Connector
pin layout (4-pin type)



M8 Connector
pin layout (3-pin type)



Specifications



Type		Distance based laser sensor		
Appearance		Rectangular		
Model	NPN	2 m cable	LR-ZB100N	LR-ZB250AN ^{*6}
		M8 connector 4-pin	LR-ZB100CN	LR-ZB250CN
	PNP	2 m cable	LR-ZB100P	LR-ZB250AP ^{*6}
		M8 connector 4-pin	LR-ZB100CP	LR-ZB250CP
		M8 connector 3-pin	LR-ZB100C3P	LR-ZB250C3P
Detectable distance		35 to 100 mm (650 to 0) ^{*1}		35 to 250 mm (215 to 0) ^{*1}
Standard detectable deviation		35 to 50 mm: 1.5 mm 50 to 100 mm: 3 mm		35 to 180 mm: 9 mm 180 to 250 mm: 25 mm
Display resolution		2 (0.2 mm)		1 to 3 (1 to 3 mm)
Spot diameter		2 × 1 mm at 100 mm		2.4 × 1.2 mm at 250 mm
Response time		1.5 ms/10 ms/50 ms selectable		
Light source	Type	Red laser (660 nm)		
	Laser class	Class 1 laser product (IEC60825-1, FDA (CDRH) Part1040.10 ^{*2})		
Function	Indicator	3-digit 7-segment display (red), output indicator (yellow), DATUM indicator (orange), 1 spot indicator (green)		
	Timer	OFF/ON delay/OFF delay/One-shot		
Specifications	Power voltage	10 to 30 VDC, including 10% ripple (P-P), Class 2 or LPS		
	Power consumption	450 mW or less (18 mA or less at 24 V, 34 mA or less a 12 V)		
	Control output	LR-ZBxN: NPN Open collector LR-ZBxP: PNP Open collector Applied voltage 30 VDC or less, Control current 100 mA or less, Residual voltage 1.2 V or less at 10 mA or less, 2 V or less at 10 to 100 mA		
	Protection circuit	Protection against reverse power connection, output overcurrent, output surge, reverse output connection		
	Output operation	Light-ON / Dark-ON selectable		
	External input ^{*3}	Input time calibration: 35 ms or more ON, 35 ms or more OFF Laser emission stop: 2 ms or more ON, 20 ms or more OFF Short-circuit current NPN: 1 mA or less/PNP: 2 mA or less		
Environmental resistance	Enclosure rating	IP68(IEC60529), IP69K(DIN40050-9), NEMA 4X, 6P, 13(NEMA250), ECOLAB ^{*4} , Diversey ^{*4}		
	Ambient light ^{*5}	Incandescent lamp: 4000 lux or less Sunlight: 8000 lux or less	Incandescent lamp: 2000 lux or less Sunlight: 4000 lux or less	
	Ambient temperature	-10 to +50°C (No freezing)		
	Storage temperature	-25 to +75°C (No freezing)		
	Ambient humidity	35 to 85% RH (No condensation)		
	Shock resistance	1000 m/s ² in X, Y, Z axis directions respectively 6 times		
	Vibration resistance	10 to 55 Hz Double amplitude 1.5 mm in the X, Y, Z axis directions respectively, 2 hours		
	Insulating resistance	20 MΩ or more (500 VDC)		
	Withstand voltage	1000 VAC 50/60 Hz 1 min		
Material	Case: SUS316L, Display: PES, Lens cover: PMMA with scratch-resistant coating, Packing/Connector ring: FKM			
Accompanying items	Instruction Manual, Certification/Identification label (FDA)			

*1 Display reading used as a guide for the detecting distance. When the setting value is tuned, the readout shifts. When the value exceeds "99", "FF" is displayed.

*2 The laser classification for FDA (CDRH) is implemented based on IEC60825-1 in accordance with the requirements of Laser Notice No.50.

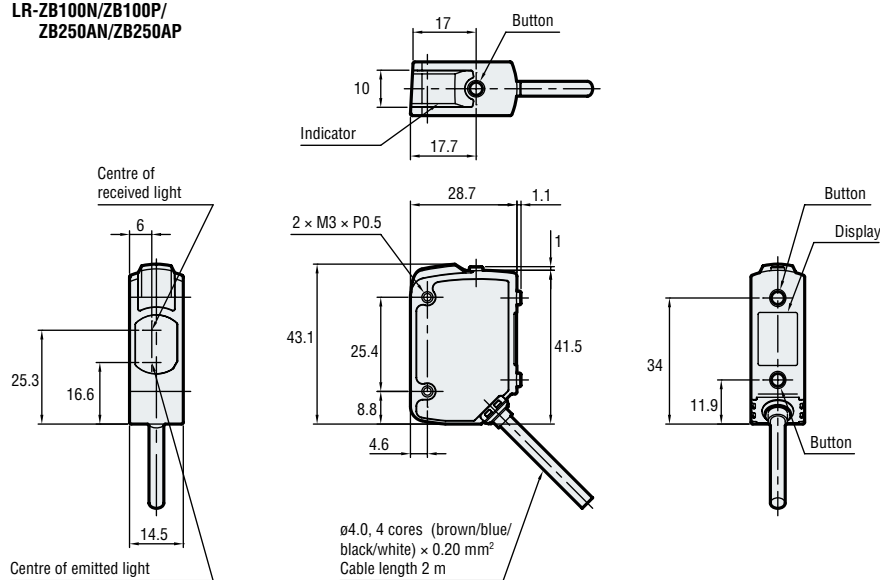
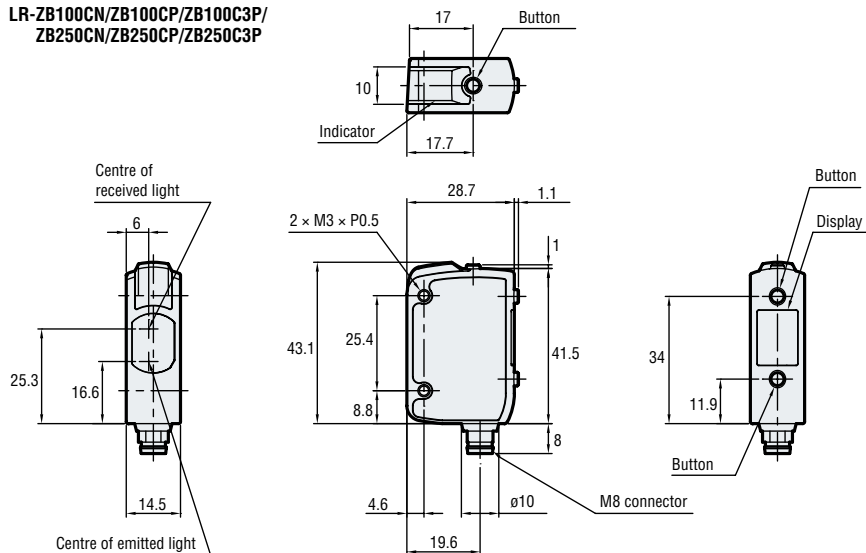
*3 M8 connector (3-pin) type does not include the external input function.

*4 Have passed resistance tests with cleaning agents from multiple manufacturers.

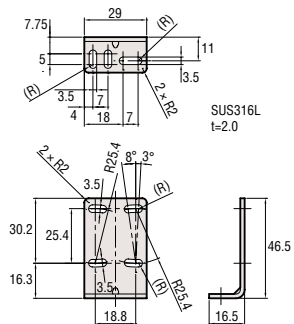
*5 When the response time is 10 ms

*6 Includes I-DATUM feature

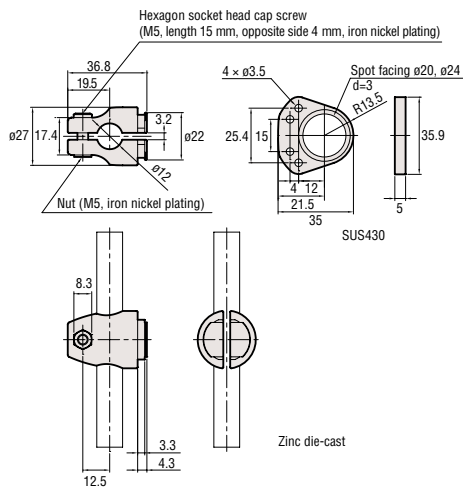
■ Dimensions

LR-ZB100N/ZB100P/
ZB250AN/ZB250APLR-ZB100CN/ZB100CP/ZB100C3P/
ZB250CN/ZB250CP/ZB250C3P

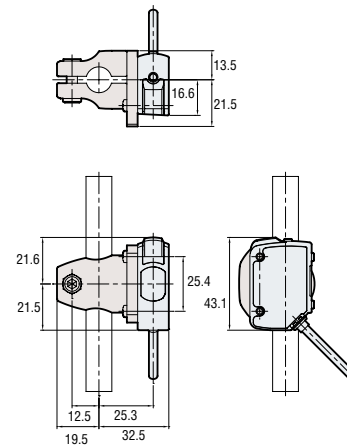
OP-87408



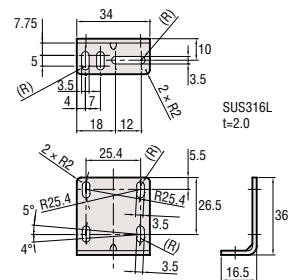
OP-87404



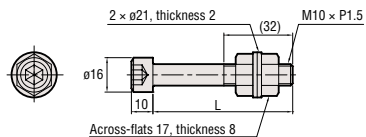
OP-87404 + LR-ZB100N



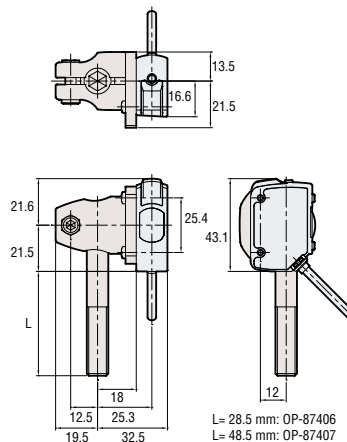
OP-87409



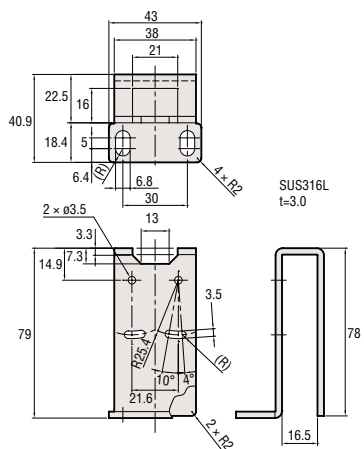
OP-87406/87407



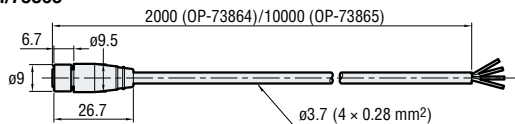
OP-87406/87407 + OP-87404 + LR-ZB100N



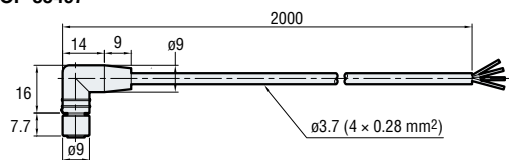
OP-87410



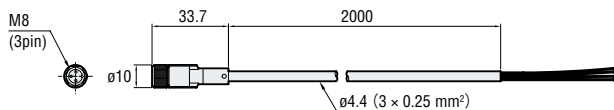
OP-73864/73865



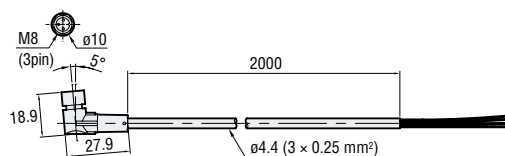
OP-85497



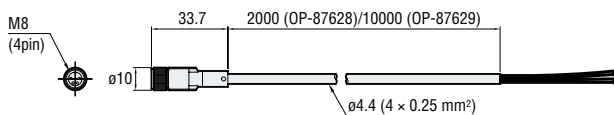
OP-87627



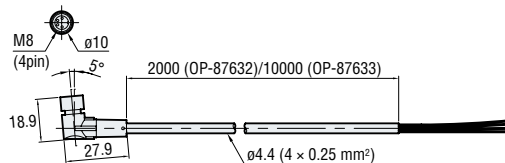
OP-87631



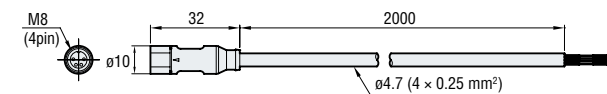
OP-87628/87629



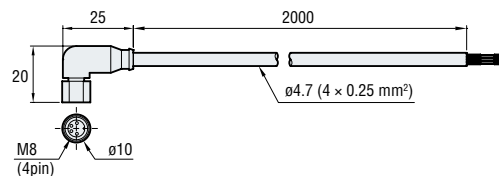
OP-87632/87633



OP-87621



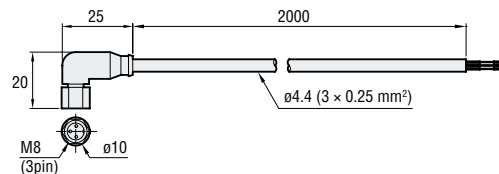
OP-87619



OP-87622



OP-87620



M8 Connector
pin layout
(4-pin type)



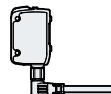
M8 Connector
pin layout
(3-pin type)



No.	Colour
①	Brown
②	White
③	Blue
④	Black

Note:

When the L-shaped connector is in use, the cable is fixed in the direction shown on the right. The connector is not rotatable.





Self-contained
CMOS Laser Sensor

LR-Z SERIES

KEYENCE

Please visit: www.keyence.com



SAFETY INFORMATION

Please read the instruction manual carefully in order to safely operate any KEYENCE product.

GLOBAL NETWORK

CONTACT YOUR NEAREST OFFICE FOR RELEASE STATUS

AUSTRIA

Phone: +43-2236-378266-0

BELGIUM

Phone: +32-15-281-222

BRAZIL

Phone: +55-11-3045-4011

CANADA

Phone: +1-905-366-7655

CHINA

Phone: +86-21-5058-6228

CZECH REPUBLIC

Phone: +420-222-191-483

FRANCE

Phone: +33-1-56-37-78-00

GERMANY

Phone: +49-6102-3689-0

HONG KONG

Phone: +852-3104-1010

HUNGARY

Phone: +36-1-802-73-60

INDIA

Phone: +91-44-4963-0900

INDONESIA

Phone: +62-21-2966-0120

ITALY

Phone: +39-02-6688220

JAPAN

Phone: +81-6-6379-2211

KOREA

Phone: +82-31-789-4300

MALAYSIA

Phone: +60-3-7883-2211

MEXICO

Phone: +52-55-8850-0100

NETHERLANDS

Phone: +31-40-20-66-100

PHILIPPINES

Phone: +63-(0) 2-981-5000

POLAND

Phone: +48-71-36861-60

ROMANIA

Phone: +40-269-232-808

SINGAPORE

Phone: +65-6392-1011

SLOVAKIA

Phone: +421-25939-6461

SLOVENIA

Phone: +386-1-4701-666

SWITZERLAND

Phone: +41-43-455-77-30

TAIWAN

Phone: +886-2-2721-8080

THAILAND

Phone: +66-2-369-2777

UK & IRELAND

Phone: +44 (0) 1908-696-900

USA

Phone: +1-201-930-0100

VIETNAM

Phone: +84-4-3772-5555