

Universal Square Photoelectric Sensor

DS-G Series

Integrated injection mold process, IP67 protection grade



Applicable to various work sites

- A variety of light sources are available
- Strong anti-interference ability, not afraid of light, stable performance and fast response
- Multiple circuit protection, safe and stable

Redefining the new standard of photoelectric sensor in China
Built for ultra-high reliability and consistency

Product upgrade and enhanced anti-interference performance

The anti-interference performance is further enhanced; The product's resistance to light, sunlight or motor interference is further enhanced.

Structure upgrade

Integrated injection molding, standard IP67 (IEC) protective structure, can cope with various harsh environments.

It can be used in water mist environment or dusty sites.

Note: During the detection process, the sensor lens may be stained with water, and water may be detected.



Simple wiring mode

Normally open and normally closed integrated, which can be switched by L/D knob.



Action switch knob

Stability indicator function

It can be output through intelligent self-diagnosis.

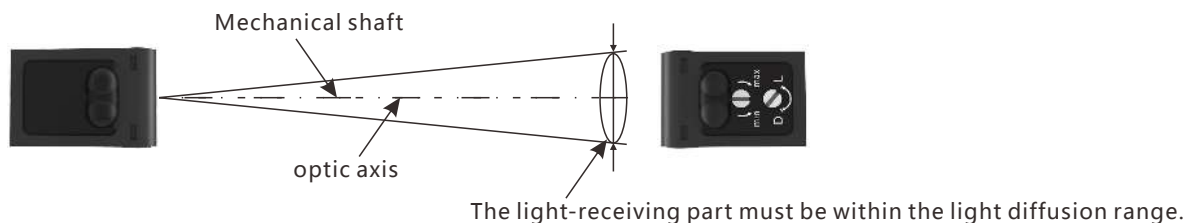
The sensor can judge whether the sensor is working in the most stable state according to the changes of ambient light and material in actual work, which is convenient for users to make the most stable setting for the product.

When the sensor detection is at a critical value, the stability indicator light (green light) flashes.

Easy to use, ensuring product reliability

Long-distance optical axis adjustment (Through-beam, Retro-reflective).

The deviation angle between the optical axis and the mechanical axis is small, and it can be aligned with the optical axis with high accuracy when installed with the mechanical axis.



Stronger protection circuit

Equipped with output reverse connection protection function, it can protect the sensor even if the wiring is wrong.

Ensure low temperature working performance and stable operation in low temperature environment

The freezing warehouse can also be used at an ambient temperature of $-40 \sim +55^{\circ}\text{C}$ (connector type).

The detection distance can be fine-tuned

The potentiometer with linear gradient resistance can slightly adjust the sensor distance.

Strong structure

The hard shell and solid structure design can protect the sensor from being damaged by external conditions.

Compliance with EU RoHS Directive

Lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls and polybrominated diphenyl ethers all comply with the Rohs Directive and have obtained the CE mark.



Through-beam (DS-GT series)



■ Infrared LED with strong penetration

The powerful infrared beam can detect the objects in the container through the container. (Even containers with attachments can pass the test.)

■ IP67 (IEC) protection structure

Stable detection can also be achieved in dusty or water vapor environment.

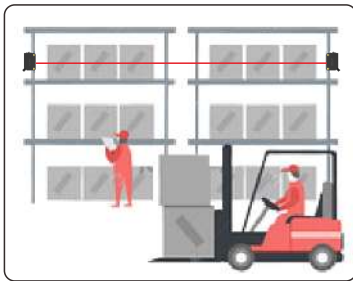
■ Free installation Red LED

Stable and reliable structure design, small optical axis deviation, mutual interference prevention function, can make transmission Sensors are installed intensively and crosswise (Emitters and Receivers).

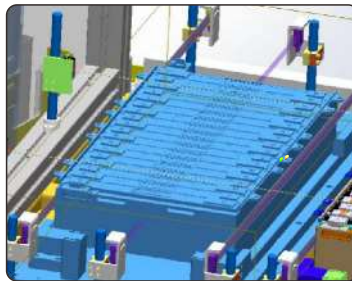
■ Long distance and anti-sunlight interference Let the sensor go out of the room and use it outdoors.

10m long distance red LED Through-beam , which can stably detect the access of vehicles in the open parking lot.

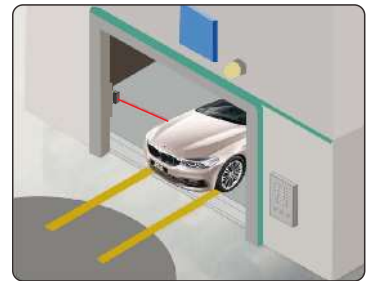
■ Application cases



Check for protrusions of large cargo.



New energy industry, testing battery modules.



Detect the entrance and exit of vehicles in the parking lot for a long time.
10M long distance Through-beam, can be installed in the spacious entrance and exit.

Retro-reflective (DS-GR series)



■ Mirror objects (high reflectivity) can also be detected stably

With the M.S.R function, the mirror can also be detected stably.

■ Two sensors are installed crosswise Red LED

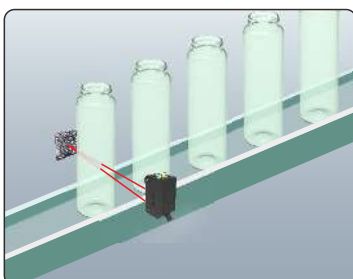
The optical axis deviation is low, and it can work stably even if it is cross-mounted.

■ Stable detection of transparent objects

The unique optical system and circuit design can stably detect thinner transparent objects.

(After testing, the transparent film can be tested stably.)

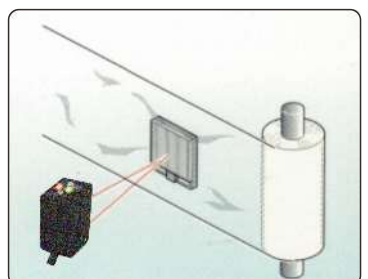
■ Application cases



Used to detect the presence and count of transparent plastic/glass bottles.



Used for tire count detection.



Coil detection.

Diffuse-reflective (DS-GD series)



Stronger detection capability

The unique optical system and circuit design can stably detect black objects (low reflectivity) and wrinkled or irregular objects.

Infrared LED with strong penetration Infrared LED

Objects inside can be detected through transparent bottles.

No-blind Sensing Infrared LED

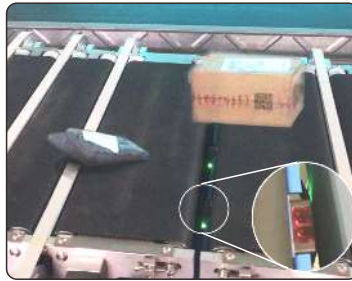
Stable detection even if it is close to the sensor;

Detection blind area: Generally, reflective sensors have a short-distance detection blind area, that is, close to the sensor, objects can not be detected. Diffuse-reflective sensors are generally have a range of 0-10mm, and retro-reflective sensors will be longer.

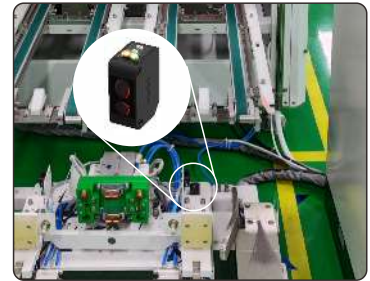
Application cases



Smart City, Smart Garbage Bin Sensing Switch.



Closely detect packages of various shapes and colors.



Logistics industry, AGV vehicle material in place inspection.

BGS Distance-settable (DS-GLS series)



BGS Functional application

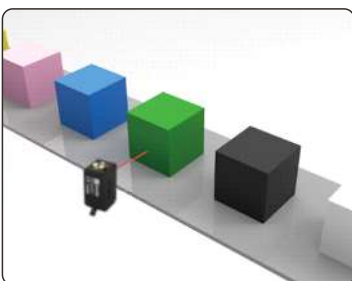
There is no need to adjust the detection distance even when changing production on the production line where different colored workpieces flow.

It is not affected by the object color and background

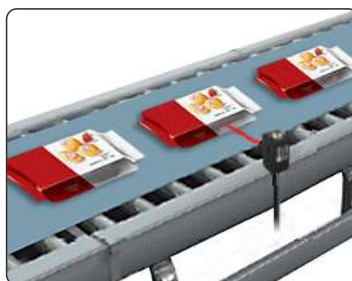
Glossy concave and convex workpieces can also be easily detected.

The differential distance is small, and small segment difference can be detected.

Application cases



With the application of BGS function, there is no need to adjust the detection distance even when changing production on the production line where different color workpieces flow.



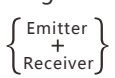
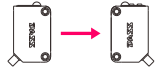
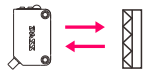
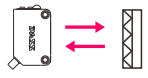
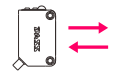
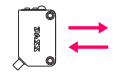
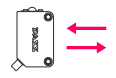
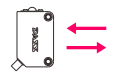
Packaging industry, Product inspection of multi-color packaging.



Photovoltaic industry, Stable detection of silicon wafers with very low reflectivity.

Type

Infrared LED  Red LED  Laser 

Sensing method		Connection method	Sensing distance	Model	
				NPN output	PNP output
Through-beam 		Pre-wired	 10m	DS-GT11	DS-GT11P
		Standard connector		DS-GT11M	DS-GT11MP
		Pre-wired	 10m	DS-GT21	DS-GT21P
		Standard connector		DS-GT21M	DS-GT21MP
		Pre-wired	 30m	DS-GT31	DS-GT31P
		Standard connector		DS-GT31M	DS-GT31MP
Retro-reflective 		Pre-wired	 2m *2	DS-GR22-E *1	DS-GR22-EP
		Standard connector		DS-GR22-EM	DS-GR22-EMP
		Pre-wired	 3m *2	DS-GR23-E *1	DS-GR23-EP
		Standard connector		DS-GR23-EM	DS-GR23-EMP
		Pre-wired	 4m *2	DS-GR24 *1	DS-GR24P
		Standard connector		DS-GR24M	DS-GR24MP
		Pre-wired	 9m *2	DS-GR31-E *1	DS-GR31-EP
		Standard connector		DS-GR31-EM	DS-GR31-EMP
Diffuse-reflective 		Pre-wired	 100mm	DS-GD11	DS-GD11P
		Standard connector		DS-GD11M	DS-GD11MP
		Pre-wired	 300mm	DS-GD12	DS-GD12P
		Standard connector		DS-GD12M	DS-GD12MP
		Pre-wired	 800mm	DS-GD14	DS-GD14P
		Standard connector		DS-GD14M	DS-GD14MP
		Pre-wired	 1m	DS-GD15	DS-GD15P
		Standard connector		DS-GD15M	DS-GD15MP
BGS Distance-settable 		Pre-wired	 20~40mm (BGSmin. setting)	DS-GLS22	DS-GLS22P
		Standard connector		DS-GLS22M	DS-GLS22MP
		Pre-wired	 20~300mm (BGSmax. setting)	DS-GLS31	DS-GLS31P
		Standard connector		DS-GLS31M	DS-GLS31MP
		Pre-wired	 30~50mm (BGSmin. setting)	DS-GLSL31	DS-GLSL31P
		Standard connector		DS-GLSL31M	DS-GLSL31MP

*1 : The accompanying reflector (DSSP-M2) can be purchased separately for different purposes.

*2 : The detection distance is the distance when DSSP-M2 is used.

Rated specification/performance

Model Item	Sensing method		Through-beam						
	Pre-wired	NPN output	DS-GT11	DS-GT21	DS-GT31	DS-GR22-E	DS-GR23-E	DS-GR24	DS-GR31-E
		PNP output	DS-GT11P	DS-GT21P	DS-GT31P	DS-GR22-EP	DS-GR23-EP	DS-GR24P	DS-GR31-EP
		Standard connector	NPN output	DS-GT11M	DS-GT21M	DS-GT31M	DS-GR22-EM	DS-GR23-EM	DS-GR24M
	PNP output	DS-GT11MP	DS-GT21MP	DS-GT31MP	DS-GR22-EMP	DS-GR23-EMP	DS-GR24MP	DS-GR31-EMP	
Sensing distance			10m		30m	2m	3m	4m	9m
Spot diameter			——		5mm diameter at a distance of 3m	——			1m distant light spot : 2mm×2mm
Standard test object			Opaque: 12-mm dia. min.			Opaque: 75-mm dia. min.			
Minimum detection object			——		an opaque object with a diameter of 6mm at a distance of 3m	——			
Directional angle			Both emitter and receiver: 3~15°			2~10°			
Light source (wavelength)			Infrared LED (850nm)	Red LED (650nm)	Laser (650nm)	Red LED (650nm)			Laser (650nm)
Power supply voltage			12 to 24 VDC ±10%, ripple (p-p): 10% max.						
Current consumption			45 mA max. (Emitter: 15 mA max., Receiver: 20 mA max.)			30 mA max.			
Control output			Load power supply voltage: 26.4 VDC max., Load current: 100 mA max. (Residual voltage: Load current of less than 10 mA: 1V max. Load current of 10 to 100 mA: 2V max. Open collector output (NPN/PNP depending on model) ; Light-ON/Dark-ON selectable.						
Protection circuits			Reversed power supply ,Output short-circuit protection						
Response time			Operate or reset: 1 ms max.						
Sensitivity adjustment			Adjuster						
Ambient illumination (Receiver side)			Incandescent lamp: 10,000 lx max、 Sunlight: 100,000 lx max.						
Ambient temperature range			Operating: 25 to 55°C, Some connector models:40C to 55°C (with no icing or condensation); Laser type : -10 to 55°C ; Storage: 40 to 70°C(with no icing or condensation)						
Ambient humidity range			Operating: 35% to 85%, Storage: 35% to 95% (with no condensation)						
Insulation resistance			20 MΩ min. at DC 500V						
Dielectric strength			AC1,000V , 50/60Hz1min						
Vibration resistance			Destruction: 10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions						
Shock resistance			Destruction: 500 m/s² 3 times each in X, Y, and Z directions						
Degree of protection			Oil resistant models: IP67 (IEC) (in-house standards: oilproof), excluding cables and connectors						
Connection method			Pre-wired cable (standard length: 2 m) M8 Pre-wired Connecto						
Indicator			Operation indicator (orange) 、 Stability indicator (green) Through-beam Emitter has power indicator (orange) only.						
Weight	Pre-wired cable (2m)		Approx 108g			Approx 52g			
	Standard connector (M8)		Approx 45g			Approx 25g			
Material	Case		PBT						
	Lens		PC						
Accessories			Instruction manual (Mounting Brackets are provided with any of the above models.)						

Rated specification/performance

Model Item	Sensing method		Diffuse-reflective			
	Pre-wired Standard connector	NPN output	DS-GD11	DS-GD12	DS-GD14	DS-GD15
		PNP output	DS-GD11P	DS-GD12P	DS-GD14P	DS-GD15P
		NPN output	DS-GD11M	DS-GD12M	DS-GD14M	DS-GD15M
		PNP output	DS-GD11MP	DS-GD12MP	DS-GD14MP	DS-GD15MP
Sensing distance			100mm	300mm	800mm	1m
Standard test object			White paper (200mm×200mm)			
Light source (wavelength)			Infrared LED (850nm)			
Power supply voltage			12 to 24 VDC ±10%, ripple (p-p): 10% max.			
Current consumption			30 mA max.			
Control output			Load power supply voltage: 26.4 VDC max., Load current: 100 mA max. (Residual voltage: Load current of less than 10 mA: 1V max. Load current of 10 to 100 mA: 2V max. Open collector output (NPN/PNP depending on model) ; Light-ON/Dark-ON selectable.			
Protection circuits			Reversed power supply ,Output short-circuit protection			
Response time			Operate or reset: 1 ms max.			
Sensitivity adjustment			Adjuster			
Ambient illumination (Receiver side)			Incandescent lamp: 10,000 lx max、 Sunlight: 100,000 lx max.			
Ambient temperature range			Operating: 25 to 55℃, Some connector models:40C to 55℃ (with no icing or condensation) Storage: 40 to 70℃(with no icing or condensation)			
Ambient humidity range			Operating: 35% to 85%, Storage: 35% to 95% (with no condensation)			
Insulation resistance			20 MΩ min. at DC 500V			
Dielectric strength			AC1,000V , 50/60Hz1min			
Vibration resistance			Destruction: 10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance			Destruction: 500 m/s² 3 times each in X, Y, and Z directions			
Degree of protection			Oil resistant models: IP67 (IEC) (in-house standards: oilproof), excluding cables and connectors			
Connection method			Pre-wired cable (standard length: 2 m) M8 Pre-wired Connecto			
Indicator			Operation indicator (orange) 、 Stability indicator (green) Through-beam Emitter has power indicator (orange) only.			
Weight	Pre-wired cable (2m)		Approx 52g			
	Standard connector (M8)		Approx 25g			
Material	Case		PBT			
	Lens		PC			
Accessories			Instruction manual (Mounting Brackets are provided with any of the above models.)			

DS-G series

Rated specification/performance

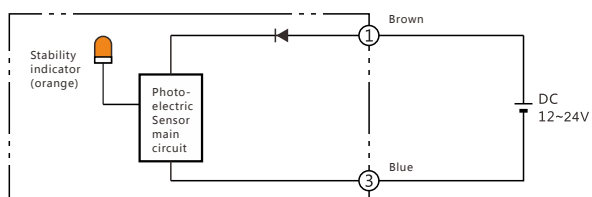
Model Item	Sensing method		BGS Distance-settable		
	Pre-wired	NPN output	DS-GLS22	DS-GLS31	DS-GLSL31 (Line light)
		PNP output	DS-GLS22P	DS-GLS31P	DS-GLSL31P(Line light)
		Standard connector	NPN output	DS-GLS22M	DS-GLS31M
		PNP output	DS-GLS22MP	DS-GLS31MP	DS-GLSL31MP(Line light)
Sensing distance			White or black paper (10cm×10cm): 20 mm to set distance	White or black paper (10cm×10cm): 20 mm to set distance	White or black paper (10cm×10cm): 30 mm to set distance
Setting range			White paper (10cm×10cm): 40 to 200 mm Black paper (10cm×10cm): 40 to 160 mm	White paper (10cm×10cm): 40 to 300 mm Black paper (10cm×10cm): 40 to 160 mm	White paper (10cm×10cm): 50 to 300 mm Black paper (10cm×10cm): 50 to 160 mm
Differential travel			10% of set distance max	5% of set distance max	
Reflectivity characteristic (black/white error)			10% of set distance max	5% at 160mm	宽55mm(100mm远处) 宽110mm(200mm远处)
Spot size			6mm×6mm(100mm)	φ 1mm (100mm)	Width 55mm (100mm) Width 110mm (200mm)
Light source (wavelength)			Red LED (650nm)	Laser (650nm)	
Power supply voltage			12 to 24 VDC ±10%, ripple (p-p): 10% max.		
Current consumption			30 mA max.		
Control output			Load power supply voltage: 26.4 VDC max., Load current: 100 mA max. (Residual voltage: Load current of less than 10 mA: 1V max. Load current of 10 to 100 mA: 2V max. Open collector output (NPN/PNP depending on model) ; Light-ON/Dark-ON selectable.		
Protection circuits			Reversed power supply ,Output short-circuit protection		
Response time			Operate or reset: 1 ms max.		
Distance setting			Adjuster		
Ambient illumination (Receiver side)			Incandescent lamp: 10,000 lx max、 Sunlight: 100,000 lx max.		
Ambient temperature range			Operating: -25 to 55℃ (with no icing or condensation) Storage: 40 to 70℃ (with no icing or condensation)	Operating: -10 to 45℃ (with no icing or condensation) Storage: 40 to 70℃ (with no icing or condensation)	
Insulation resistance			Operating: 35% to 85%, Storage: 35% to 95% (with no condensation)		
Insulation resistance			20 MΩ min. at DC 500V		
Dielectric strength			AC1,000V , 50/60Hz1min		
Vibration resistance			Destruction: 10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions		
Shock resistance			Destruction: 500 m/s² 3 times each in X, Y, and Z directions		
Degree of protection			Oil resistant models: IP67 (IEC)		
Connection method			Pre-wired cable (standard length: 2 m) M8 Pre-wired Connector		
Indicator			Operation indicator (orange) 、 Stability indicator (green) Through-beam Emitter has power indicator (orange) only.		
Weight	Pre-wired cable (2m)		Approx 52g		
	Standard connector (M8)		Approx 25g		
Material	Case		PBT		
	Lens		PC		
Accessories			Instruction manual (Mounting Brackets are provided with any of the above models.)		

I/O loop diagram

NPN Output

Operation mode	Timing charts	Operation selector	Output circuit
Light-ON	(Between brown ① and black ④ leads)	L Side (LIGHT ON)	Through-beam Receivers, Retro-reflective Models, Diffuse-reflective Models. Connector Pin Arrangement Note: Pin ② is not used.
	(Between brown ① and black ④ leads)	D Side (DARK ON)	

Through-beam Emitter



Connector Pin Arrangement

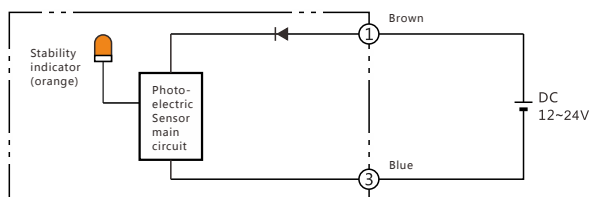


Note: Pin ② and ④ is not used.

PNP Output

Operation mode	Timing charts	Operation selector	Output circuit
Light-ON	(Between brown ① and black ④ leads)	L Side (LIGHT ON)	Through-beam Receivers, Retro-reflective Models, Diffuse-reflective Models. Connector Pin Arrangement Note: Pin ② is not used.
	(Between brown ① and black ④ leads)	D Side (DARK ON)	

Through-beam Emitter



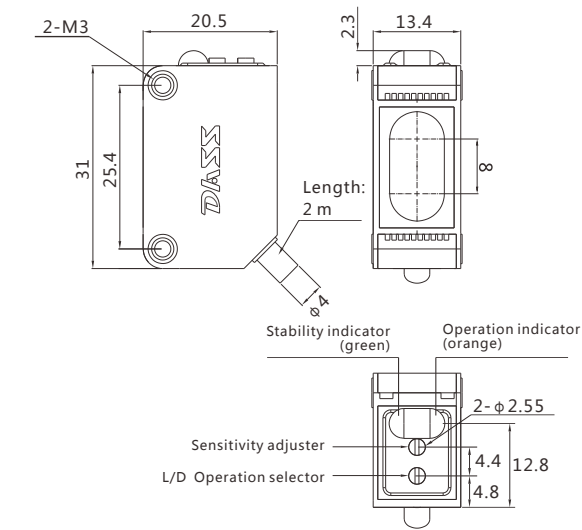
Connector Pin Arrangement



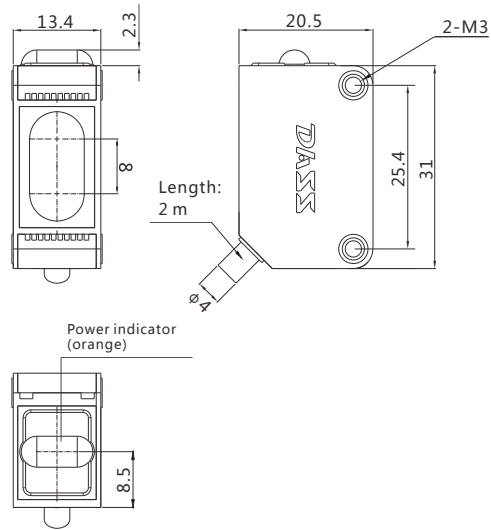
Note: Pin ② and ④ is not used.

DS-G series Overall dimension

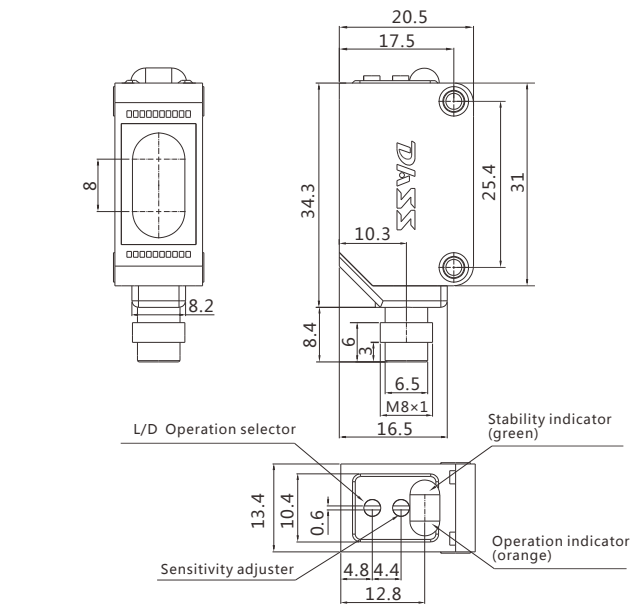
■ DS-GD□□(P)/GR□□(P)/GT□□(P)Receiver



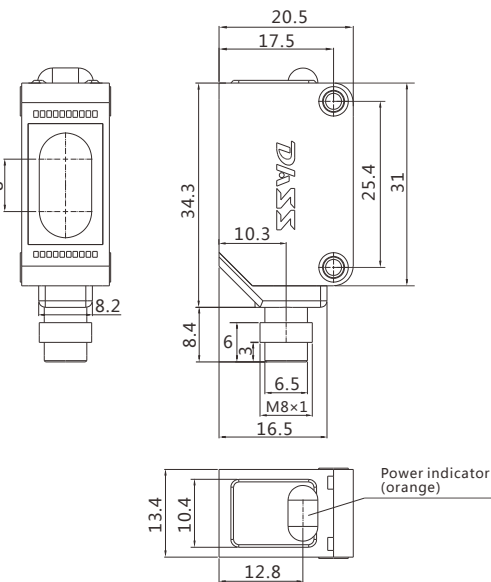
■ DS-GT□□(P) Emitter



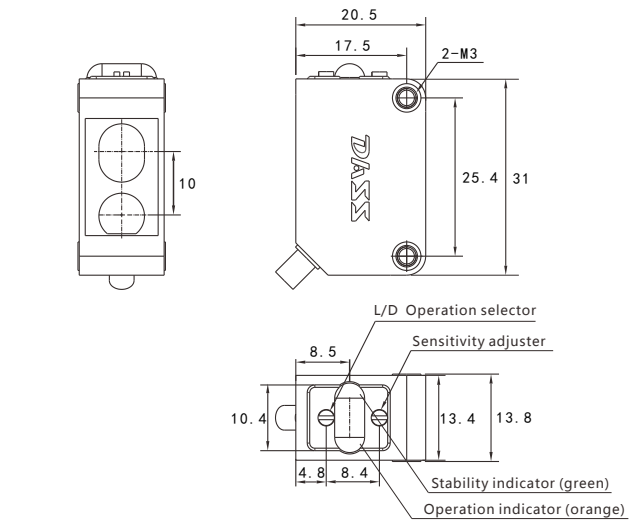
■ DS-GD□□M(P)/GR□□M(P)/GT□□M(P)Receiver



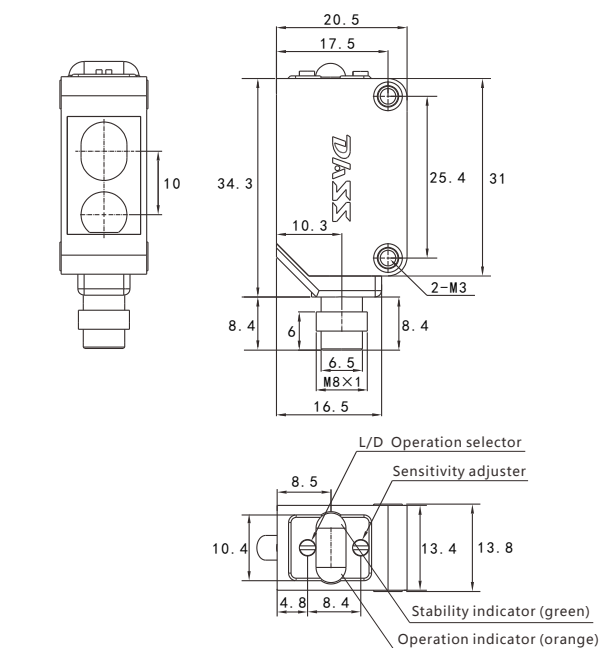
■ DS-GT□□M(P)Emitter



■ DS-GLS□□(P)



■ DS-GLS□□M(P)



Accessories (Order Separately)

■ Sensor I/O Connectors (Sockets on One Cable End)

Connector is not provided with the Sensor. Be sure to order a Connector separately.

Size	Cable	Appearance	Cable type		Model
M8	Standard	Straight 	2m	4-wire	DSSP-M8PVC4S2M
			5m		DSSP-M8PVC4S5M
		L-shaped 	2m		DSSP-M8PVC4A2M
			5m		DSSP-M8PVC4A5M

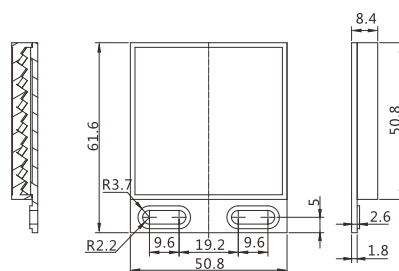
■ Reflectors

Reflector required for Retroreflective Sensors

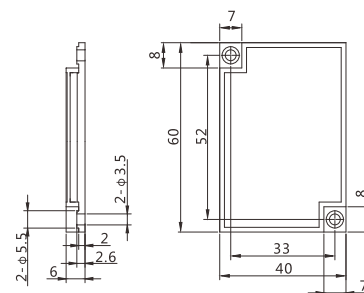
Model	Appearance
DSSP-M1	
DSSP-M2	
DSSP-M3	
DSSP-M4	

■ Dimension drawing

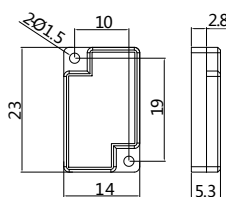
DSSP-M1



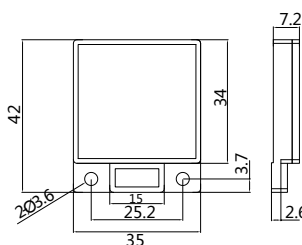
DSSP-M2



DSSP-M3

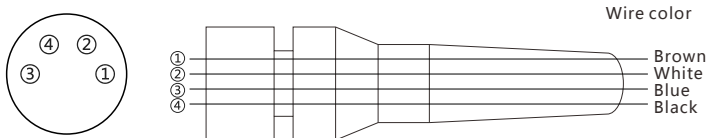


DSSP-M4



■ Plugs (Sensor I/O Connectors)

M8 connecto



Classification	Wire color	Connector pin No.	Application
DC	Brown	①	Power supply (+V)
	White	②	—
	Blue	③	Power supply (0V)
	Black	④	Output

Note: Pin 2 is not used.

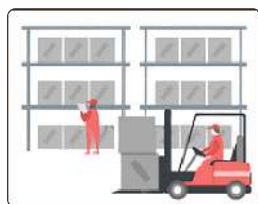
Nomenclature

Through-beam Models Receiver
Retro-reflective Models
Diffuse-reflective Models

BGS Distance-settable



Manufacturing world-class photoelectric sensor



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