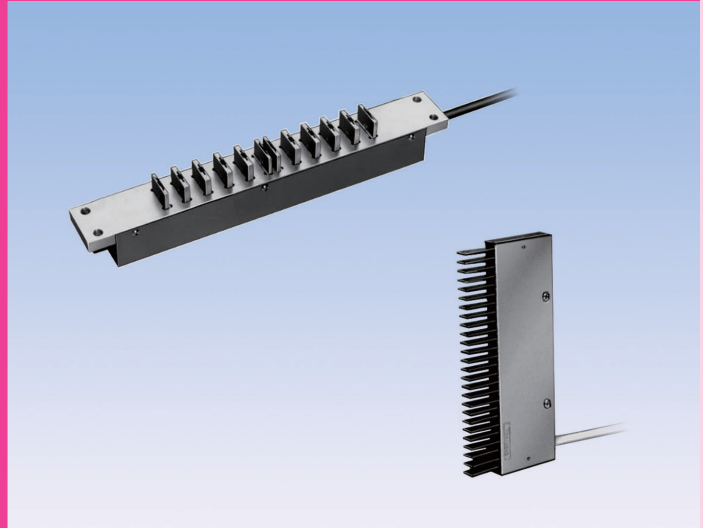


# Products for Specific Applications



- Water detection sensor
- Photo sensor for dark rooms
- Reflective light curtain sensor
- Light curtain sensors for outdoor use
- UV detection sensor
- Wafer detection sensor
- Glass substrate detection sensor
- Missing tablet detection sensor
- High-speed mobile object detection sensor

# GT2(S)-WS

Water detection sensors



- Light wavelength absorbed in water molecules
  - Transparent water reliably detected
- Protective structure: IP 67
  - Resin-molded for protection

Products for Specific Applications

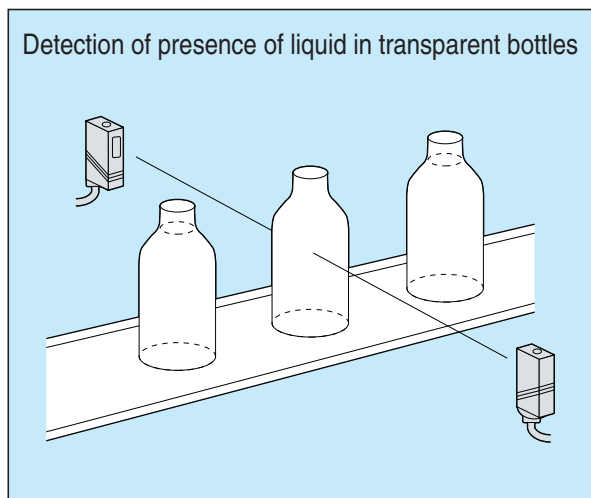
## Type

Detection method	Detecting distance	Shape	Model	Operation mode	Output mode
 Through-beam type	2m	Head-on	<b>GT2-WS</b>	Light-ON/ Dark-ON selectable	NPN open collector
		Side-on	<b>GT2S-WS</b>		

- Detecting distances for different pinhole sheets

Hole diameter	ø1	ø3	ø5	5 x 1	1 x 5
Detecting distance	5cm	30cm	1m	30cm	30cm

## Sample Application

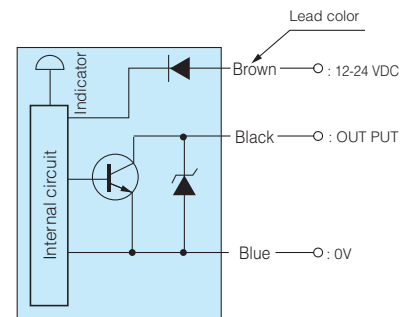


# LED light absorption type sensors for water detection

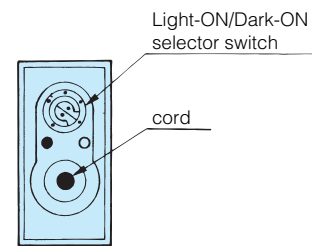
## Rating/Performance/Specification

Rating/performance	Model	Head-on Side-on	GT2-WS GT2S-WS
	Detection method	Through-beam type	
	Detecting distance	2m	
	Detection object	Liquid or opaque object of $\phi 20$ mm or larger	
	Power supply	12-24 VDC $\pm 10\%$ , ripple 10% max.	
	Current consumption	Transmitter: 25 mA max.; receiver: 10 mA max.	
	Output mode	NPN open collector / Rating: sink current 100 mA (30 VDC) max.	
	Operation mode	Light-ON/Dark-ON selectable (with switch)	
	Response time	1ms max.	
	Operating angle	15° (at receiver)	
Specification	Light source (light wavelength)	Infrared LED (1450nm)	
	Indicator	Transmitter: power indicator (red LED) / Receiver: light reception indicator (red LED) / stability indicator (green LED)	
	Volume (VR)	Sensitivity adjustment	
	Switch (SW)	Light-ON/Dark-ON selector switch	
	Short circuit protection	Provided	
	Material	Case/lens: polycarbonate	
	Connection	Permanently attached cord (Outer dimension: dia. 4.2) / Transmitter: 0.3 mm <sup>2</sup> x 2cores 3m, gray / Receiver: 0.3 mm <sup>2</sup> 3cores 3m, black	
	Mass	About 100 g (transmitter/receiver)	
	Accessory	Mounting bracket, 2 pinhole sheets	

## Input/Output Circuit and Connection



## Light-ON/Dark-ON Switching



Turning all the way to the left end enables the Light-ON mode.  
Turning all the way to the right end enables the Dark-ON mode.

## Environmental Specification

Environment	Ambient temperature	-25 - +55 °C (non-freezing)
	Ambient humidity	35-85%RH (non-condensing)
	Protective structure	IP67
	Vibration	10-55 Hz / 1.5 mm amplitude / 2 hours each in 3 directions
	Shock	500 m/s <sup>2</sup> / 3 times each in 3 directions
	Dielectric withstanding	1,000 VAC for 1 minute
	Insulation resistance	500 VDC, 20 M $\Omega$ or higher

## Applicable power supply unit

PS Series

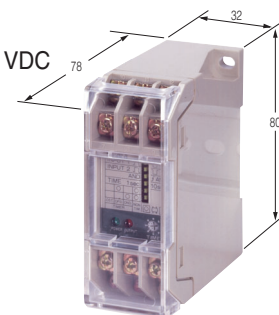
High capacity of 200 mA at 12 VDC

(General-purpose type) PS3N

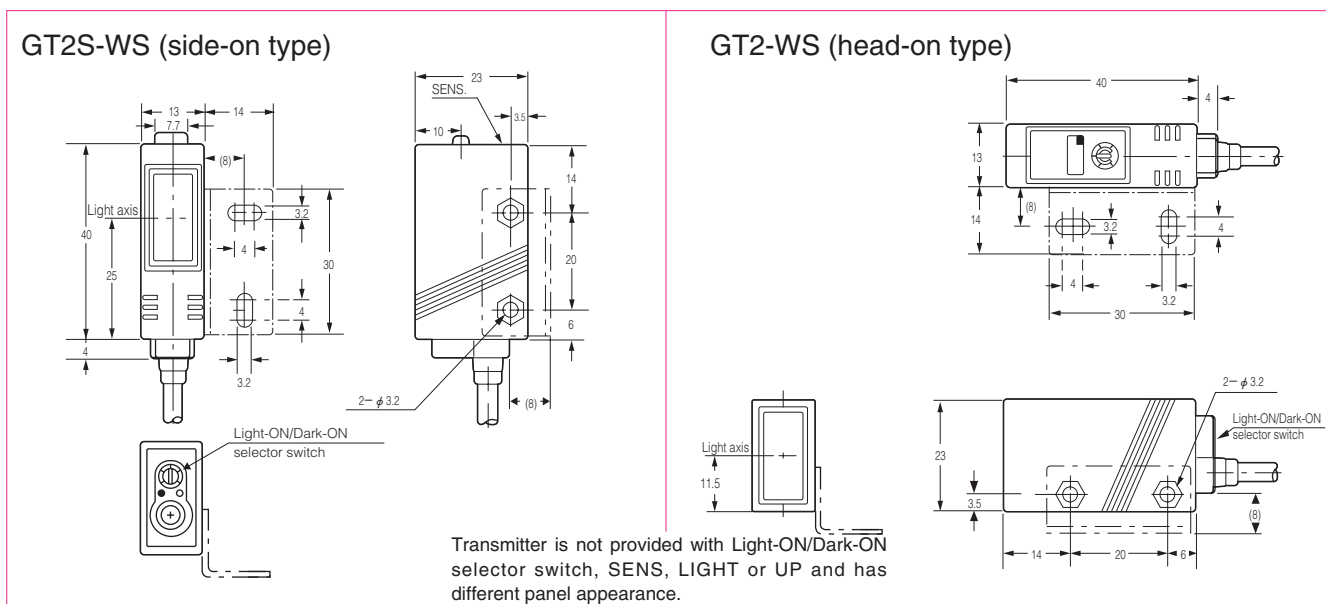
PS3N-SR

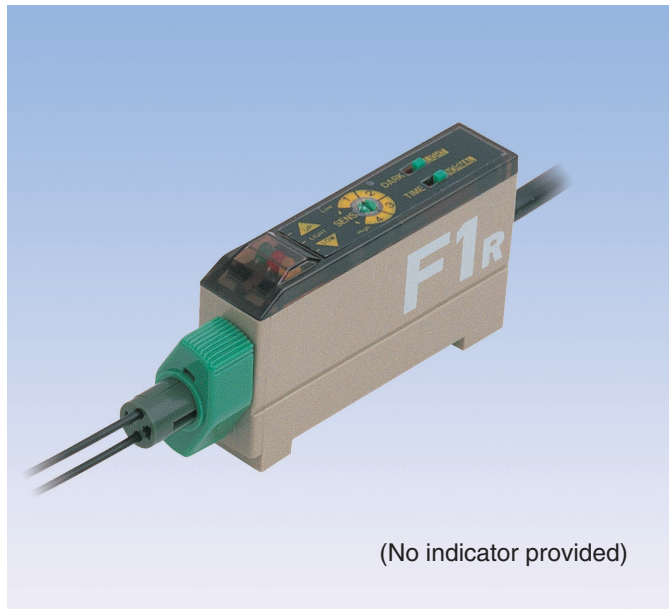
(Multifunctional type) PS3F

PS3F-SR



## Dimensions (in mm)





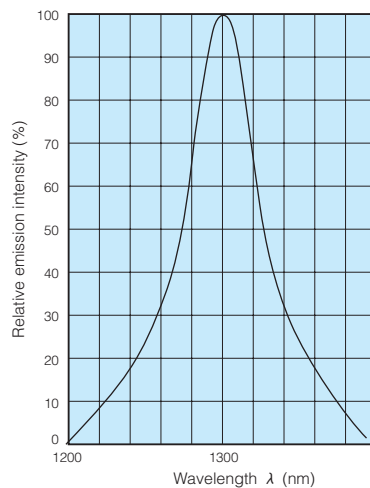
- Slim width of 12 mm
- Multifunctional slim sensor ideal for dark room use
  - Infrared ray of 1,300 nm used as light source, no indicator provided and no visible light emitted
  - 4-turn adjustment with indicator for fine-tuning

## Type

Detection method	Detecting distance	Model	Operation mode	Output mode
Through-beam type	30mm (GLT500 series)	<b>F1RM-DR</b>	Light-ON/ Dark-ON selectable	NPN open collector
Reflective type	5mm (GLX 500 series)			
(*Depending on fiber optic cable)				

\*The light source is infrared LED. Use glass fiber optic cable (separately provided).

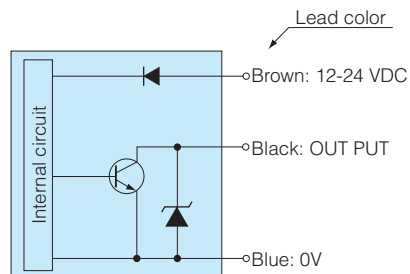
## Emission Spectrum Characteristics (Typical Example)



## Rating/Performance/Specification

Model	F1RM-DR
Light source (wavelength)	Infrared LED (1300nm)
Power supply	12-24V DC $\pm 10\%$ / Ripple 10% max.
Current consumption	30mA max.
Operation mode	Light-ON/Dark-ON selectable with switch
Timer	Off-delay/timer disabled selectable with switch
Delay time	About 50 ms fixed
Output mode	NPN open collector
Rating	Sink current 30V DC 100 mA max. (Residual voltage: 1 V)
Hysteresis	10% max. of distance (reflective type)
Response time	250 $\mu$ s max
Sensitivity adjustment	With volume (4-turn without stopper, indicator provided)
Protective structure	IP 40
Material	ABS resin
Connection	Permanently attached cord (Outer dimension: dia. 4) / 0.3 mm <sup>2</sup> x 3cores 2m
Mass	About 80 g max. (including cord)
Applicable power supply unit	PS Series, IP Series

## Input/Output Circuit and Connection

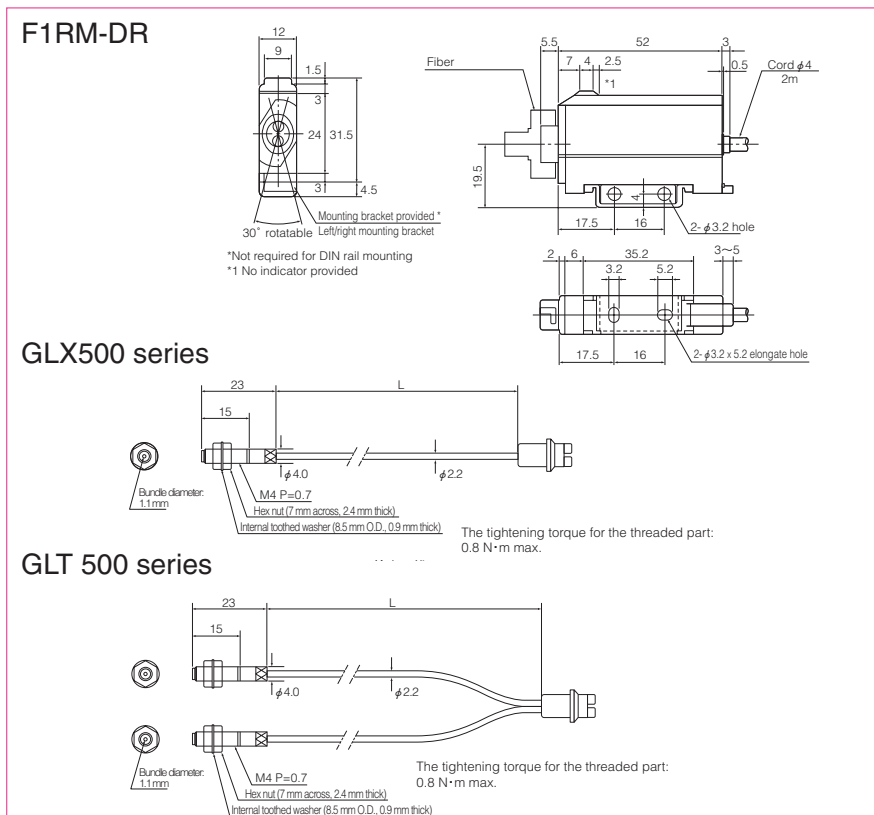


- Output is provided with a short circuit protection circuit. The output transistor turns off when load short circuit or overload occurs. Check the load and turn the power back on.

## Environmental Specification

Ambient light	10000lx max.
Ambient temperature	-25 - +55 °C Storage: -40 - +70 °C (non-freezing)
Ambient humidity	35-85%RH max. (non-condensing)
Vibration	10-55 Hz / 1.5 mm amplitude / 2 hours each in 3 directions

## Dimensions (in mm)



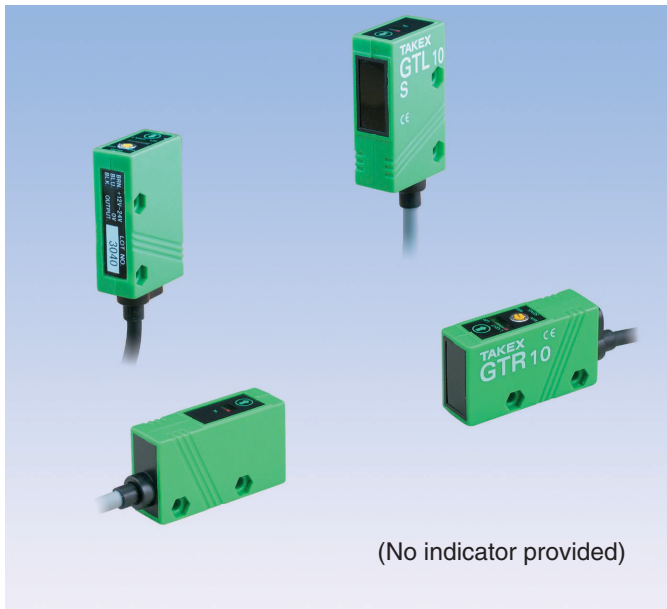
## Fiber Optic Cable (Typical Example)

### GLT Series (detecting distance: 30 mm)

Model	GLT505	GLT510	GLT520
Fiber length L (m)	0.5	1	2
Ambient temperature	Tip: -60 - +200°C; covering: 200°C		
Fiber material	Covering	Fluoroplastic	
	Core	Glass	
Fiber diameter	Cable	2.2	
	Core	Bundle diameter 1.1	
Allowable bending radius	R25		
Minimum detector object diameter	1.0 (fine-tunable)		

### GLX series Detecting distance 5mm

Model	GLX505	GLX510	GLX520
Fiber length L (m)	0.5	1	2
Ambient temperature	Tip: -60 - +200°C; covering: 200°C		
Fiber material	Covering	Fluoroplastic	
	Core	Glass	
Fiber diameter	Cable	2.2	
	Core	Bundle diameter 1.1 (2-division)	
Allowable bending radius	R25		
Minimum detector object diameter	0.05 (fine-tunable)		



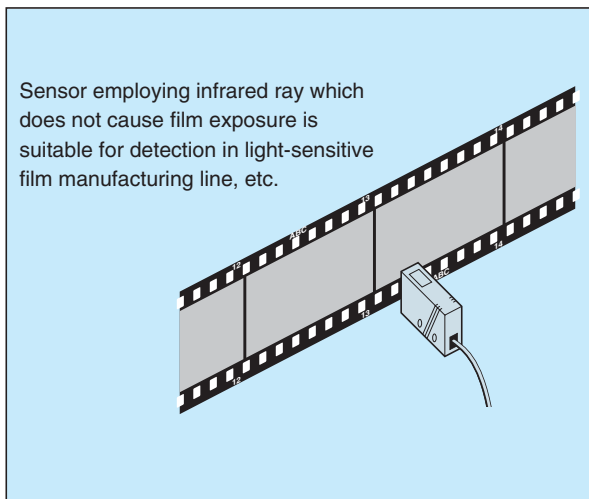
- Ideal for detection of photographic film, light-sensitive paper, etc.
  - Available as light source of sensor used in dark room (product with long wavelength 1,450 nm also available)
- Built-in amplifier for easy handling
- Various models for different applications

Products for Specific Applications

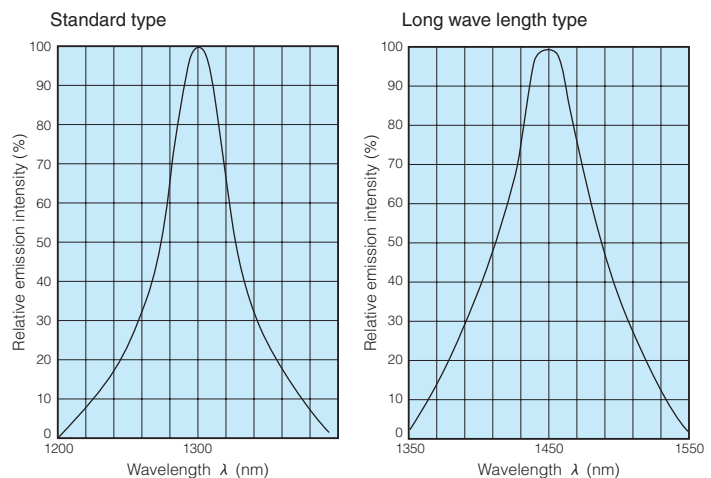
### Type

Detection method	Detecting distance	Model		Operation mode	Output mode	Remarks
		Side-on type	Head-on type			
Through-beam type	2m max.	<b>GT2S-DR</b>	<b>GT2S-DR</b>	Light-ON/ Dark-ON selectable (with switch)	NPN open collector	Generic type
Reflector type	0.2-1m	—	<b>GR2M-DR</b>			
Diffuse-reflective type	100mm max.	<b>GR02S-DR</b>	<b>GR02-DR</b>			
Through-beam type	1.7m max.	<b>GT2S-DR14</b>	<b>GT2-DR14</b>	Light-ON/ Dark-ON selectable (with switch)	NPN open collector	Long wavelength type
Reflector type	0.2-0.8m	—	<b>GR2M-DR14</b>			
Diffuse-reflective type	70mm max.	<b>GR02S-DR14</b>	<b>GR02-DR14</b>			

### Sample Application



### Emission Spectrum Characteristics (Typical Example)



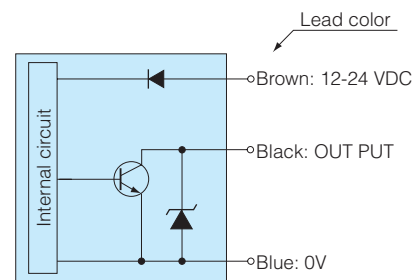
Rating/Performance/Specification (Generic type)

Model	GT2-DR	GT2S-DR	GR2M-DR	GR02-DR	GR02S-DR
Detection method	Through-beam type	Side-on through-beam type	Reflector type	Diffuse-reflective type	Side-on diffuse-reflective type
Detecting distance	2m max.		0.2-1m *1	100m max.	
Detection object	Opaque object of ø20 mm or larger		—	Standard detection object: 100 x 100 white drawing paper	
Power supply	12-24V DC ±10% / Ripple 10% max.				
Current consumption	Transmitter: 25 mA max.; Receiver: 10 mA max.		34mA max.	38mA max.	
Output mode	NPN open collector Rating: sink current 100 mA (30 VDC max.)				
Operation mode	Light-ON/Dark-ON selectable (with switch)				
Response time	5ms max		1ms max	5ms max	
Operating angle	10° (at receiver)		10° (at reflector)	—	
Hysteresis	—		10% max		
Light source	Infrared LED (Light wavelength: 1300nm)				
Volume	Sensitivity adjustment				
Switch	Light-ON/Dark-ON selector switch				
Short circuit protection	Provided				
Material	Case/lens: polycarbonate				
Connection	Permanently attached cord (Outer dimension: dia. 4.2) Transmitter: 0.3 mm <sup>2</sup> x 2 cores 3m, gray Receiver: 0.3 mm <sup>2</sup> x 3 cores 3m, black		Permanently attached cord (Outer dimension: dia. 4.2) 0.3 mm <sup>2</sup> x 3 cores 3m, black		
Mass	About 100 g max. (transmitter/receiver)		100g max.		
Notes	Pinhole plate optionally available		*1 With K-7 reflector (accessory)		

Environmental Specification (generic/long-wavelength type)

Ambient light	5000 lx max.
Ambient temperature	-25 - +50 °C (non-freezing)
Ambient humidity	35-85%RH (non-condensing)
Protective structure	IP67
Vibration	10-55 Hz / 1.5 mm amplitude / 2 hours each in 3 directions
Shock	500 m/s <sup>2</sup> / 3 times each in 3 directions
Dielectric withstanding	1,000 VAC for 1 minute
Insulation resistance	500 VDC, 20 MΩ or higher

Input/Output Circuit and Connection (generic/long-wavelength type)

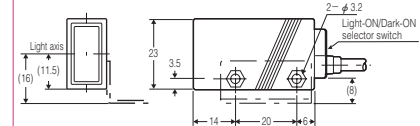
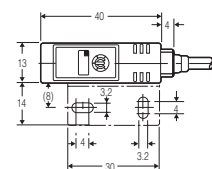


Dimensions (in mm)

(generic/long-wavelength type)

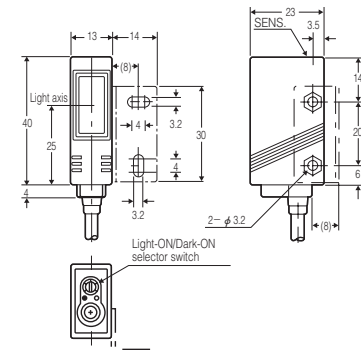
head-on type

GT2-DR  
GT2-DR14  
GR2M-DR  
GR2M-DR14  
GR02-DR  
GR02-DR14



side-on type

GT2S-DR  
GT2S-DR14  
GR02S-DR  
GR02S-DR14



(No indicator provided)

Further enhanced performance! product with wavelength of 1,450 nm available

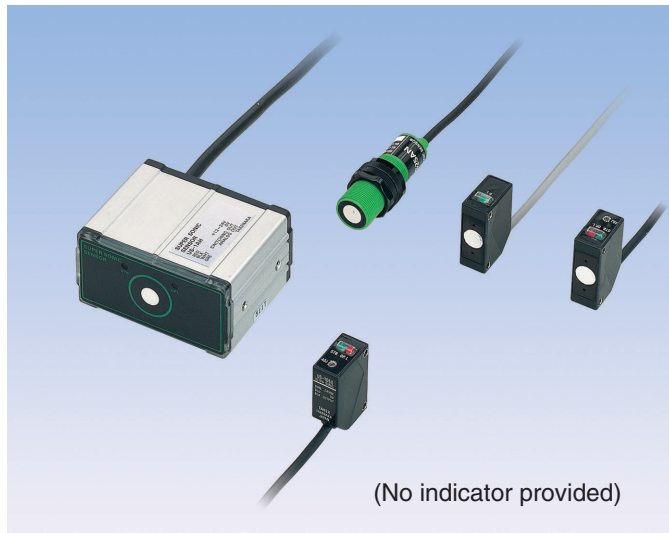
The DR Series sensors are ideal for detection of photographic film and light-sensitive paper and can be used as the light source of a sensor used in a dark room. (1,450 nm wavelength does not cause exposure in film detection.)

Rating/Performance/Specification (Long wavelength type)

Model	GT2-DR14	GT2S-DR14	GR2M-DR14	GR02-DR14	GR02S-14DR
Detection method	Through-beam type	Side-on through-beam type	Reflector type	Diffuse-reflective type	Side-on diffuse-reflective type
Detecting distance	1.7m max.		0.2-0.8m	70m max.	
Detection object	Opaque object of ø20 mm or larger		—	Standard detection object: 100 x 100 white drawing paper	
Power supply	12-24V DC ±10% / Ripple 10% max.				
Current consumption	Transmitter: 25 mA max.; Receiver: 10 mA max.		34 mA max.	38 mA max.	
Output mode	NPN open collector Rating: sink current 100 mA (30 VDC max.)				
Operation mode	Light-ON/Dark-ON selectable (with switch)				
Response time	1ms max				
Operating angle	10° (at receiver)		10° (at reflector)	—	
Hysteresis	—		10% max		
Light source/wavelength	Infrared LED (Light wavelength: 1450nm)				




# Ultrasonic Sensors

Sensors for dark rooms

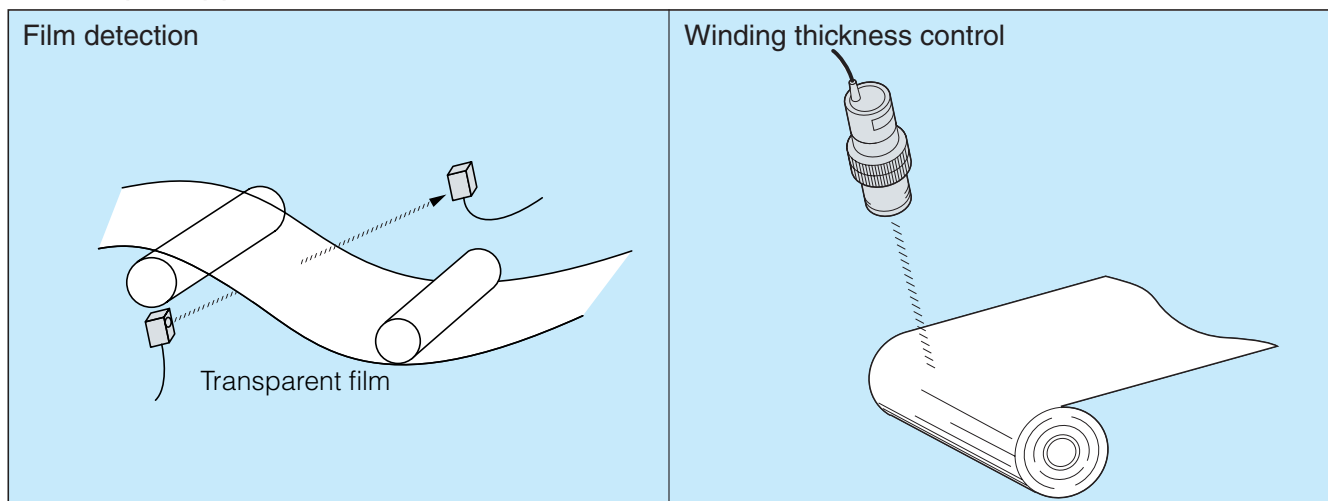


- Wide range of detectable objects whether transparent or opaque
- Less susceptible to color or gloss of detected object
- Analog output available

## Type

Detection method	Detecting distance	Model	Operation mode	Output mode
Through-beam type	 500mm max	<b>US-T50NL</b>	Wave-OFF	NPN open collector output
Reflective type	 60-250mm	<b>US-R25-01</b>	Wave-ON	
		<b>US-S25AN-NL</b>	Proportional output	Analog output
	 0.08-1m	<b>US-1AH-NL</b>	Wave-ON/ Wave-OFF selectable (with switch)	Analog output  Comparator output

## Sample Application





## Rating/Performance/Specification

Model	Set model US-T-50-NL		US-R25-01	US-S25AN-NL	US-1AH-NL
	Transmitter model	Receiver model			
Detection method	Through-beam type		Reflective type		Ultrasonic reflective type
Detecting distance	500mm max.		60~250mm		0.08~1m
Detection object	10 x 30mm (*)		30 x 30mm (*)		40 x 40mm (*)
Dead zone	—		Within 60mm		Within 80mm
Power supply	24V DC ±10% / Ripple 10% max.				12-24V DC ±10% / Ripple 10% max.
Current consumption	TE50:20mA max. / TD50:15mA max.		25mA max.		50 mA max.
Response time	10ms max.		50 ms max.	2V→300ms max. for 10V 10V→30ms max. for 2V	Analog output: 30 ms Comparator output: 50 ms
Output mode	Output	NPN open collector / Rating: sink current 100 mA (30 VDC) max.		Voltage output in proportion to distance Effective voltage: 2.2~10 V (13.5 V max.) Rating: source current 10 mA max.; at output voltage 10 V	0.8-10V Output impedance 600Ω
	Comparator output	—		—	NPN open collector / Rating: sink current 100 mA (30 VDC) max.
Operation mode	Wave-OFF		Wave-ON	—	Wave-ON/Wave-OFF selectable (with switch)
Operating angle	20°		—		—
Resolution	—		2 mm (including 80-mV ripple)	1 mm = 10mmV	
Linearity	—		+/- 5% max. of F.S.		±3% FS
Hysteresis	—		10% max.		3% max. of detecting distance
Ultrasonic frequency	360KHz ± 15KHz				180KHz ± 10 KHz
Volume	Sensitivity adjustment	Distance adjustment	—		Distance adjustment (4-turn, without stopper)
Switch	—		—		Wave-ON/Wave-OFF selector switch
Short circuit protection	—		—		Output short circuit protection, protection against reverse connection
Connection	Permanently attached cord (outer diameter: dia.4)		Permanently attached cord (outer diameter: dia.4) 0.2 mm <sup>2</sup> x 3cores, 2 m		Permanently attached cord (outer diameter: dia.6.5) 0.3 mm <sup>2</sup> x 4cores, 2 m
Mass	80g max. (Transmitter/Receiver)		80g max.	65g max.	350g max.

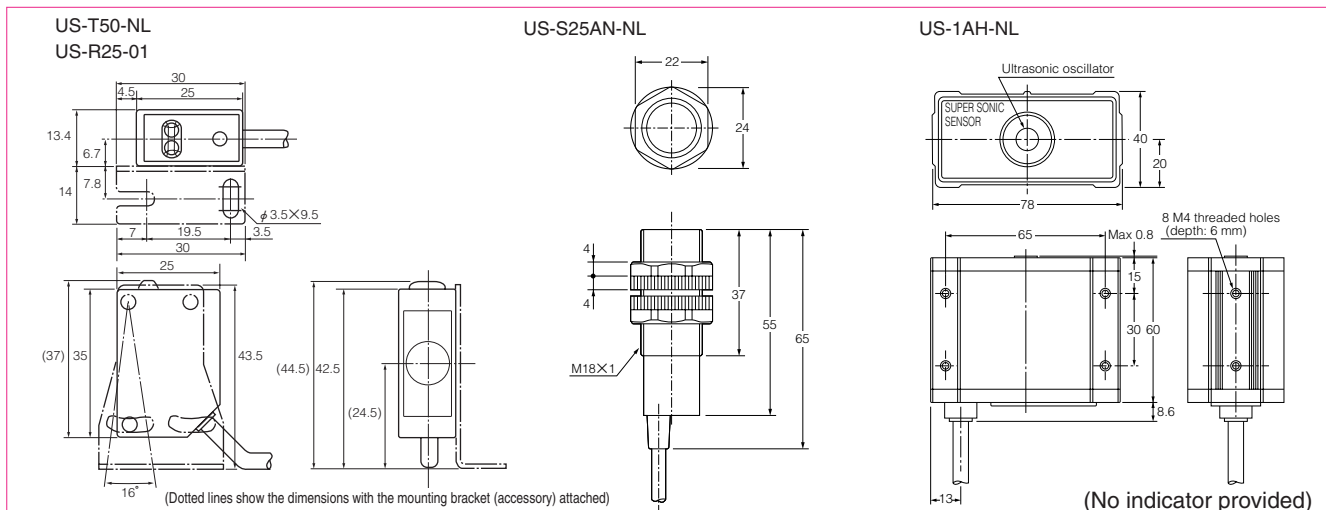
● For detection of object with low ultrasonic reflectance such as rubber, the maximum detecting distance may be reduced. \*Sample object: 1-mm thick aluminum plate

## Environmental Specification

Model	US-T50-NL	US-R25-01	US-S25AN-NL	US-1AH-NL
Ambient temperature	-25 - +55 °C (non-freezing)			
Ambient humidity	35-85%RH (non-condensing)			
Ambient wind speed	1 m/s max.			
Protective structure	IP54(no drops of water allowed on head)			IP51
Vibration	10-55 Hz / 1.5 mm amplitude / 2 hours each in 3 directions			
Shock	490 m/s <sup>2</sup> / 2 times each in 3 directions (ultrasonic element excluded)			980 m/s <sup>2</sup> / 2 times each in 3 directions

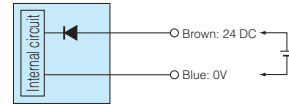
(Note) Temperature unevenness in space transmitting ultrasonic vibration excluded.

## Dimensions (in mm)

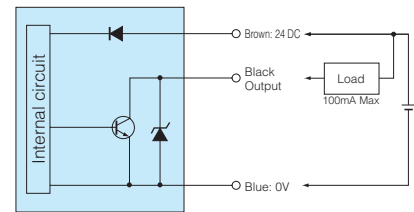


## Input/Output Circuit and Connection

### • Transmitter US-TE50-NL

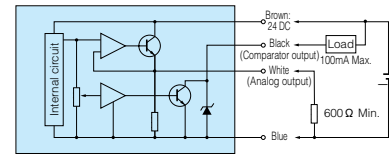


### • Receiver/reflective type sensor US-TD50-NL US-R25-01

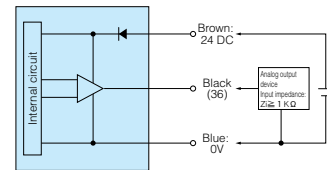


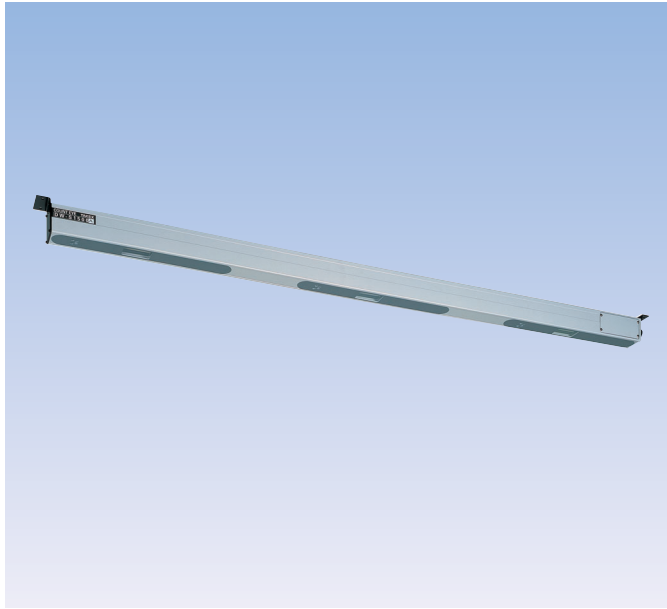
(Output is not provided with short circuit protection circuit.)  
(Use caution to prevent load short circuit.)

### US-1AH-NL (NPN output)



### US-S25AN-NL





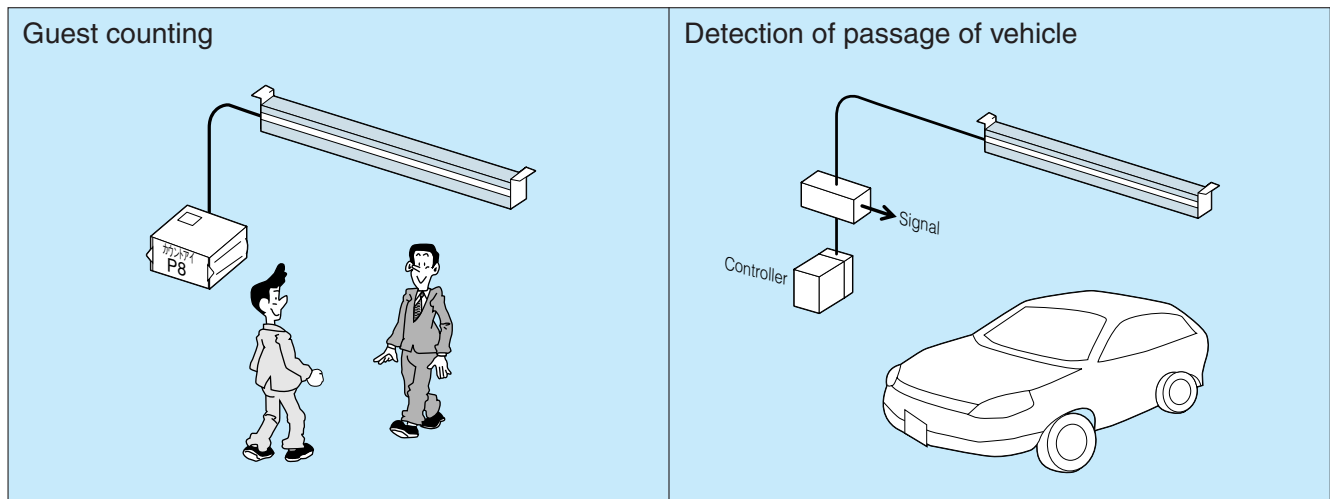
- Detection accuracy is improved by incorporating a limited-distance reflective system
- Overlapped passage (entry and exit simultaneously) reliably detected
- Direction of passage differentiated
- Ideal as a for guest counting sensor

### Type

Detection method	Detecting distance	Model	Detecting width	Output mode
Limited-distance reflective type	0.2-1m	<b>DW-S500</b>	500mm	Open collector
		<b>DW-S900</b>	900mm	
		<b>DW-S1500</b>	1500mm	

\*2 2 m type also available. (\*2)

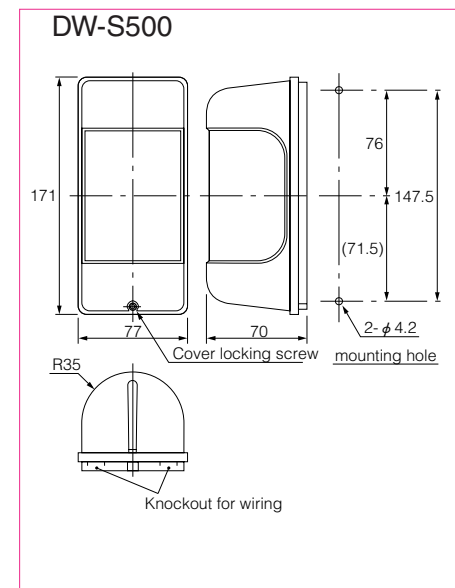
### Sample Application



## Rating/Performance/Specification

Model	DW-S500	DW-S900	DW-S1500
Detection method	Limited-distance reflective type		
Detecting distance	0.2-1m	0.2-1m (*2)	
No. of built-in sensors	2	4	6
Detecting width	About 500mm	About 950mm	About 1500mm
Speed of passage	2-7km / hour		
Power supply	12V DC $\pm$ 10%		
Power consumption	160mA	250mA	300mA
Output mode	Open collector / Rating: 50 mA (30 VDC) max.		
No. of outputs	2 (*)	4	6
One-shot timer	500ms	150ms	
Operation mode	Light-ON		
Hysteresis	10% max. of detecting distance		
Connection	Terminal block (*1)		
Case material	Resin	Aluminum	
Mass	About 0.5kg	About 3kg	About 4.5kg
Notes	*Product with direction differentiation output is also available. *1 DW-S1500 also has a type with cord attached in direction of sensor side. *2 2 m type also available (excluding DW-S500).		

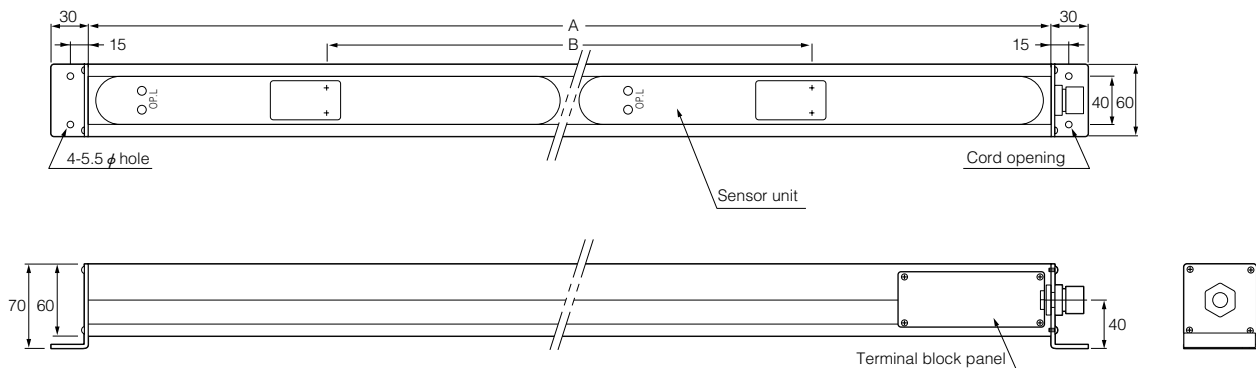
## Dimensions (in mm)



## Environmental Specification

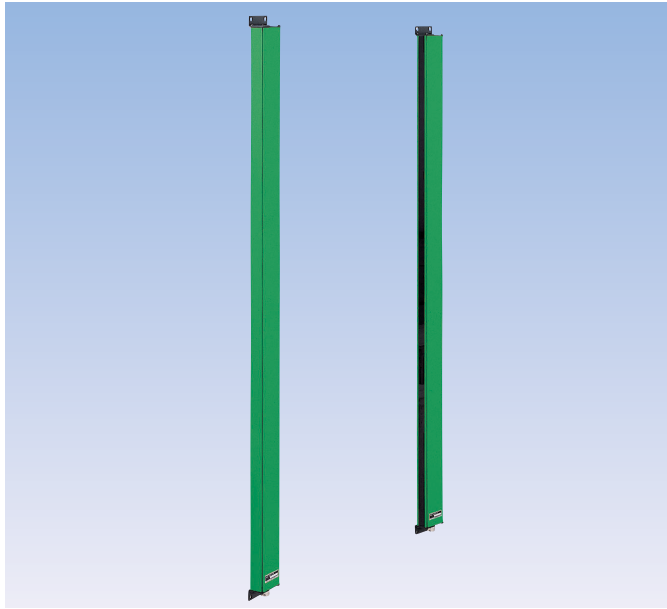
Environment	Specification
Ambient light	Sunlight: illumination on light receiving surface 10,000 max. Incandescent lamp: illumination on light receiving surface 3,000 max.
Ambient temperature	0 - +50 °C (non-freezing)
Ambient humidity	35-85%RH (non-condensing)
Protective structure	IP40
Vibration	10-55 Hz / 1.5 mm amplitude / 2 hours each in 3 directions

## DW-S900 / 1500



### • Dimensions of portions (in mm)

Model	DW-S900	DW-S1500
A	950	1500
B	550	1100
No. of built-in sensors	2	3



- Excellent resistance to biggest problem in outdoor use: sunlight

- Dual sensor integration
- Ideal for detecting the passage of vehicles and people

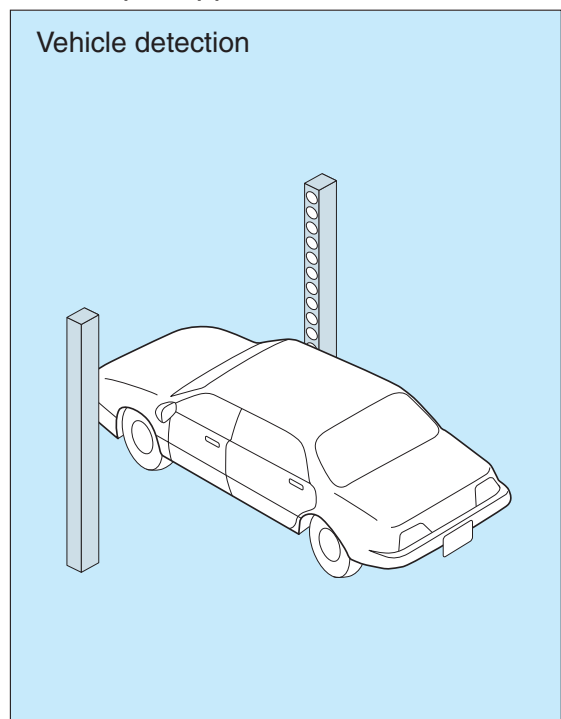
## Type

Detection method	Detecting distance	Set model	No. of light axes	Detecting width	Operation mode	Output mode
Through-beam type	 7m	<b>LST-T112</b>	12	900mm	Dark-ON (one output for sensor A/B)	NPN open collector
		<b>LST-T116</b>	16	1220mm	Stability (one output for sensor A/B)	
		<b>LST-T120</b>	20	1540mm	Stability (one output for sensor A/B)	

The LST Series light curtain sensors overcome the weakness of photo sensors vulnerability to faulty operation caused by intense sunlight. One case contains both the transmitter and receiver so that objects passing between the sensor units can be reliably detected by combining the output of one of the two sensors even if the receiver of the other fails due to sunlight.

## Sample Application

### Vehicle detection



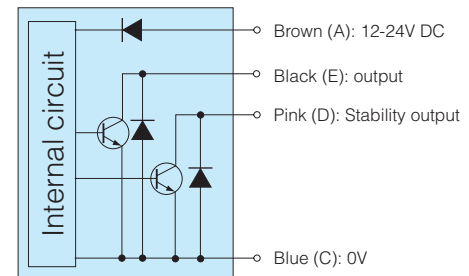
### Timing chart



## Rating/Performance/Specification

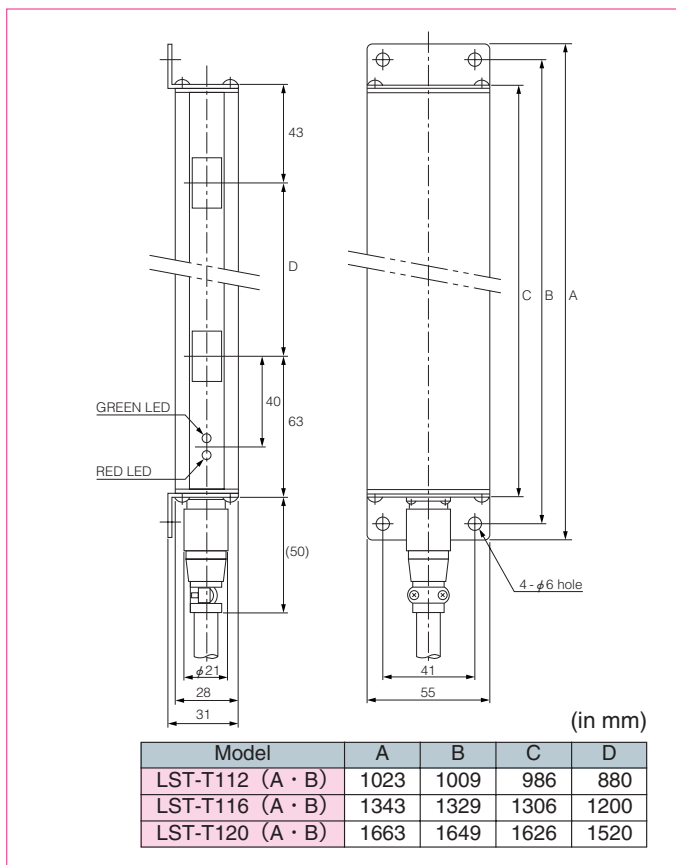
Model	Sensor A	LST-T112A	LST-T116A	LST-T120A
	Sensor B	LST-T112B	LST-T116B	LST-T120B
Set		LST-T112	LST-T116	LST-T120
Detection method	Through-beam type (scanning pulsed illumination, matching with consecutive 2 pulses)			
Detecting distance	7m			
Detection object	Opaque object of light blocking width of 100 mm min.			
Light axis interval	80mm			
No. of light axes	12	16	20	
Detecting width	900mm	1220mm	1540mm	1
Operation mode	Dark-ON mode (detection output: 1 each for Sensors A and B)			
Stability output	Provided (1 each for Sensors A and B)			
Output mode	100 mV (30 VDC) max. for each output			
Power supply	24V DC $\pm$ 10% / Ripple 10% max.			
Current consumption	160 mA max.	180 mA max.	200 mA max.	
Response time	12ms	15ms	18ms	
Light source	Infrared LED			
Light-sensitive element	Photodiode			
Indicator	Detection indicator: 1 red LED (Sensor A/B) Stability indicator: 1 green LED (Sensor A/B)			
Material	Case: aluminum / Front cover: acrylic / Lens: acrylic			
Connection	Connector (TRC116-12A 10-5F 10.5 provided by Tajimi Electronics)			
Mass (Sensor A/B)	1.2 kg	1.5 kg max.	2 kg max.	
Ambient light	Direct radiation on light receiving surface 50,000 max. (with halogen lamp)			
Ambient temperature	- 30 - +60 °C (non-freezing, non-condensing) (Cold start at - 30 °C available)			
Ambient humidity	20-95%RH (Sensor must be enclosed in case not subject to dew condensation.)			
Protective structure	IP54			

## Input/Output Circuit and Connection



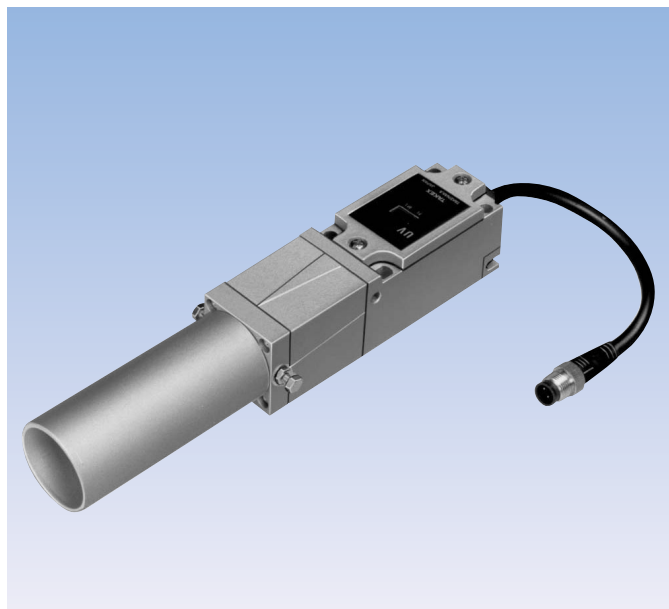
- Output circuit is the same for detection outputs of Sensors A and B and stability output.
- Output is NPN open collector and provided with short circuit protection.

## Dimensions (in mm)



# UV-R200


UV detection sensors



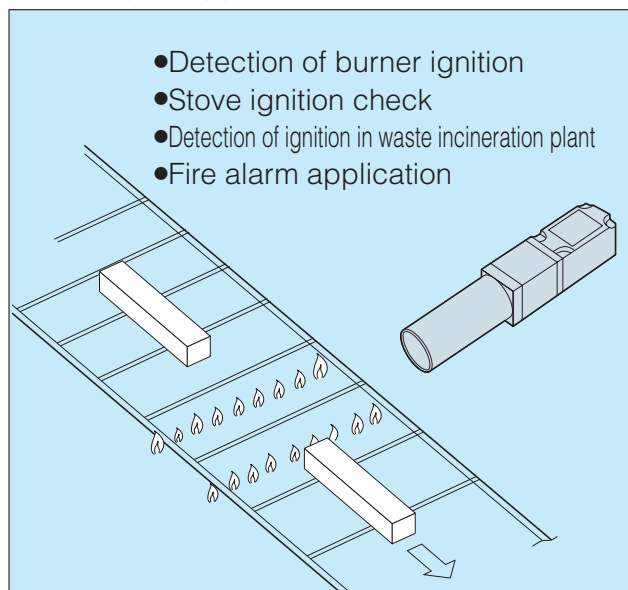
- Ultraviolet ray from flame accurately detected
- Ideal for monitoring ignition and extinguishing flame
  - A UV detector is utilised in the receiver that detects ultraviolet rays radiated from burning objects.

Products for Specific Applications

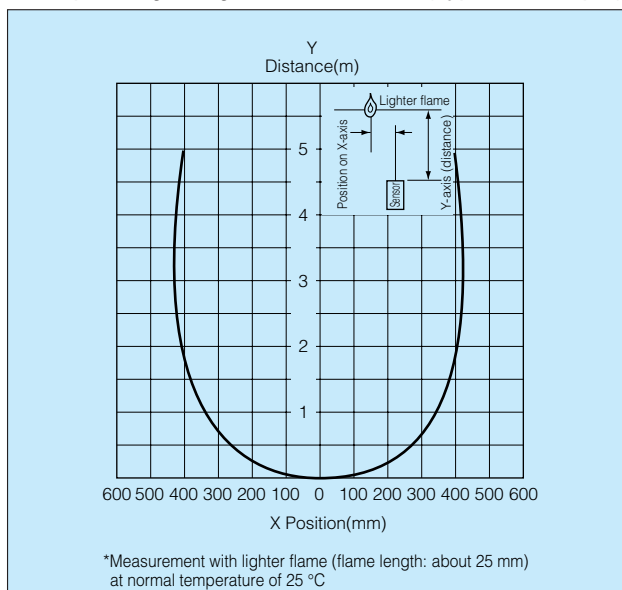
## Type

Detection method	Detecting distance	Model	Operation mode	Output mode
Radiation detection type	 2m	<b>UV-R200</b>	Light-ON	NPN open collector

## Sample Application



## Operating Range Characteristics (Typical Example)



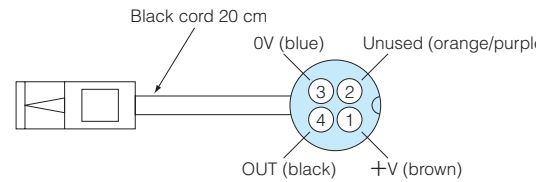
# UV-R200

## Rating/Performance/Specification

Rating/Performance	
Model	<b>UV-R200</b>
Detection method	UV radiation detection (peak wavelength: 200 nm)
Detecting distance	2 m (with gas lighter flame)
Power supply	12-24V DC $\pm 10\%$ / Ripple 10% max.
Current consumption	25 mA max.
Output mode	NPN open collector Rating: sink current 100mA (30V DC) max.
Operation mode	Light-ON (activation at UV reception)
Response time	0.1 s max.
Specification	
Indicator	Power indicator (green LED), operation indicator (red LED)
Sensitivity adjustment	Provided
Detector life	About 10,000 hours *1
Material	Main unit: zinc die-cast / Hood: aluminum / Lens: quartz glass
Connection	Permanently attached cord with connector 0.2 m, 0.5 mm $\times$ 4 cores
Mass	800g
Notes	*Total UV reception time • Cord with connector (5 m) provided. • Do not apply vibration or shock.

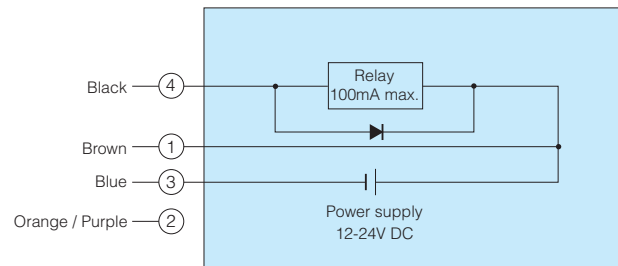
(Environmental Specification) • Ambient temperature:  $-10 - +55$  °C (non-freezing)  
 • Ambient humidity: 35-85%RH (non-condensing)  
 • Protective structure: IP66

## Connector Pin Assignment

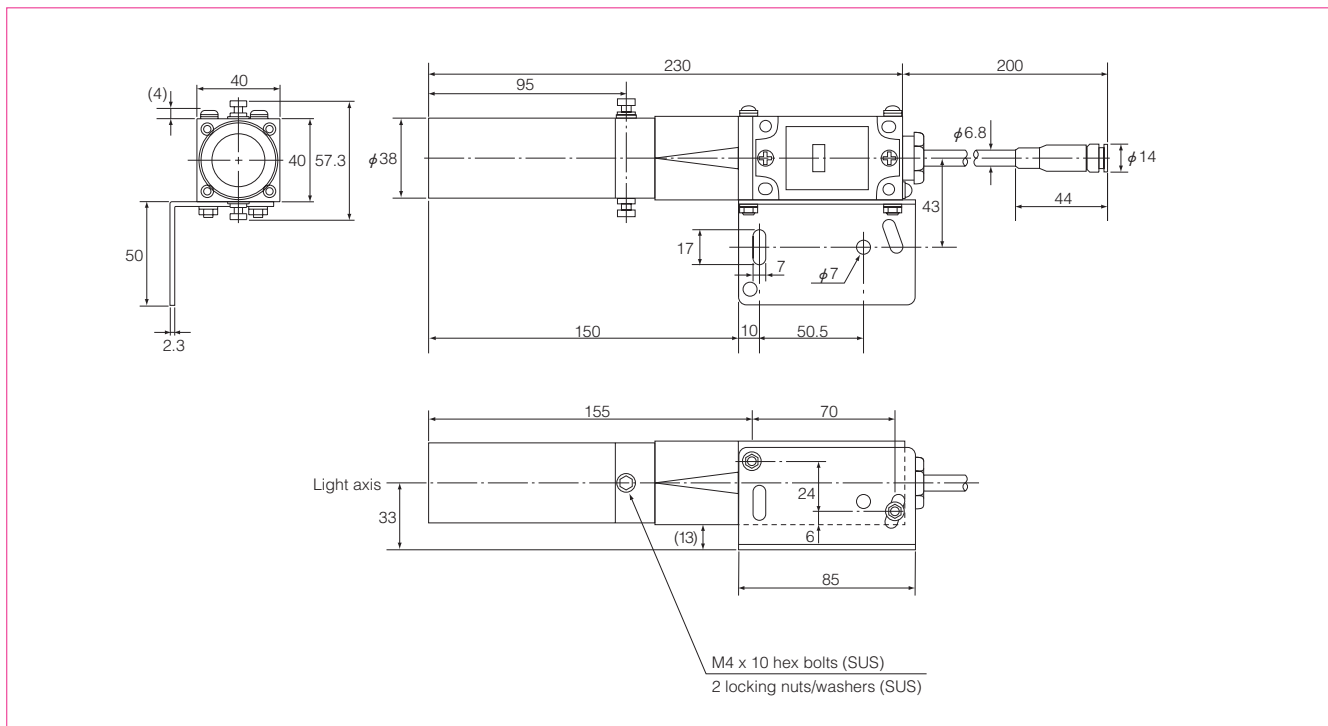


Colors in parentheses show four lead colors for use with the cord with connector.

## Connection

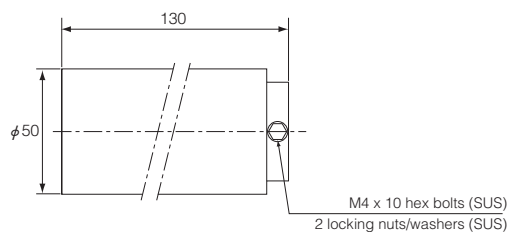


## Dimensions (in mm)



### F301 airless hood (optional)

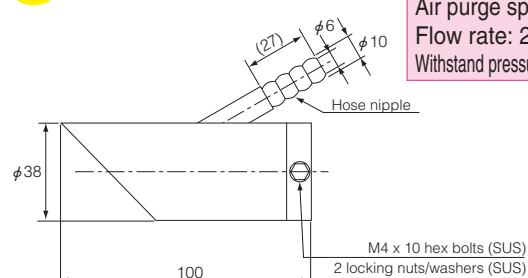
CAD



Remove adapter before use.

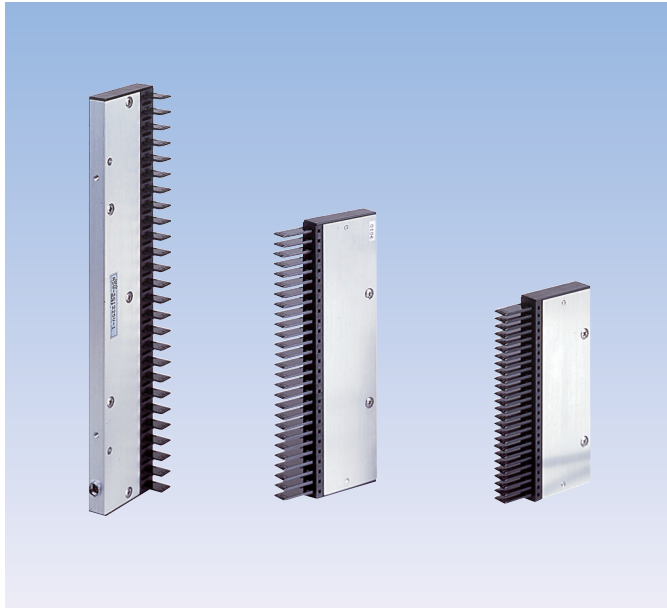
### A301 air purge hood (optional)

CAD



Air purge specification  
 Flow rate: 200  $\ell$ /min.  
 Withstand pressure: 0.98 MPa

Remove adapter before use.



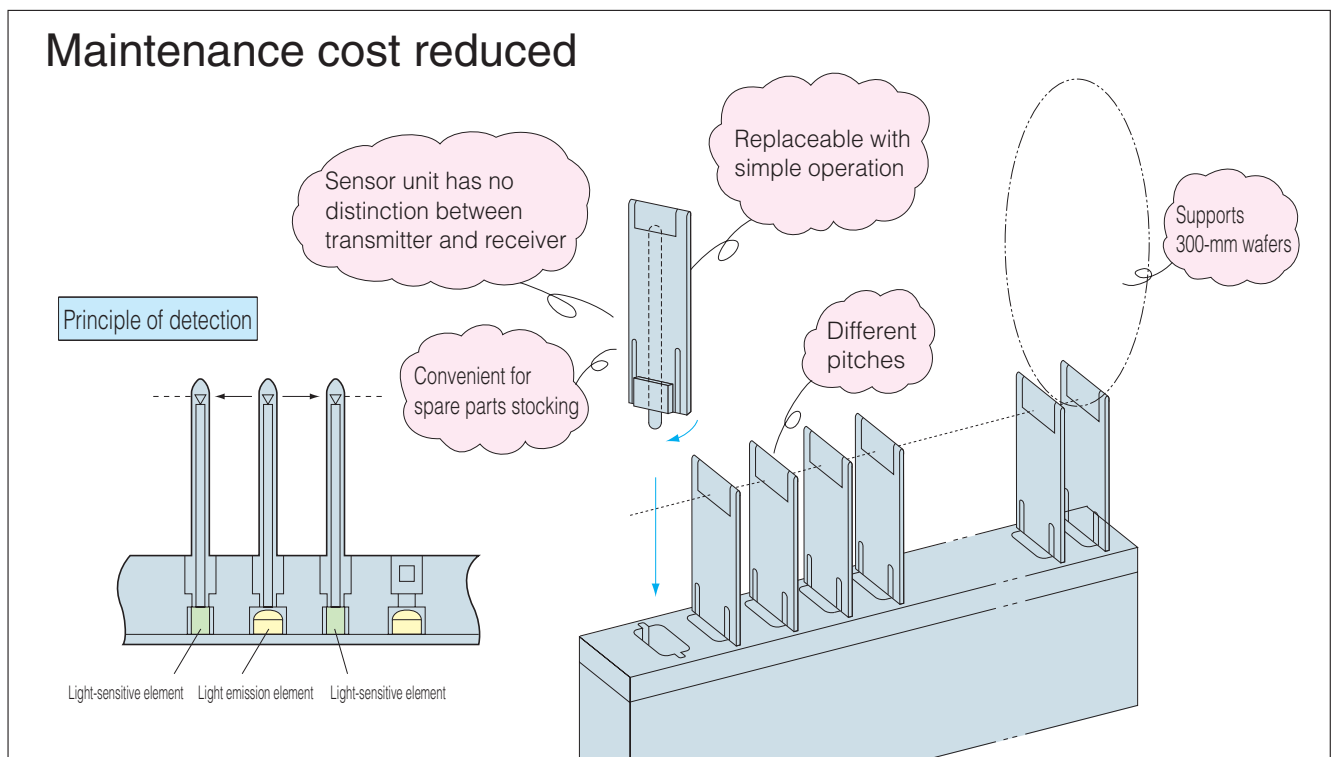
- Comb tooth-shaped part (sensor unit) replaceable with single operation
  - No need to replace entire sensor
  - Reduction of maintenance cost
- Supports 300-mm wafers
  - 12-inch type now available in addition to 6- and 8-inch types
  - Side-on type (-SG 1225 V) available
- Unique optical system along with fiber optic technology
- Through-beam model for reliable detection

### Type

Detection method	Applicable wafer size	Model	No. of channels	Comb tooth pitch	Power supply	Operation mode	Output mode
Through-beam type	6 inches	<b>ASW-SG625</b>	25	4.76mm	DC24V	Dark-ON	NPN open collector
	8 inches	<b>ASW-SG825</b>	25	6.35mm			
		<b>ASW-SG826</b>	26				
	12 inches (300mm)	<b>ASW-SG1225V</b>	25	10.00mm	DC12-24V		
<b>ASW-SG1225V-J</b>							

(Contact Takex for prices.)

### Maintenance cost reduced





## Rating/Performance/Specification

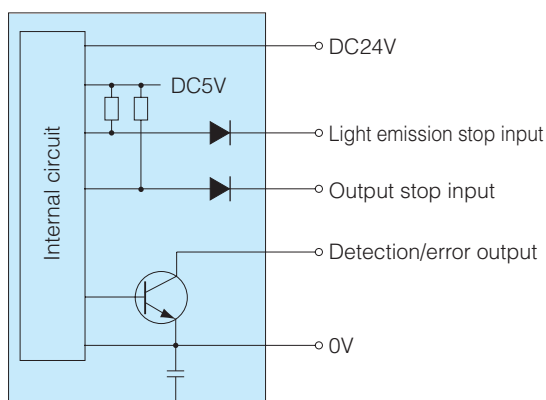
Model	ASW-SG 625	ASW-SG 825	ASW-SG 826	ASW-SG 1225V	ASW-SG 1225V-J
Applicable wafer size	6 inches	8 inches		12 inches (300mm)	
No. of detection channels	25		26	25	
Detection method	Through-beam type				
Power supply	24V DC $\pm 10\%$ / Ripple 10% max.			12-24V DC $\pm 10\%$ / Ripple 10% max.	
Power consumption	2.4W max.			1.7 W max.	
Output mode	NPN open collector Rating: sink current 30 mA (30V DC) max.				
Operation mode	Dark-ON (error output activated at detection of error)			Dark-ON	
Response time	4 ms max.				
Light source (wavelength)	Infrared LED (830 nm)			Infrared LED (860 nm)	
Connection	Permanently attached cord with connector (cord length: 3 m)				Connector type (Cord length: 3m)
Light emission stop input	Light emitted with open or at 4 V or higher, emission stopped at 1.5 V or lower				
Output stop input	Output permitted with open or at 4 V or higher, prohibited at 1.5 V or lower				
Material	Sensor: polycarbonate / Case: aluminum / Cord: flame-retardant PVC sheath (UL 2464)				
Mass (max.)	330g	365g	400g	500g	

## Environmental Specification

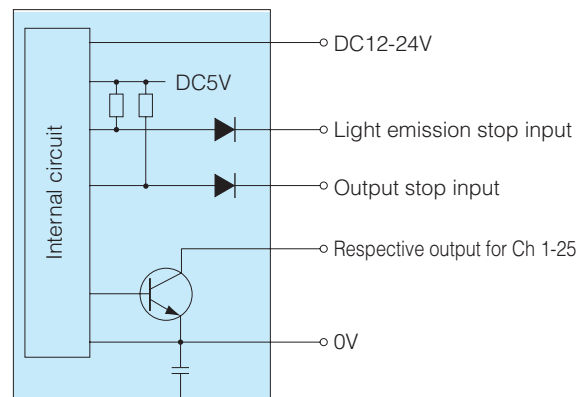
- Ambient light  
6-/8-inch types: 700 lx max.  
12 inch type: 1500 lx max.
- Ambient temperature  
-10 - +55 °C (non-freezing)
- Ambient humidity:  
35-85%RH (non-condensing)
- Protective structure: IP40

## Input/Output Circuit and Connection

ASW-SG625  
ASW-SG825  
ASW-SG826

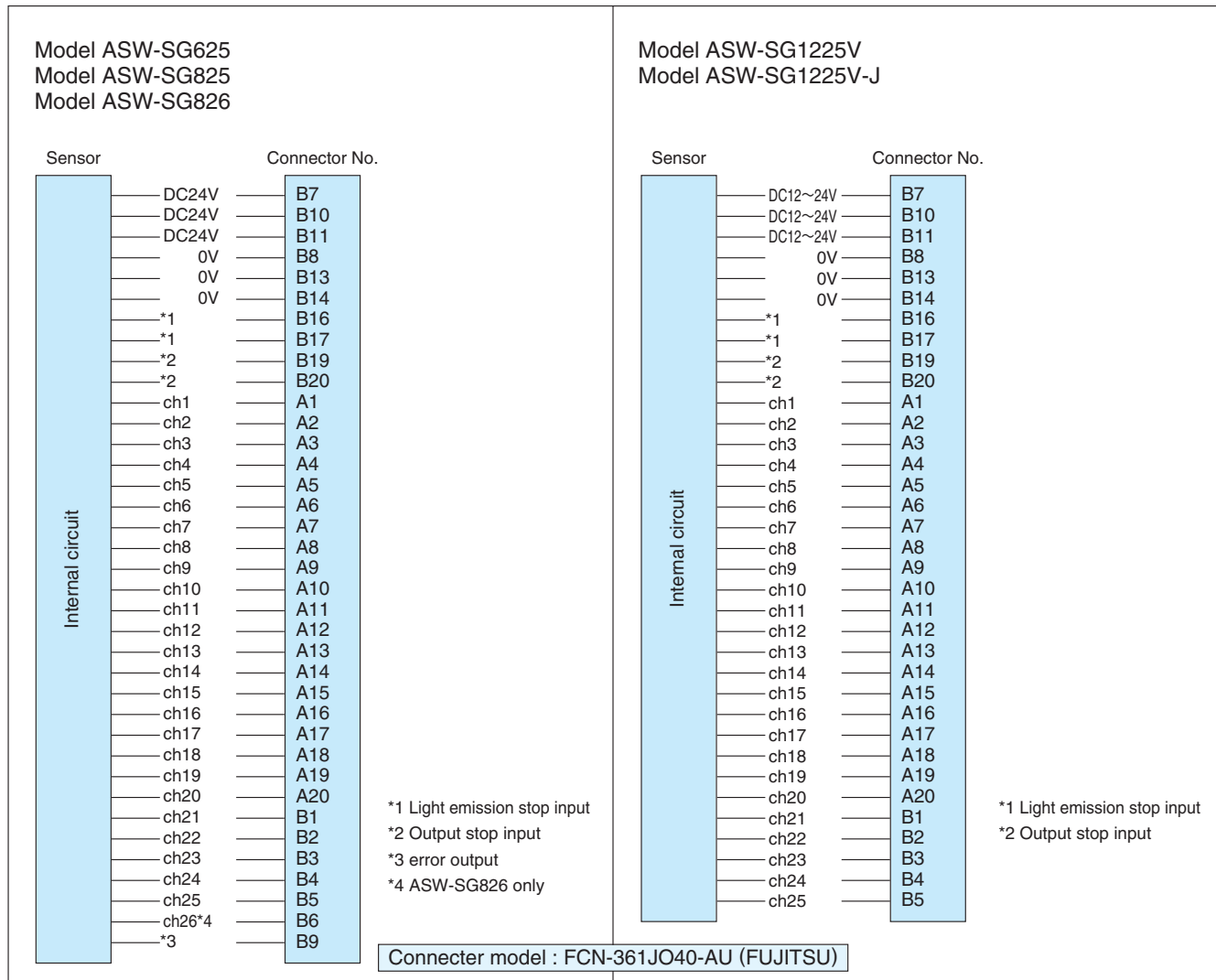


ASW-SG1225V  
ASW-SG1225V-J



# ASW-SG

## Connector External Connection



Products for Specific Applications

## Convenient Features

### 7-core robot cable

Serial output up to connector, parallel output from connector.



### Useful auxiliary functions

- Light emission stop feature: for diagnosis of sensor output circuits
- Output stop feature: for reduced number of inputs to the PC by parallel connection of multiple outputs
- Error output: for monitoring detection conditions of the sensor (not provided for ASW-SG1225)

#### • Light emission stop feature

Activating the light emission stop input (+1.5 V or lower) stops the emission of LEDs of all channels, which is the same as detection state, and the output transistors for all channels are activated. Use this function for diagnosis of sensor output circuits.

#### • Output stop (external synchronization) feature

Activating the output stop input (+1.5 V or lower) deactivates the output transistors of all channels regardless of the sensor operation. This allows parallel connection of two or more sensors, which reduces the number of inputs to the PC.

#### • Error output (not provided for ASW-SG1225)

Signal is output to indicate faulty operation due to erroneous detection caused by external light or circuit failure. Use this function for monitoring the detection condition of the sensor.

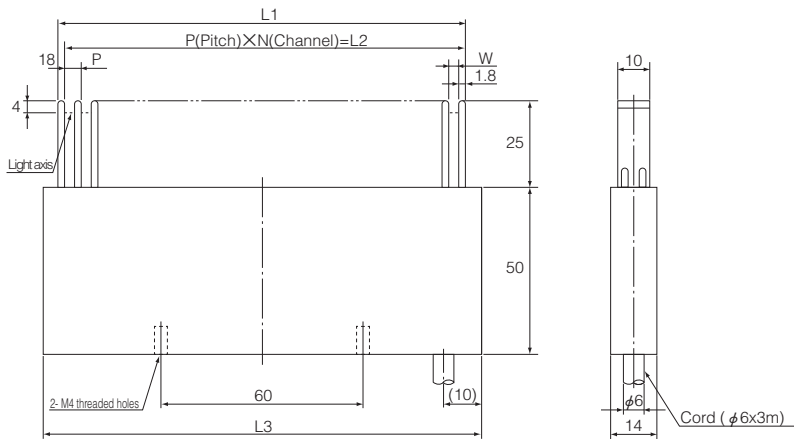
## Dimensions (in mm)

ASW-SG625  
ASW-SG825  
ASW-SG826

CAD

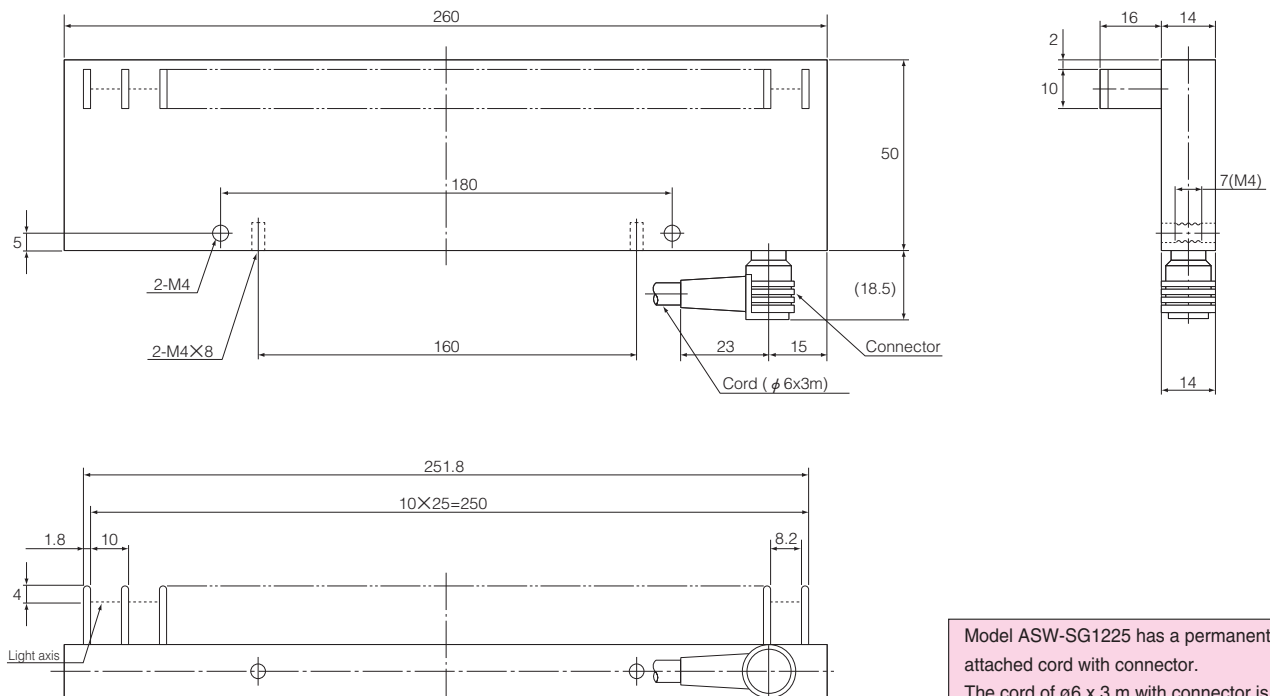
Dimensions of portions

Model	P(Pitch)	N(Channel)	W(Width)	L1	L2	L3
ASW-SG625	4.76±0.05	25	2.96	120.8	119	130
ASW-SG825	6.35±0.05	25	4.55	160.55	158.75	168.65
ASW-SG826		26		166.9	165.1	175



ASW-SG1225V-J

CAD



Model ASW-SG1225 has a permanently attached cord with connector. The cord of  $\phi 6 \times 3$  m with connector is attached at the connector portion in the figure.

# SST9298

## ASW-Useries

Wafer detection sensors



Wide type

Comb teeth type

- Silicon wafer reliably detected
- Through-beam model unaffected by surface reflection
  - Wide model and comb teeth models available

### Type

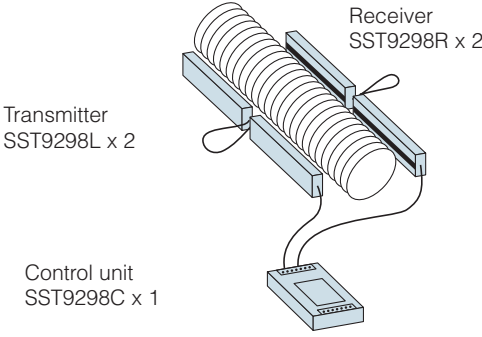
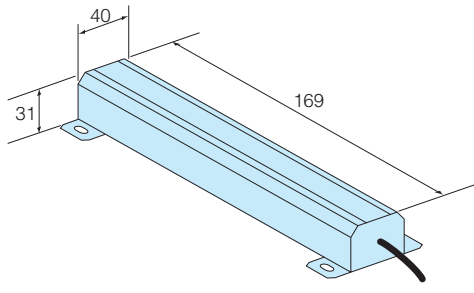
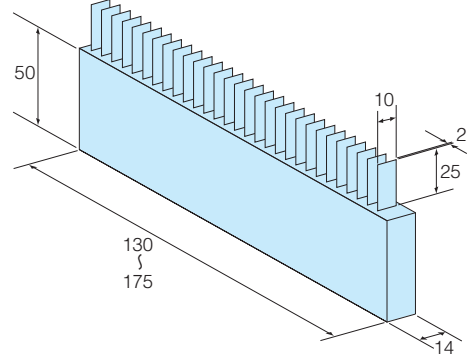
Detection method	Detecting distance		Model	Operation mode	Output mode
Through-beam type	300 mm fixed		<b>SST9298</b>	Dark-ON	Light blocking count Clamping error Light reception stability
U-shaped through-beam type		6 inches	<b>ASW-U625</b>		NPN open collector
			<b>ASW-U626</b>		
		8 inches	<b>ASW-U825</b>		
			<b>ASW-U826</b>		

### Features and Application Examples

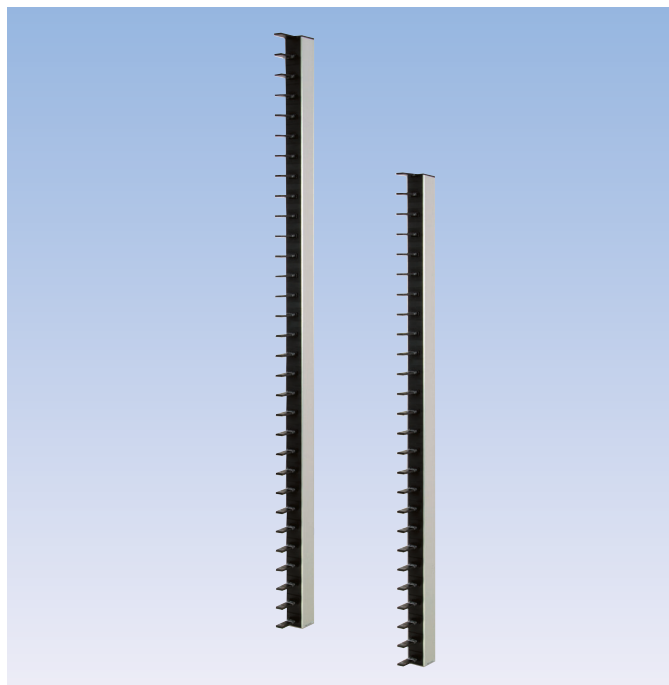
Multifunctional wide type	Low-cost comb teeth type
<ul style="list-style-type: none"> <li>● Carrierless and exclusively for 8-inch wafers</li> <li>● Checking for possible clamping error as well as wafer count possible</li> <li>● 50/52 ch (25/26 ch) selectable</li> <li>● Red LED facilitating light axis alignment</li> <li>● Control unit available offering a variety of control output signals</li> </ul>	<ul style="list-style-type: none"> <li>● Wide variety including 6-inch and 8-inch models and 25-ch and 26-ch configuration for each</li> <li>---Outputs for individual channels are available</li> <li>● Light axis alignment unnecessary, allowing easy set-up</li> <li>● Design in view of delicate wafers including detecting parts of comb teeth made of round-edged plastic pieces</li> </ul>

# SST/ASW-U

## Rating/Performance/Specification

Type	Wide type	Comb teeth type			
Applicable wafer size	8 inch (carrierless)	6 inch		8 inch	
Model	SST9298 *1	ASW-U625	ASW-U626	ASW-U825	ASW-U826
Detection method	Through-beam type	U-shaped through-beam type			
Detecting distance	300 mm fixed				
Power supply	24V DC ±10% / Ripple 10% max.				
Current consumption	200mA max.	100mA max.			
Output mode	<ul style="list-style-type: none"> <li>Light blocking count output (binary/BCD selectable with switch)</li> <li>Binary output (6-bit) / BCD output (7-bit)</li> <li>Clamping error output (1-bit)</li> <li>Light reception stability output (1-bit)</li> <li>(Rating) photocoupler output 30 mA (30 VDC) max.</li> </ul>	NPN open collector (each channel) (Rating) sink current 30 mA (30 VDC) max.			
Operation mode	Dark-ON				
No. of light axes	(selectable with switch)	25ch	26ch	25ch	26ch
Applicable wafer pitch	6.35mm	4.76mm		6.35mm	
Response time	20 ms max. (without data check) 40 ms max. (with 2-data matching) 60 ms max. (with 3-data matching)	} Selectable with switch		7 ms max.	
Light source (wavelength)	Red LED (660 nm)	Infrared LED (940 nm)			
Connection	Transmitter: 0.3 mm <sup>2</sup> x 4 cores 5m, Connector type Receiver: 0.3 mm <sup>2</sup> 6 cores 5m, Connector type Control unit: terminal block	Permanently attached cable with connector			
Notes	<p>*1 Set model No. Set model configuration:</p>  <p>Transmitter SST9298L x 2</p> <p>Receiver SST9298R x 2</p> <p>Control unit SST9298C x 1</p>	(Supplementary specification) Light emission stop input: emitted with open or at 4 V or higher, emission stopped at 1.5 V or lower Output stop input: output permitted with open or at 4 V or higher, stopped at 1.5 V or lower Protective structure: IP 40 (equivalent to simple dust proof) Ambient temperature: -10 - + 55 °C (non-freezing, non-condensing) *Standard cord length: 3 m For 1.5-m cord, add "-Y1.5" at the end of the model No.			
Dimensions overview	 <p>Figure showing 1 receiver</p>				

Products for Specific Applications



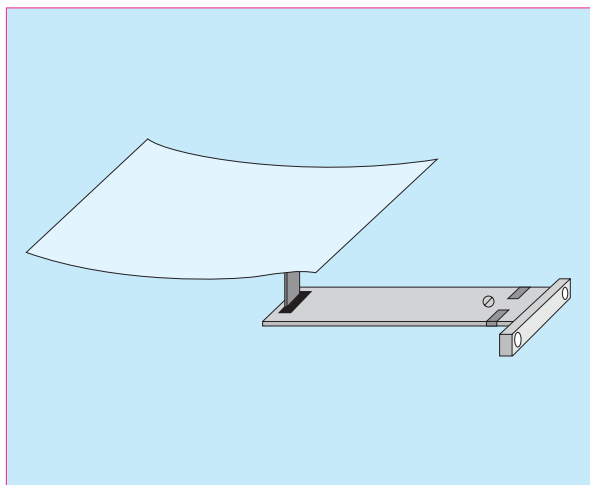
- Collective detection of transparent glass substrates
  - Glass substrates immediately after vapor deposition detectable as long as surface is glossy
  - Mirror-like objects such as stainless steel plates also detectable
- Adaptable to suit each situation including detected object count and pitch
- Each sensor unit independently replaceable
  - If sensor unit for 1 ch is damaged due to shock, etc., the damaged sensor unit can be independently replaced therefore no need to replace the entire sensor.

### Type

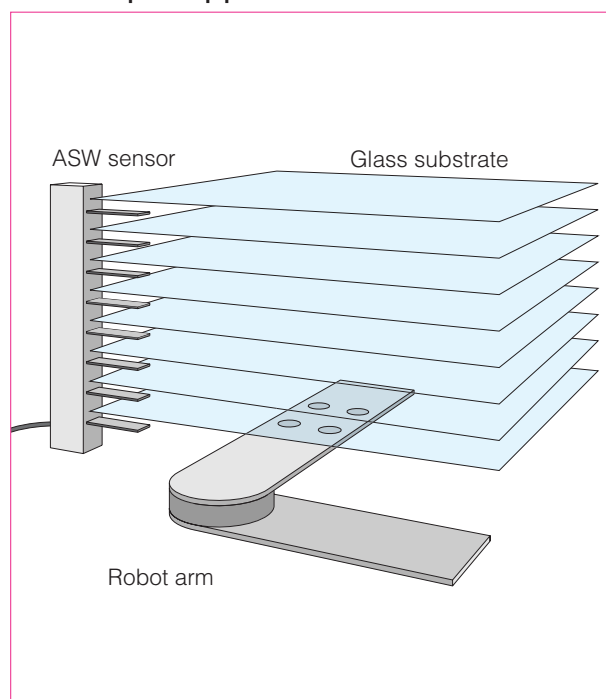
Detection method	Detection object	Model	No. of channels	Substrate pitch	Operation mode	Output mode
Reflective type	Transparent glass	<b>ASW-R06D4228</b>	28	42	Light-ON	NPN open collector

### Overview

ASW is a series of diffuse-reflective type sensors exclusively for glass substrates that detect liquid crystal glass or transparent substrates. An optical system especially designed for glass surface reflection is integrated that reliably detects warped or inclined glass. Operating distance is variable with the sensitivity adjustment provided.



### Sample Application



## Rating/Performance/Specification

Model	ASW-R06D4228
Detection method	Diffuse-reflective type for glass substrate
Detecting distance	Transparent glass at 20 mm max. (warp $\pm 10^\circ$ max.), up to 25 mm
Detection object	Transparent glass (vapor-deposited glass detectable as long as surface is glossy *1)
No. of channels	28 channels + 1 channel (dummy)
Applicable pitch	42mm
Power supply	24V DC $\pm 10\%$ / Ripple 10% max.
Current consumption	680 mA max. (with all channels activated)
Output mode	NPN open collector (each channel) sink current 30 mA (30 VDC) max.
Operation mode	Light-ON
Response time	7 ms max.
Light source	Red LED (660 nm)
Indicator	Operation indicator: orange LED x 28 (channel) (provided on comb teeth)
Connection (Connector type)	Permanently attached robot cable (2 m) with connector at end *2 (57-30360 provided by DDK)
Mass	About 2.4kg
Replacement comb tooth model	ASW-CU60R
Ambient light	5000 lx max.
Ambient temperature	5-40°C
Ambient humidity	35-85%RH (non-condensing)
Protective structure	IP40
Vibration	10-55 Hz / 1.5 mm amplitude / 2 hours each in 3 directions
Dielectric withstanding	500V AC for 1 minute
Insulation resistance	500 VDC, 20 M $\Omega$ or higher

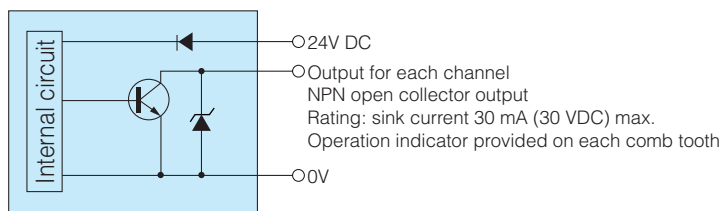
- For model Nos. and configuration, see the following page.

\*1 Detecting distance may be reduced for vapor-deposited glass depending on the film quality (check in advance).

\*2 Cable (provided by Kurabe): bending radius: 60 mm; bending life: 300,000 cycles; AWG 28 x 40; ETFE insulated; with flame-retardant PVC sheath

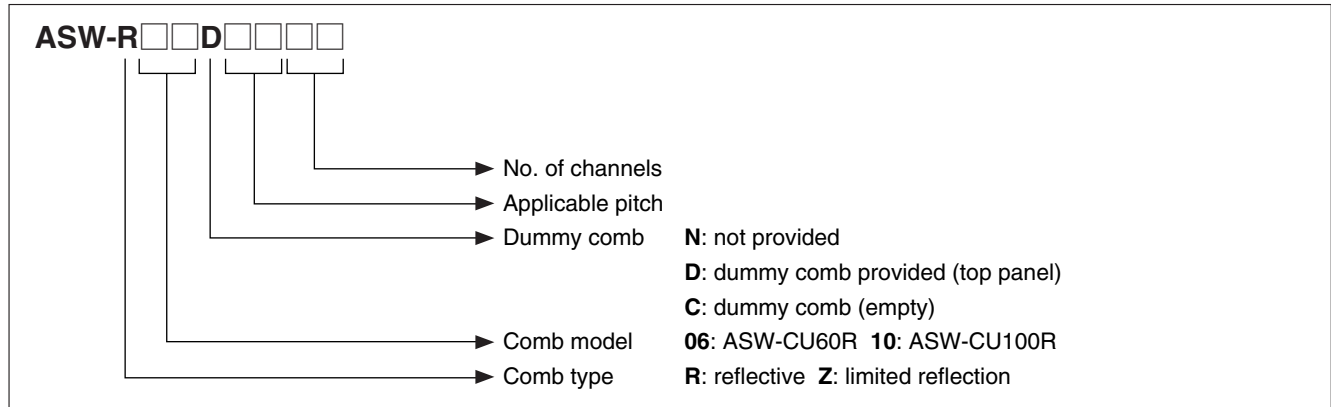
## Input/Output Circuit and Connection

NPN output type

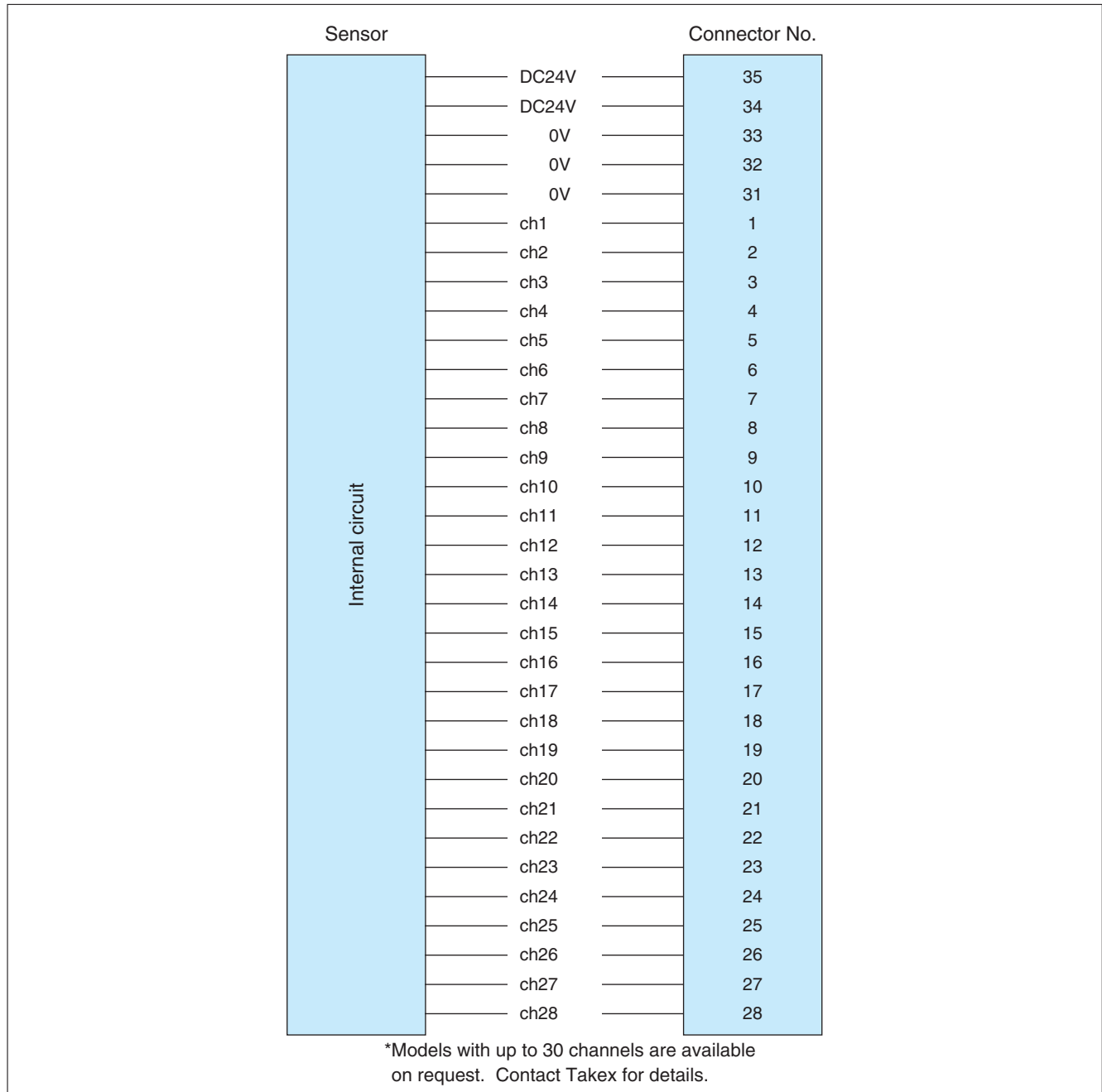


# ASW

## Model No. and Configuration

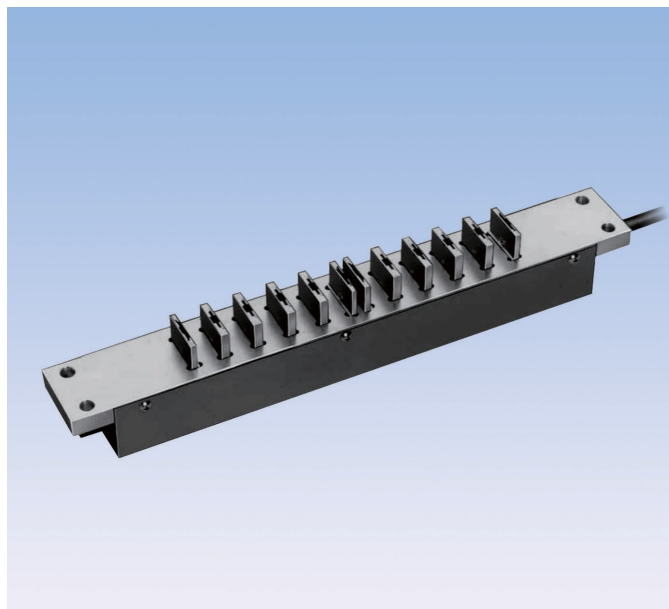


## Connector External Connection









- Tablet detected using a through-beam sensor
- Reliable and stable detection of object moving at high speed
  - Sensor for checking any missing tablet in PTP is activated when any one of the tablets in one sheet is found missing

### Type

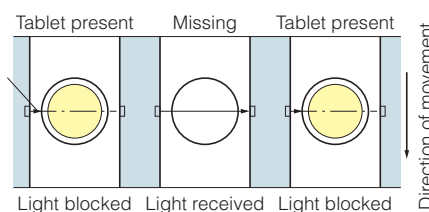
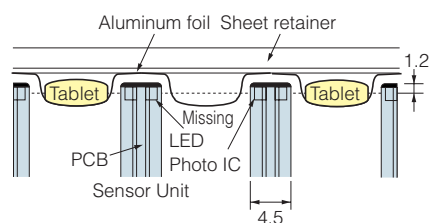
Detection method	Detecting distance (between transmitter and receiver)	Model	No. of channels	Minimum tablet size	Operation mode	Output mode
Through-beam type	(Determined based on tablet size; specification subject to discussion)	TCS-□□TS	2-20 ch	ø5 tablet or capsule (Inquire for transparent objects.)	Dark-ON	NPN open collector

### Principle of Detection and Application

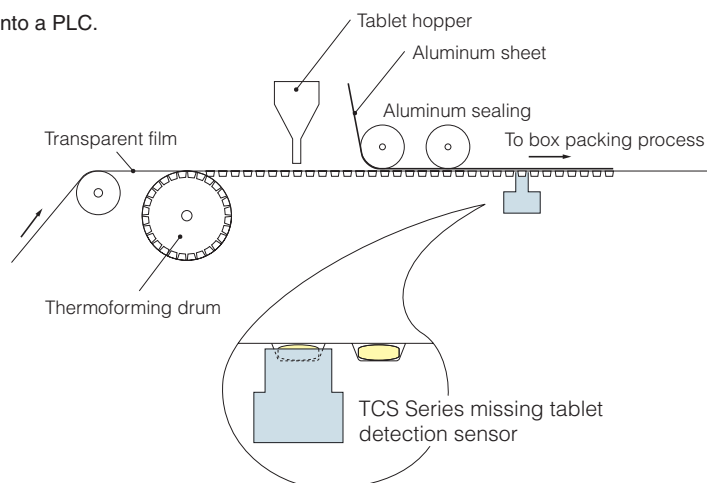
Unlike the conventional reflective type sensors, the TCS Series sensors are through-beam type that reliably detect any missing tablet with transmitter and receiver installed in the concave parts of the sheet.

Sensors are installed on the sheet guide as shown in the figure below, which output ON/OFF signals depending on whether tablets or capsules that should block the light beams are present.

The open collector output signals can be directly fed into a PLC.



#### PTP-packaging machine

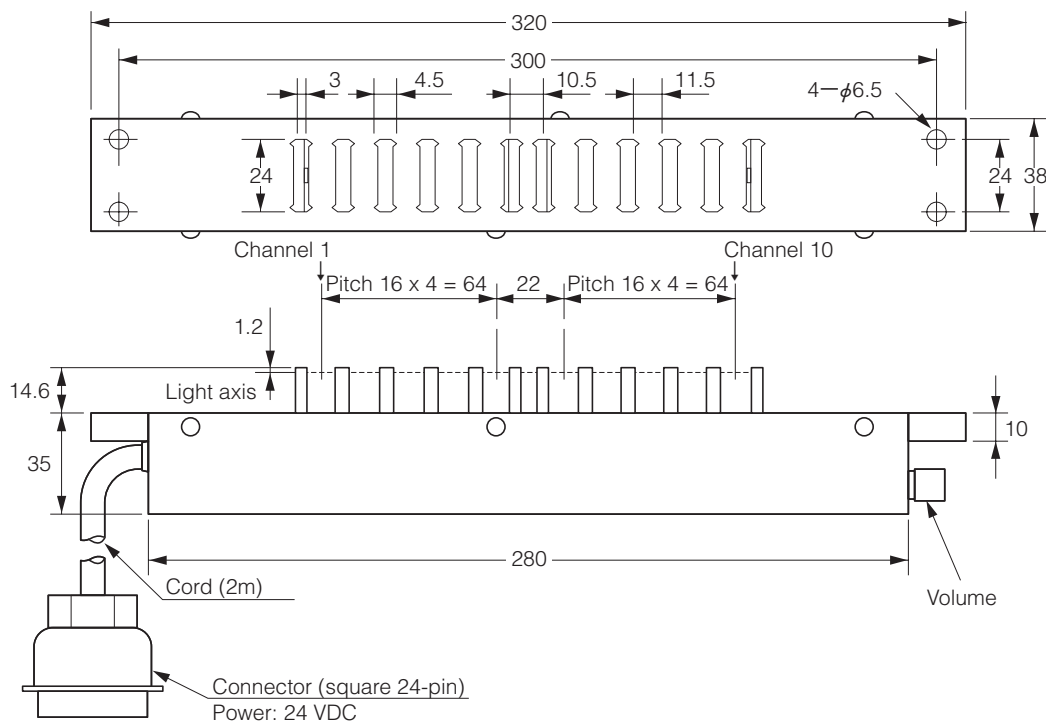


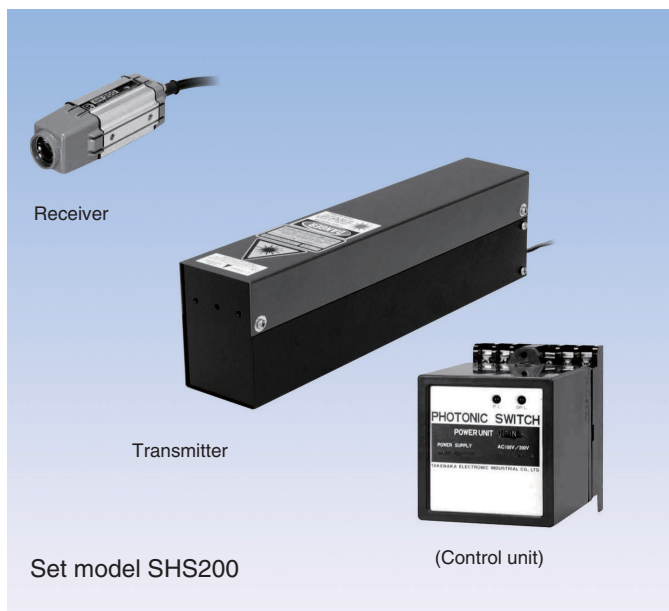
## Rating/Performance/Specification

Model	TCS-□□TS (□□ for No. of channels)
Detection method	Through-beam type
No. of channels	2-20ch
Sheet	PTP-packaging material only. Transparent film sealed with gold or silver aluminum foil.
Minimum tablet diameter	ø5 tablet or capsule; inquire for transparent objects.
Tablet height	2mm max.
Power supply	24V DC ±10% / Ripple 10% max.
Current consumption	200 mA max.
Output mode	NPN open collector output / Rating: sink current 70 mA (30 VDC) max.
Operation mode	Dark-ON mode
Response time	500 μs max.
Light source (wavelength)	Infrared LED (940nm)
Indicator	Operation indicator (red LED) in sensor
Sensitivity adjustment	Provided
Material	Cover: stainless steel / Body: aluminum
Connection	Permanent attached cord with 24-pin connector, 2 m

## Dimensions (in mm)

(Example with 10-ch 2-block system)





- High speed 200 kHz

- He-Ne laser  Class 2 laser employed

- High performance characterized by smallest detectable object diameter of 0.5 mm

The SHS Series photo sensors use an He-Ne laser as the transmitter light source and PIN photodiode as the light-sensitive element and therefore are capable of detecting objects moving at ultrahigh speed such as falling or rotating objects.

Take safety measures according to the operation manual.

### Specification

(Transmitter)

Transmitter	He-Ne laser
Light wavelength	632.8nm (Red)
Oscillation mode	TEM <sub>00</sub> (transverse monomode)
Output	0.5 mW min., Class 2
Beam diameter	See Laser Beam Diameter.
Rise time	70% at power-up; 15 minutes max. before rated output
Output stability	±5% (24 hours)
Power supply	AC100V±10% 50/60Hz 25VA
Laser tube life	8,000 h av.
Ambient temperature	0 - +40 °C (non-freezing)
Ambient humidity	35-85%RH (non-condensing)
Protective structure	IP40
Mass	3 kg max.

(Receiver)

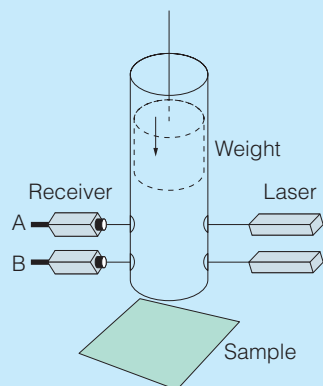
Distance	5 m (through-beam)
Light-sensitive element	PIN photodiode
Detection object	Opaque object of ø0.5mm or larger
Connection	Permanently attached cord 0.3 mm <sup>2</sup> x 3 cores shielded, 5m
Ambient temperature	0 - +40 °C (non-freezing)
Ambient humidity	35-85%RH (non-condensing)
Protective structure	IP40
Mass	170 kg max.

(Control unit)

Response frequency	200kHz
Output mode	Voltage output (Q): 10 V at light reception, 5 mA Voltage output (Q̄): 10 V at light blocking, 5 mA
Connection	Terminal block
Power supply current	AC100V/200V ±10% 50/60Hz
Ambient temperature	0 - +40 °C (non-freezing)
Ambient humidity	35-85%RH (non-condensing)
Protective structure	IP40
Mass	1 kg max.

### Sample Applications

- Rate of fall measurement for strength test, etc.



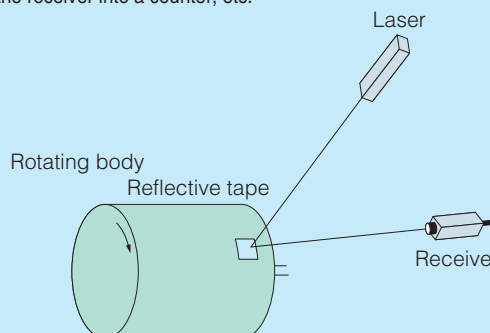
25 Photo sensors are installed facing two holes made in a top and bottom parts of a cylinder side.

The falling weight blocks the beam of Photo Sensor A, then the beam of Photo Sensor B. The time difference is used for measuring the rate of fall.

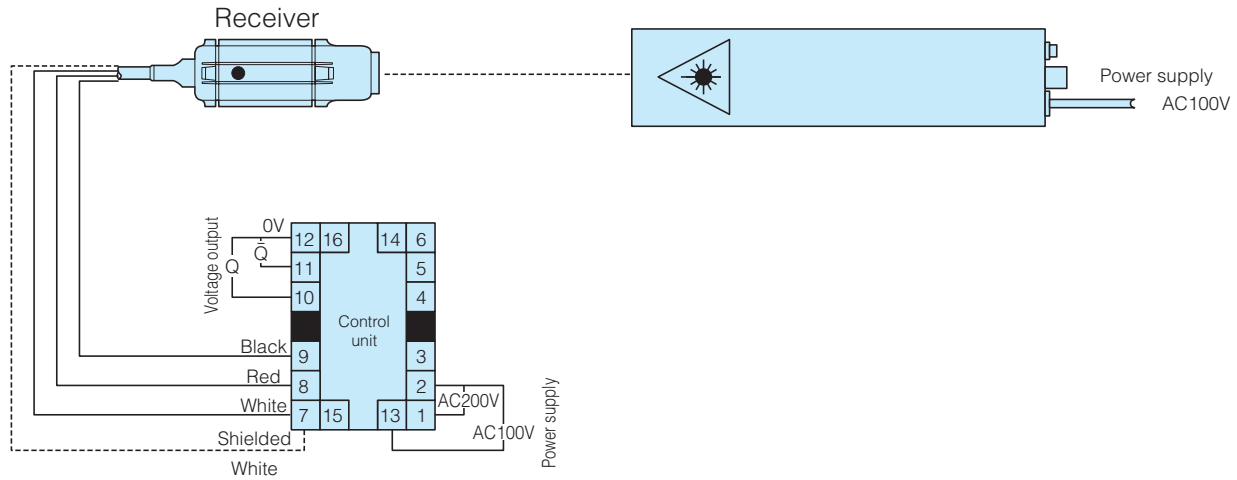
- Measurement of No. of rotations of drum, disk, etc.

Pasting a reflective tape on one point of a rotating body allows reception of laser beam with the receiver at each rotation.

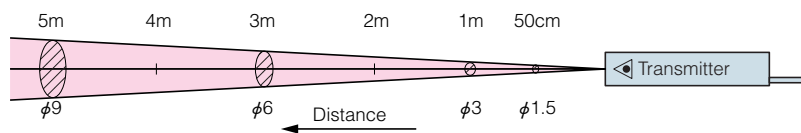
The number of rotations can be measured by feeding the output signals from the receiver into a counter, etc.



## Configuration and Connection



## Laser Beam Diameter (Typical Example)

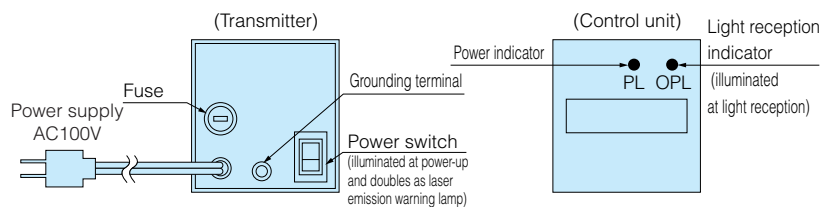


## Safety Precautions and Measures

The transmitters of the SHS series sensors use helium-neon laser, which corresponds to Class 2 and requires safety precautions and measures.

- Do not attempt to look directly into or touch laser beam.
- Take measures to prevent diffusion of any unexpected reflection of laser beam caused by mirror-like detection objects or mirror surfaces.
- Do not direct laser beam to human body or use the sensor to detect people.
- A warning label, instruction label and laser beam emitter label are provided for drawing attention to handling of laser. Make sure that they do not come off.
- The transmitter contains high-voltage power supply. Do not attempt to open the cover while the sensor is in operation.

## Panel Description



## Dimensions (in mm)

