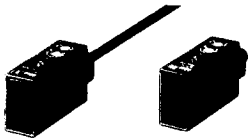


# SA1C

## Photoelectric Switches

### Operation Instructions

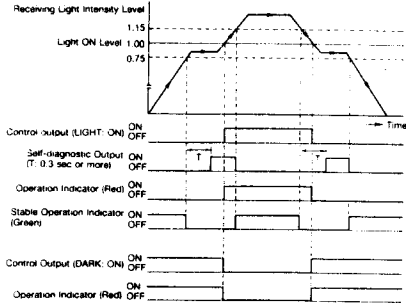


IDEAC IZUMI CORPORATION

## SPECIFICATIONS

Detection Mode	Through-Beam Type		Retro-Reflex Type		Polarized Retro-Reflex Type		Diffuse-Reflex Type		Limited-Reflex Type		Spot-Reflex Type	
	①	②	①	②	①	②	①	②	①	②	①	②
Type No.	SA1C-TN3S	SA1C-TD3	SA1C-RN3S	SA1C-RD3	SA1C-PN3S	SA1C-PD3	SA1C-DN3S	SA1C-DD3	SA1C-GN3S	SA1C-GD3	SA1C-NN3S	SA1C-ND3
Power Voltage	12, 24V DC (Operating Voltage: 10 to 30V DC) Ripple 10% maximum											
Current Draw	Projector: 25mA max. Receiver: 20mA max.		30mA maximum		25mA maximum		60mA maximum		30mA maximum		10mA maximum	
Sensing Range	10m		5m		3m		60cm		10cm		10cm	
Light Source	Infrared LED		Infrared LED		Red LED		Infrared LED		Infrared LED		Red LED	
Detectable Object	Opaque											
Control Output	① NPN output + Self-diagnostic output (NPN) with short circuit protection NPN output: NPN open collector, 30V DC, 100mA max., Residual voltage 1.5V max. Self-diagnostic output: NPN open collector, 30V DC, 50mA max., Residual voltage 1.5V max. ② NPN output + PNP output with short circuit protection NPN output: NPN open collector, 30V DC, 100mA max., Residual voltage 1.5V max. PNP output: PNP open collector, 30V DC, 200mA max., Residual voltage 2.0V max.											
Response Time	0.5 msec maximum											
Extraneous Illuminance	Sunlight: 10,000 lux maximum, Incandescent light: 3,000 lux (on the receiver surface)											
Operating Temperature	-25 to +55°C (without freezing)											
Operating Humidity	35 to 85% RH (no condensation)											
Degree of Protection	IP67 (IEC Pub 529) (Connector type: IP66)											
Connection	Cable type: φ4mm (0.2mm <sup>2</sup> ) 2- or 4-core vinyl cable type 2m long Connector type: φ8mm 3- or 4-pin connector (2m-long cable is separately ordered.)											
Material	Housing: Polybutylene terephthalate resin, Lens: Polycarbonate											
Interference Prevention	Two units only can be installed in close proximity.											

## OPERATION CHARTS



### Self-diagnostic Output

Self-diagnostic output goes on when the unstable incident lasts 0.3 msec or more after the stable operation indicator goes off. Self-diagnostic output goes off when the stable operation is assured and the stable operation indicator goes on.

The unstable incident occurs by the following causes:

- Taints on the lens
- Slight optical axis misalignment
- Change in background

Self-diagnostic function is useful when the sensing becomes unstable in changeable installing environments.

## INDICATORS

Each indicator operates according to the receiving light intensity level described below. Use the photoelectric switches at stable incident or interruption.

Receiving Light Intensity Level	Mode	Stable Operation Indicator (Green)	Operation Indicator (Red)	
			Light ON	Dark ON
1.15	Stable Incident	ON	ON	OFF
	Unstable Incident	OFF	ON	OFF
1.00	Unstable Interruption	OFF	OFF	ON
	Stable Interruption	ON	OFF	ON

## OPTICAL ALIGNMENT

The optical alignment described below is for Light ON mode.

### Through-Beam Type

Face the projector and receiver each other. Move them up, down, and sideways and lock them in the middle of the range where the operation indicator (Red) goes ON. Make sure that the stable operation indicator (Green) goes ON at incident and interruption.

### Retro-Reflex/Polarized Retro-Reflex Types

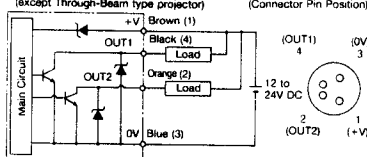
Face the photoelectric switch and reflector each other. Move them up, down, and sideways and lock them in the middle of the range where the operation indicator (Red) goes ON. Make sure that the stable operation indicator (Green) goes ON at incident and interruption.

### Diffuse-Reflex/Limited-Reflex/Spot-Reflex Types

While detecting an object, move the photoelectric switch up, down and sideways and lock it in the middle of the range where the operation indicator (Red) goes OFF when the object is removed and that the stable operation indicator (Green) goes ON when the object is detected or removed.

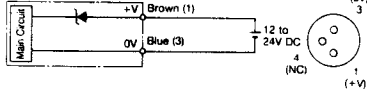
## OUTPUT CIRCUIT DIAGRAM

### NPN Output + Self-diagnostic Output (except Through-Beam type projector)

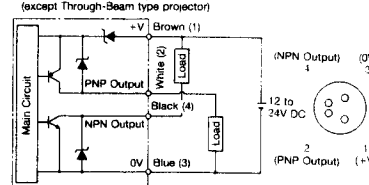


OUT1: Control Output, OUT2: Self-diagnostic Output

### Through-Beam Type Projector



### PNP Output + NPN Output (except Through-Beam type projector)



\*Applicable Connector Cable  
When using a connector type, use the applicable connector cables.  
(3-pin type: SA9C-CA3D, 4-pin type: SA9C-CA4D)

## SENSITIVITY ADJUSTMENT

When the Reflex type is affected by background, or for detection of translucent or small objects with the Through-Beam type or Retro-Reflex type, adjust the sensitivity as follows. The sensitivity adjustment described below is for Light ON mode.

Order	Photoelectric Switch Status	Sensitivity Control	Adjusting Procedure
①	Receiving the light Through-Beam: without object Reflex: with object		First, when receiving the light, turn the sensitivity control clockwise from Min position until the operation indicator (Red) goes ON (Point A).
②	Not receiving the light Through-Beam: with object Reflex: without object		Second, in the interruption status, turn the sensitivity control further clockwise until the operation indicator (Red) goes ON again (Point B). When the operation indicator does not go ON, Max position is specified as point B.
③	—		Last, set the sensitivity control in the middle between A and B.

Note: Use the attached screwdriver or a fit screwdriver to turn the sensitivity control. After adjustment, make sure that the stable operation indicator goes ON at incident or interruption.

## INSTRUCTIONS

### (Power)

- Use a power supply with little noise and surge at the rated voltage. And make sure that the ripple factor is within the allowable limits.
- When using a switching power supply, be sure to ground the FG (frame ground) terminal. If the FG terminal is not grounded, high-frequency noise will affect the photoelectric switch.

### (Operation Mode Selection)

The operation mode can be selected by the operation mode selector on the top surface. To set to (D/ON), turn the operation mode selector clockwise to the extremes. To set to (L/ON), turn the operation mode selector counterclockwise to the extremes.

### (Cable Color)

The cable color conforms to the IEC standard. Before wiring, make sure of the cable color according to the connection diagram.

### (Extraneous Light Immunity)

Especially for Through-Beam type, care should be taken that the receiver is not exposed to the light from the fluorescent lamp.

### (Insertion and Removal of Connector)

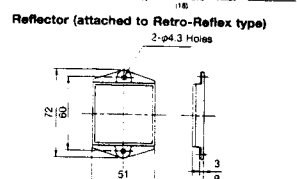
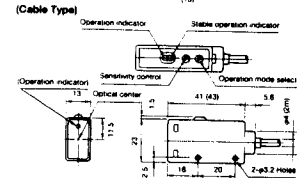
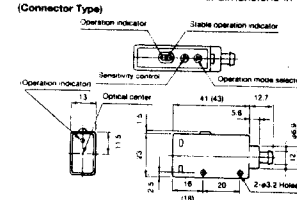
Do not apply excessive stresses to the connector on the photoelectric switch. Check if the cable connector is locked or not and then insert or remove the connector.

### (Installation)

- Since the photoelectric switches can prevent interference from each other, up to two units can be installed in close proximity. (Except Through-Beam Type).
- Do not use the photoelectric switches near an induction machine or heat source, or where they are subjected to strong shocks or vibrations, large amounts of dust, corrosive gases, water for a long period of time, oil and chemicals.
- Do not tighten the mounting screws excessively. Recommended tightening torque ranges from 0.5 to 0.8 N-m. Do not strike the photoelectric switch with a hammer, otherwise, the protection characteristics may be damaged.

## DIMENSIONS

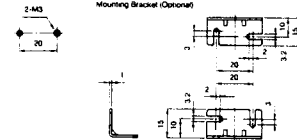
All dimensions in mm.



Note 1: Dimensions in ( ) represent the polarized retro-reflex type.

Note 2: The through-beam type receiver has an operation indicator on the receiver surface (inside the lens).

### (Mounting Hole Layout)



### (Other Precautions)

- Parallel wiring with high-voltage or power lines in the same conduit is not recommended due to induction noise. When wiring is long, use a separate conduit for wiring.
- Do not use the photoelectric switches in the transient state when turning power ON (for 20 msec).
- The lens is made of polycarbonate resin. Do not use organic solvents such as ammonia, caustic soda and benzene to clean the lens.
- Do not use the photoelectric switches under conditions exceeding the rated operating temperature, vibration resistance and shock resistance.