TAKEX

PHOTOSENSOR
with embeded amplifier

NA SERIES Instruction Manual

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OUTLINE

Operates directly from either AC/DC 24V to 240V POWER SUPPLY.
The terminal block enables simple connection and wiring. The "F" type includes a timer function.

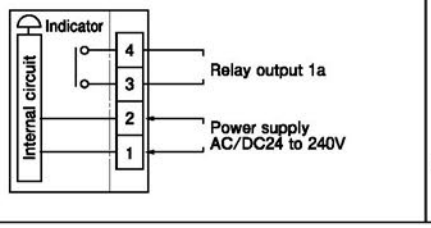
SPECIFICATIONS

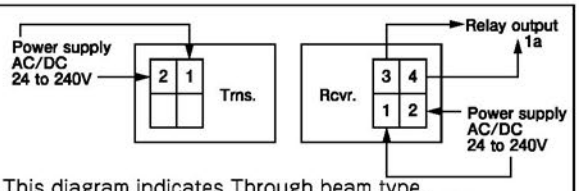
CE

Type		Basic				Multifunctional (with timer)			
Model		NA-T30	NA-T20R	NA-M7R	NA-R10	NA-T30F	NA-T20RF	NA-M7RF	NA-R10F
Detection method		Through beam		Polarized retroreflective	Diffuse reflective	Through beam		Polarized retroreflective	Diffuse reflective
Detecting distance		30m or less	20m or less	0.03 to 7m or less (with reflector model K-7)	1m or less (200×200mm white drawing paper)	30m or less	20m or less	0.03 to 7m or less (with reflector model K-7)	1m or less (200×200mm white drawing paper)
Detection object		Opaque object of dia. 22mm min		Mirror-like opaque	Opaque translucent	Opaque object of dia. 22mm min		Mirror-like opaque	Opaque translucent
Power supply		24 to 240V AC/DC ±10% 50/60Hz							
Power Consumption	Transmitter	1.8W or less	1.5W or less	2W or less		1.8W or less	1.5W or less	2W or less	
	Receiver	2W or less	2W or less			2W or less	2W or less		
Output mode		Relay output 1a / Ratin : 3A 250VAC or less 30VDC or less : resistive load							
Operation mode		Light ON/Dark ON selectable				・Light ON/Dark On selectable. ・Timer function selectable Selectable between on delay, off delay one shot and timer disabled (with switch) Delay time : 0.1 to 5s			
Response time		10ms or less							
Hysteresis		———			10% or less	———			10% or less
Operating angle		3° (at receiver)		30° (at reflector)	———	3° (at receiver)		30° (at reflector)	———
Light source (wavelength)		Infrared LED (880nm)	Red LED (700nm)		Infrared LED (880nm)	Infrared LED (880nm)	Red LED (700nm)		Infrared LED (880nm)
Indicator	Transmitter	Power indicator (orange LED)	———	Operation indicator (orange LED)		Power indicator (orange LED)	———	Operation indicator (orange LED)	
	Receiver	Operation indicator (orange LED)				Operation indicator (orange LED)			
Volume (VR)		———			Sensitivity Adjustmnet	Delay time adjustment			Sensitivity Adjustmnet/ Delay time adjustment
Switch (SW)		Light ON/Dark ON selector switch				FUNCTION.SW provided OND. : on delay ○side...Light ON ●side...Dark ON OFD. : off delay ○side...Light ON ●side...Dark ON OST. : one shot ○side...Light ON ●side...Dark ON NORM. : timer disabled ○side...Light ON ●side...Dark ON			
Material		Lens : acrylic / Case : heat resistant ABS / Cover : acrylic							
Connection		Terminal block (Screw : M3.5)							
Weight	Transmitter	Approx. 170g	Approx. 150g	Approx. 170g		Approx. 170g	Approx. 150g	Approx. 170g	
	Receiver	Approx. 170g	Approx. 170g			Approx. 170g	Approx. 170g		
Accessory				reflector model K-7	Operation manual, Mounting bracket			reflector model K-7	

- The detecting distance and detection object for retroreflective types varies, depending on reflector types combined with the sensor.
- The detecting distance is the range which you can set for the reflector. The sensor can detect an object even at an ectremely short range.
- The detecting distance of the diffuse reflective type varies, depending on transmittance of the detection object. Please be sure to check the detection beforehand.

OUTPUT CIRCUIT AND WIRING

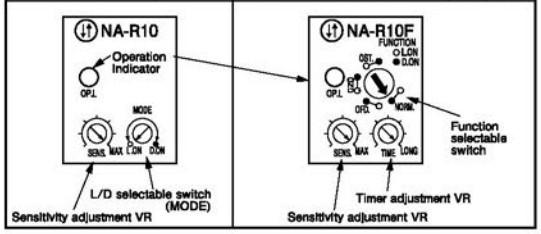




- This diagram indicates Through beam type. Refer to the receiver as for the connection of Diffuse reflective and Polarized retroreflective type.

PANEL INSTRUCTION

Basic Type	Multifunctional Type (F)



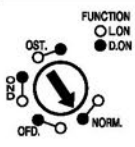
- The Sensitivity adjustment VR is equipped with Diffuse reflective type only.
- Sensitivity increases when turning the Sensitivity adjustment VR (SENS) clockwise (Max. side).
- Operation indicator (OP.L)···Orange LED indicator lights when the relay is activated.

BASIC TYPE

- L/D selectable SW (MODE)
  It's set Light On mode by turning counter clockwise (L.ON side).
  It's set Dark On mode by turning clockwise (D.ON side).

※ Be sure to turn the SW to the end.

"F" TIMER FUNCTION



○ means Light On Mode.
● means Dark On Mode.
NORM.··· Without Timer Function.
OFD.····· OFF Delay timer.
OND.····· ON Delay timer.
OST.····· ONE Shot timer.

- Timer can be set between 0.1 to 5 seconds by the Timer adjustment VR.

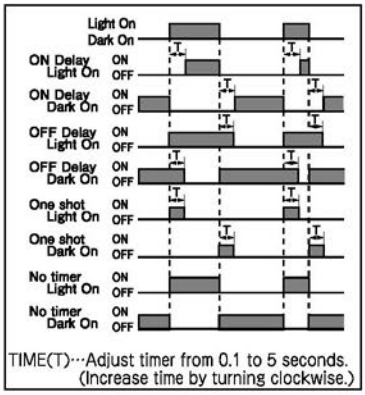
ENVIRONMENTAL SPECIFICATION

Ambient light
10,000 lx or less
Ambient temperature
−25 to +55℃ (non-freezing)
Ambient humidity
35 to 85%RH (non-condensing)
Storange temperature
−30 to +70℃ (in transportation or storage)
Protective structure
I P66
Vibration
10 to 55Hz, 1.5mm double amplitude
2 hours each in 3 directions
Shock
100m/s²
3 times each in 3 directions
Dielectric withstanding
1,500VAC for 1 minute
Insulation resistance
500VDC, 100MΩ or higher
Rated impulse withstand voltage
1kV
EMC
EN60947-5-2:2007(3rd Edition)+A1:2012
Frequency of operating cycle
50Hz
Minimum operational current
10mA at 5VDC
OFF-state current
0A

DESCRIPTION OF OPERATION (Multifunctional type)

- The timer can be used when the required output signal cannot be obtained with simple on/off operation.
- Three timer modes are available :

1. One shot ··· outputs a signal for a set time after detection.
2. Off delay ··· extends the output signal for a preset amount of time.
3. On delay ··· delays the output for a preset time after a detection.



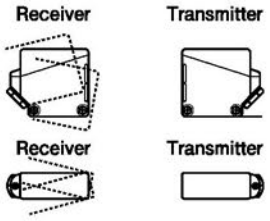
TIME(T)···Adjust timer from 0.1 to 5 seconds.
(Increase time by turning clockwise.)

INSTALLATION AND ADJUSTMENT

(In case of Light On Condition)

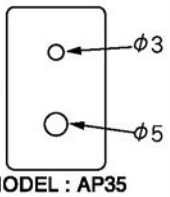
◆ Through beam type

Install the transmitter and the receiver linearly. By swinging the transmitter vertically and holizontally, find the range where the operation indicator (orange) turns on and direct the sensor in the center of the range. Adjust the position of the receiver in the same way.



◎ AP35 a pinhole sticker is optionally available. It reduces the size of detection objects and the activation area.

◎ Put the sticker with either the top or bottom side up for aligning either of the holes with the optical axis. Fix the sticker to the concave of the front lens to align the hole with the optical axis. Do not cut the sticker into two pieces.



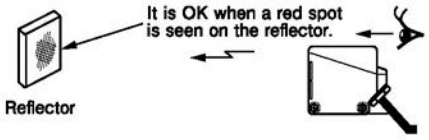
MODEL : AP35

(setting distance : affix to Trns. and Rcvr.)

Pinhole mask	ϕ3	ϕ5
Setting Distance	1m	3.5m

◆ Polarized retroreflective type

Arrange the sensor in line with the reflector. Face the sensor to the mirror and move it vertically and horizontally. Install the sensor in the center of the area where the operation indicator (orange) turns on. Taking advantage of the red light spot on the reflector seen from the behind the sensor allows easy setting.



Reflector	Range	Notes
K－7	0.03 to 7m	Accessory
K－71	0.03 to 3.5m	Option
S－510G	0.1 to 4m	Option

- The range depends on reflector type.
- The sensor might not reliably detect highly reflective objects or objects that disrupt polarization (ex. object covered with transparent film). In such a case try the following countermeasures:
  - Mount the sensor at an angle to the target object.
  - Increase the distance between the sensor and the target object.

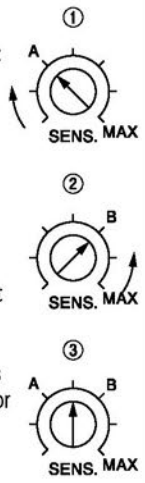
◆ Diffuse reflection type

● When any light reflecting object is in the background.

① Place a detection object at a given position and turn up the sensitivity adjustment volume from MIN until the operation indicator turns on (Point A).

② Remove the object and turn down the Sensitivity adjustment volume from MAX until the operation indicator turns off (Point B). (MAX is regarded as Point B if the operation indicator doesn't turn on at MAX.)

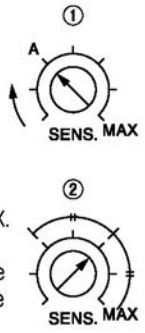
③ Set the volume at the middle point between Points A and B.



● When no light reflecting object is in the background.

① Place a detection object at a given position and turn up the sensitivity adjustment volume from MIN until the operation indicator turns on (Point A).

② Set the volume at the middle point between Point A and MAX. Make sure that the operation indicator and turns on when the detection object is placed at the given position.



PRECAUTIONS FOR WIRING

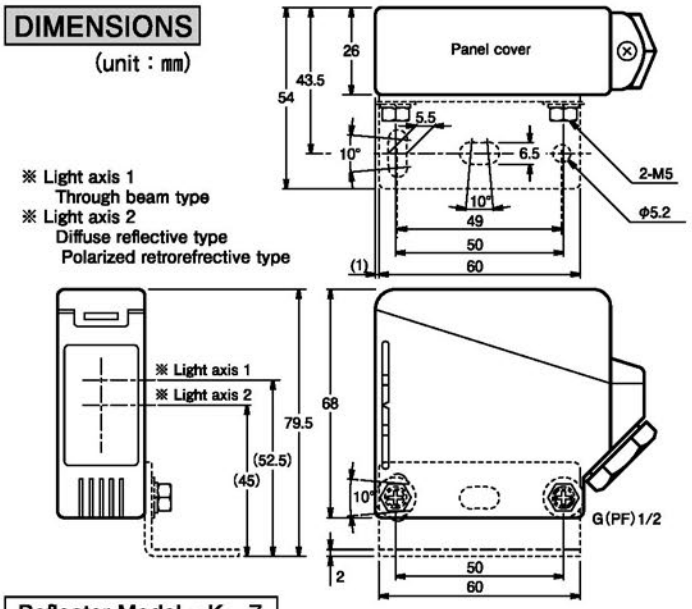
- Turn off power before opening the panel cover for wiring or inspection. Put on the panel cover and fix it by the screw before turning on the power.
- Mis-wiring may result in burnout or breakage. Check wiring before supplying the power.
- Tightly fasten the screws on the terminal block when wiring. When using crimp terminals uses ones that fit for M3.5 screw.
- A rubber bushing compatible with cables of 9 to 11㎜ in diameter is attached. When using cables of 6 to 9㎜, use JV7 optional bushing.
- Use thread size G(PF)1/2 when use metal conduit.
- Use a metal conduit to avoid malfunction or damage caused by induction when the wiring should be laid close to high-voltage cables or power lines.

PRECAUTIONS DURING USE

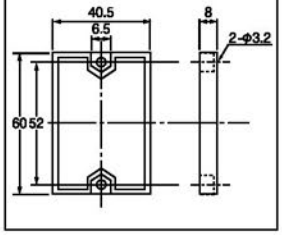
- After wiring, fix the hook of the panel cover on the slit of the sensor and secure the cover by the screw with a tightening torque of 0.6N·m or less.
- Use a power supply within the rated voltage and current in the specification.
- Avoid turning the power on and off consecutively.
- Do not use the sensor where water is splashing constantly or under the water. To use the sensor in an environment containing a corrosive gas or exposed to a splash of chemicals or oils, or a place exposed to vibration or shock may cause false operation.
- Clean the lens by a soft and dry cloth periodically. A stain or dirt stuck on the lens deteriorates the perfomance. Do not use organic solvent including alcohol and thinner.
- The output relay is not replaceable.
- Fix the attached bracket on the sensor and tighten it with a torque of 0.8N·m or less.
- Limit the current of the power supply to 2A.
- When using a switching regulator, be sure to ground the frame ground (FG) terminal.

DIMENSIONS

(unit : ㎜)



Reflector Model・K－7



- The guarantee period of this product is one year after the delivery.
- If any defect is found during the guarantee period, Takenaka will repair or replace the defective product.
- This product is an industrial sensor which issues an output upon detecting an object. It does not have any function to prevent accidents, death or injuries.
- Takenaka will not held responsible for any damage or loss incurred due to accidents, faulty installation, abuse, misuse, improper maintenance or acts of God including lightning surge.