

We appreciate your purchase of ATSUMI INTRUDER ALARM SYSTEM BEAM DETECTOR. Please read this installation manual carefully for appropriate installation of the product and keep it in a safe place for the future use.

## BEAM DETECTORS

**NR30TD (Outdoor 30m/ Indoor 60m)**

**NR60TD (Outdoor 60m/ Indoor 120m)**

**NR90TD (Outdoor 90m/ Indoor 180m)**

**<NOTE>**

This detector is intended for detection of an illegal intruder and NOT for theft prevention. Each user is requested to use it effectively under his/her full control. ATSUMI ELECTRIC Co., Ltd. shall not be liable for any theft or damage.

## INSTALLATION INSTRUCTIONS

In this manual, symbols and marks are used to call attention to instructions that should be observed when installing the detector so as to prevent the user and others from being exposed to a danger and property from being damaged.

Have full understanding of these marks before reading this installation manual.

Symbol	Meaning
<b>WARNING</b>	Indicates that failure to observe this instruction may cause a possible danger resulting in death or serious injury to the user.
<b>CAUTION</b>	Indicates that failure to observe this instruction may possibly cause injury to the user or damage to the property.

The contents of instructions are identified by following marks of two types.

Mark	Meaning
	Indicates what MUST NOT be performed..
	Indicates what MUST be performed.

# 1 FOR PROPER INSTALLATION

### 1. Observe following instructions for installation of the unit.

<b>CAUTION</b>	
	This detector is intended for detection of human intruder. When using it for any other purpose, be sure to study and test carefully in advance.
	Study carefully possible intrusion route and posture of an intruder to determine the installation position so that the beam is interrupted without fail.
	Where there is not enough strength, perform full reinforcement work before installing the detector. If installed where not strong enough, the detector may drop, possibly resulting in its failure or damage and personal injury.
	The beam spread angle of this detector is about 1° on each side. When using a multiple number of the same type detectors or when using this detector with another type detector, position them so that no interference would occur.
	Do not install the unit where the beam is interrupted by an obstacle, or malfunction may result.
	Do not install the unit where intense source of light such as sunlight and automobile head light beam is reflected into the receiver. A strong light incoming within ±3° angle of each receiver axis may cause malfunction.
	Do not install the unit where the detector can move easily after being installed, or malfunction may result.
	Do not install the unit where it is exposed to foul water or sea spray, or a failure or malfunction may result.
	Do not install the unit where the distance between the transmitter and receiver exceeds the rated detectable distance, or malfunction may result.
	Do not install the unit where electrical noise or electromagnetic wave exists, or a failure or malfunction may result.
	Do not install the unit where the detector receives strong impact or vibration, or a failure or malfunction may result.

**⚠ CAUTION**

- ⊘ Do not install the unit where the detector is exposed to corrosive gas or dust, or a failure or shortened service life may result.
- ⊘ The transmitter and receiver are in a set as the complete detector. Never use them separately or with other detectors, or malfunction may result.
- ⊘ Do not install the unit where temperature or humidity rises extremely high, or the unit may get deformed or deteriorated and a failure may result.
- ⊘ Keep the unit away from magnets or any magnetized object, which may cause a failure or malfunction.

**2. Observe following instructions for wiring and maintenance.**

**⚠ WARNING**

- ⊘ Do not disassemble or modify the unit, or a fire, electrical shock or failure may occur.
- ⊘ Do not perform wiring work with the power turned on, or a fire, electrical shock or failure may occur.
- ⊘ The required power (operation voltage range) is DC10.5V to 28V. Do not use the unit outside of the specified voltage range, or a fire, electrical shock or failure may occur.
- ⊘ Do not perform wiring work when it thunders, or a fire, electrical shock or failure may occur depending on where lightning strikes.

**⚠ CAUTION**

- ⊘ The movable range of the lens is 5° up and down respectively and 90° right and left respectively. Do not move the lens beyond this range with force, or the unit may break.
- ⊘ Do not apply a strong impact or vibration to the unit, or a failure or damage may result.

## 2 COMPONENTS

The unit consists of the following major components.

PARTS	PCS
Transmitter	1
Receiver	1
Installation manual	1

PARTS	PCS
φ4 tapping screw	4
Mount plate	2
Mount bracket	2

PARTS	PCS
Packing	2

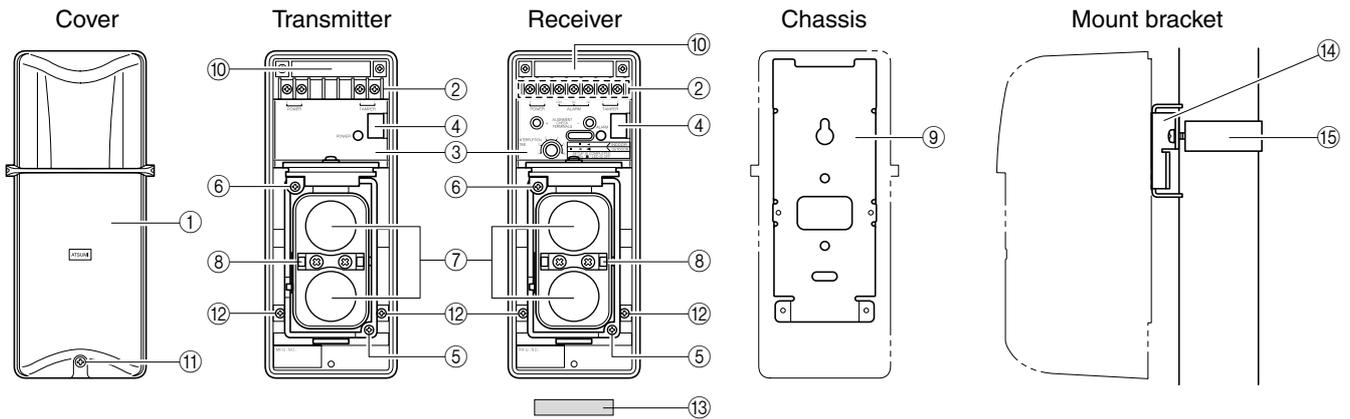
## 3 GENERAL DESCRIPTION

The NR30TD/NR60TD/NR90TD outputs an alarm when the infrared pulse beam (referred to as beam hereinafter) emitted from its transmitter is not received by the receiver for a certain period of time (beam interruption time). To reduce influences from various external factors, the unit is provided with following features.

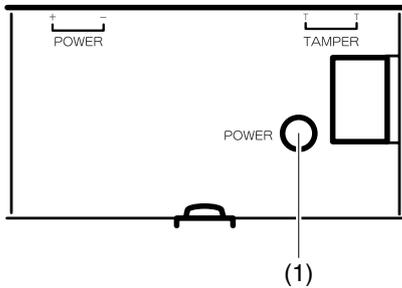
- 100 Times Sensitivity Allowance  
As the transmitter emits beam 100 times as strong as the minimum level required for guarding, stable operation is maintained even if beam energy is cut by rain, fog, frost, etc.
- Twin beam and guard method  
To prevent an erroneous operation by detecting a small animal or bird, the unit is designed so that no alarm is output unless both beams arranged in vertical two levels are interrupted at the same time.
- Double modulation detection method  
This method uses the double (frequency and pulse) beam modulation so as to reduce influence from the external disturbance light.
- Beam interruption time control  
Using this function, it is possible to adjust the beam interruption time according to the installation site so as to reduce causal factors of malfunction at that site.

# 4

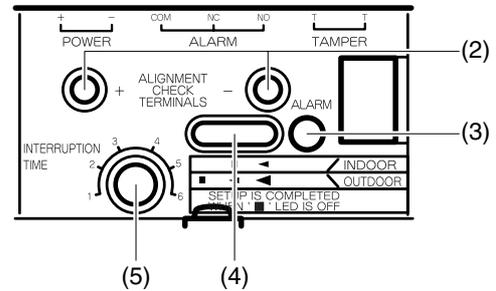
## PART NAMES AND FUNCTIONS



Operation section of transmitter



Operation section of receiver

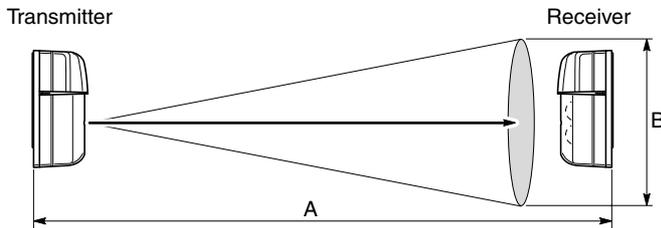


- ① Cover  
Passes the near infrared ray and attenuates the visible ray.
- ② Wiring terminal  
Input/output terminals for wiring to the controller
- ③ Operation section
  - Transmitter
    - (1) Power supply LED  
Indicates the power input state.
  - Receiver
    - (2) Tester level check terminal  
Used to check the optical axis alignment with a tester.
    - (3) Alarm LED  
Indicates the alarm state.
    - (4) Axis alignment level meter LED  
Indicates the optical axis alignment state by lighting and flashing.
    - (5) Beam interruption time adjustment volume  
Used to determine the detection sensitivity.
- ④ Tamper switch  
Detects open/close of the cover.
- ⑤ Vertical adjustment screw  
Used to make fine adjustment of optical axis vertically.
- ⑥ Horizontal adjustment screw  
Used to make fine adjustment of optical axis horizontally.
- ⑦ Twin lens  
Lens to transmit and receive the infrared beam.
- ⑧ Scope  
Used to make rough adjustment of the optical axis alignment.
- ⑨ Chassis  
Used to install the main unit to the wall or pole.
- ⑩ Wire hole  
Used for wiring.
- ⑪ Cover fixing screws  
Used to fix the cover.
- ⑫ Chassis fixing screws  
Used to install the main unit to the chassis.
- ⑬ Sponge (included in the package)  
Used to fill the wiring hole to prevent water and dust from entering.
- ⑭ Mount plate  
Used to mount the chassis to the pole.
- ⑮ Mount bracket  
Used to mount the chassis to the pole.

# 5 BEAM SPREAD

As the beam has spreads, an optical path is formed when it is reflected against the nearby (highly reflective) wall or the like, thereby alarm output may be prevented even if the beam from the transmitter to the receiver is interrupted. When a multiple number of detectors are installed, the beam from another detector may affect and cause malfunction.

The beam spread angle of this unit is about  $\pm 1^\circ$ . Refer to the figure and table below to determine the installation position and distance to be used when installing a multiple number of units.

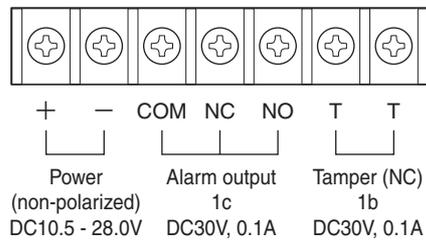
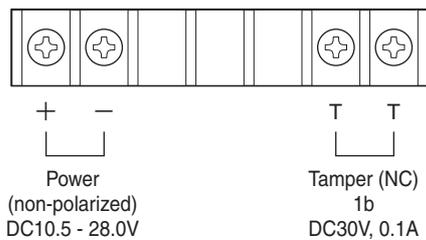


Distance and (approximate) beam spread

Distance A	Beam spread width B
15m	0.5m
30m	1.0m
60m	2.0m
90m	3.0m
120m	4.0m
180m	6.0m

# 6 WIRING

## 1. Terminal Arrangement



## 2. WIRING LENGTH

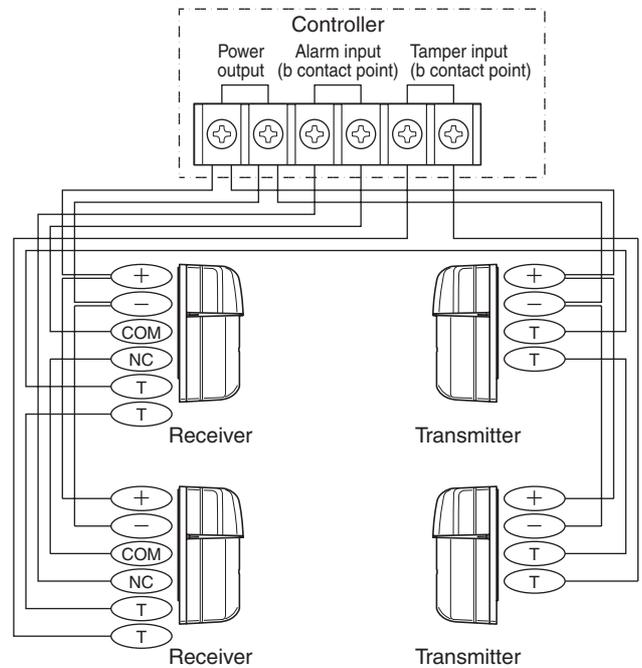
Wire gauge	Maximum wiring distance (m)					
	NR30TD		NR-60TD		NR90TD	
	DC12V	DC24V	DC12V	DC24V	DC12V	DC24V
AWG22 or $\phi 0.65$	220	2000	200	1850	190	1710
AWG19 or $\phi 0.90$	430	3800	400	3550	360	3300
AWG16 or $\phi 1.20$	760	6850	700	6350	650	5900
AWG14 or $\phi 1.60$	1350	12000	1250	11270	1150	10400

Each value in the above table represents the maximum wiring distance (one way) when DC12V or DC24V power source is used.

When installing 2 or more sets on one wire, the maximum length is obtained by dividing the maximum wire length given above by the number of sets installed.

When using a thicker than AWG19 or  $\phi 0.9$  wire, use relays for connection. It is not possible to connect directly to the terminal inside of the detector.

## 3. EXAMPLE



**⚠ CAUTION**

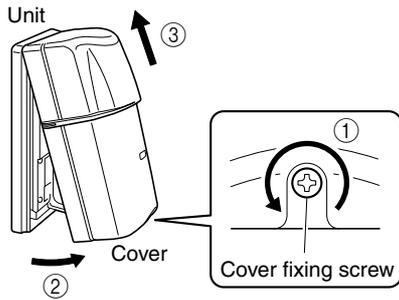
- ⊘ Do not use aerial wiring, or malfunction may result.
- ! Be sure to cover outdoor wiring with pipes, or an electrical shock or failure may occur.
- ! Be sure to turn off the power during the wiring work, or an electrical shock or failure may occur.

# 7 INSTALLATION

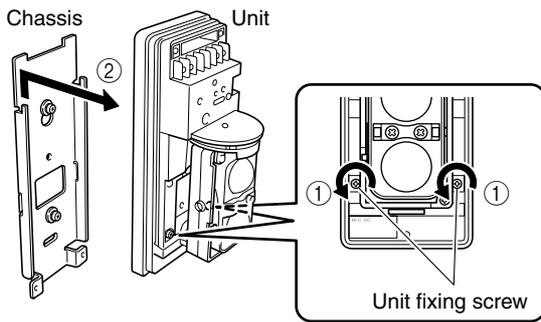
For pole mounting, pole-back mounting, and embedded mounting, optional parts are required. In any of these cases, purchase the required optional parts and install the unit according to the installation manual supplied with the optional parts. Described below is the installation procedure for wall mounting. For more information on optional parts, refer to **14** OPTIONAL PARTS.

- (1) Loosen the cover fixing screw and remove the cover.  
Loosen 2 unit fixing screws and remove the chassis by sliding it a little against the unit.

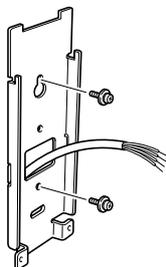
• Removing the cover



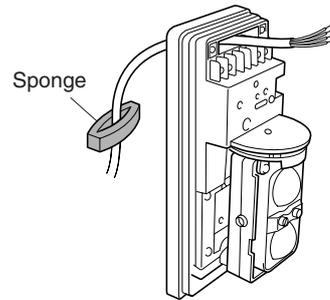
• Removing the unit from the chassis



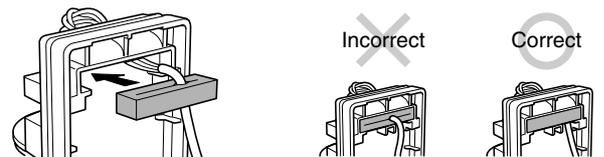
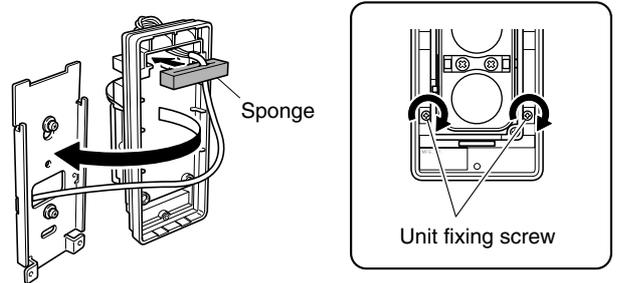
- (2) Route the wire through the wire hole in the chassis and secure the chassis in place at the installation location using the detector mounting screws included with the chassis.



- (3) After passing the wire through the cut in the sponge included in the package, route the wire through the wiring hole.



- (4) Referring to **6** WIRING, perform wiring.
- (5) After performing wiring, push the sponge into the wire hole to fill it as shown in the figure below. Install the unit on the chassis and secure it by tightening the detector unit fixing screws.



- (6) Referring to **9** OPTICAL AXIS ALIGNMENT, adjust the respective optical axes of the transmitter and the receiver.
- (7) Referring to **10** OPERATION CHECK, check the operation of the unit. Adjust sensitivity as required, referring to **8** SENSITIVITY ADJUSTMENT.
- (8) Attach the cover, securing it in place using the cover mounting screw.

**CAUTION**

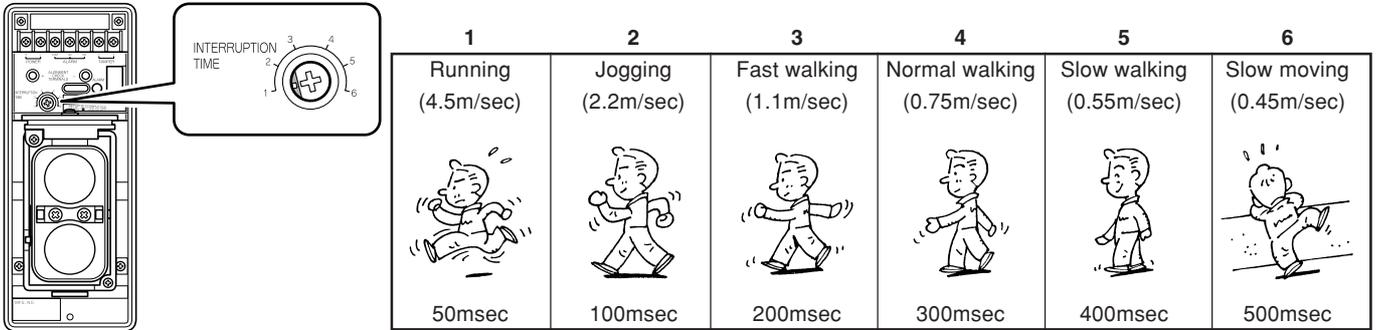
- Where there is not enough strength, perform full reinforcement work before installing the detector. If installed where not strong enough, the detector may drop, possibly resulting in its failure or damage and personal injury.
- After performing wiring, make sure to fill the wiring hole with the sponge. Failure to use the sponge properly may allow rainwater or the like to get inside the unit via the wiring, possibly resulting in equipment failure or faulty operation.

## 8 SENSITIVITY ADJUSTMENT

It is possible to adjust the detection sensitivity by adjusting the interruption time adjustment volume.

When the unit is mounted on a wall, the interruption time can be set longer because the intruder cannot move quickly. This way, it is possible to prevent an erroneous operation by a bird, small animal, paper and other object that flies in.

Adjust the sensitivity with the moving speed of a possible intruder taken into consideration. Also, be sure to check the unit for operation after adjustment.



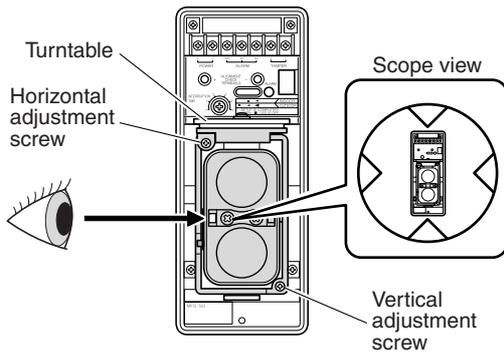
## 9 OPTICAL AXIS ALIGNMENT

There are two ways for optical axis alignment, by using a level meter or a tester.

### 1. Alignment using a level meter

#### (1) Rough adjustment

While looking into the scope located in the center of the lens 10 to 15cm away from it, turn the turntable and horizontal adjustment screw for adjustment in the horizontal direction and the vertical adjustment screw for adjustment in the vertical direction until the detector on the other side is in the center of the scope as shown in the scope view shown below.



#### (2) Fine adjustment

Check the level meter of the receiver.

When the square marked level lamp in the table on the label is turned off, it means alignment is completed.

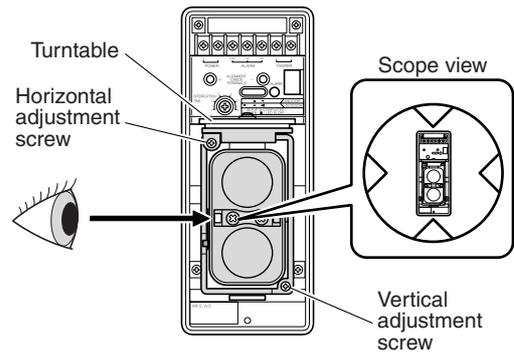
If the lamp remains on, adjust the horizontal and vertical adjustment screws of the transmitter and receiver until the square marked level lamp turns off.



### 2. Alignment using a tester

#### (1) Rough adjustment

While looking into the scope located in the center of the lens 10 to 15cm away from it, turn the turntable and horizontal adjustment screw for adjustment in the horizontal direction and the vertical adjustment screw for adjustment in the vertical direction until the other detector is in the center of the scope as shown in the scope view shown below.

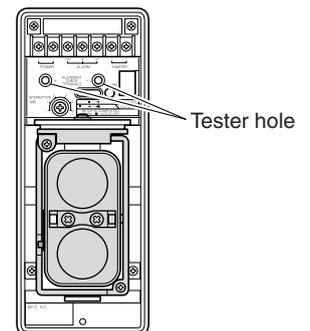


#### (2) Fine adjustment

Insert the tester stick into the tester hole in the receiver to check the tester voltage.

If the measured value is 3V or more, adjustment is completed.

If it is less than 3V, adjust the horizontal and vertical adjustment screws of the transmitter and receiver until 3V or more voltage is obtained.

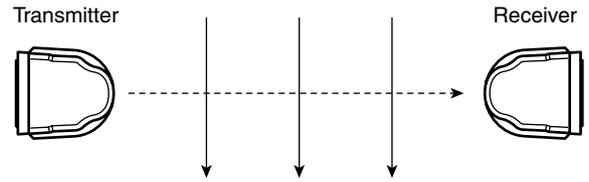


## 10 OPERATION CHECK

### 1. Alarm Operation

To check the alarm operation, actually walk along assumed intrusion path near the transmitter and receiver, respectively and in-between as shown in the figure below.

Check that the alarm LED lights up and the controller receives the alarm signal when the beam is interrupted.



### 2. Tamper Operation

Check that the controller receives an abnormal signal when either of the transmitter and receiver cover is open.

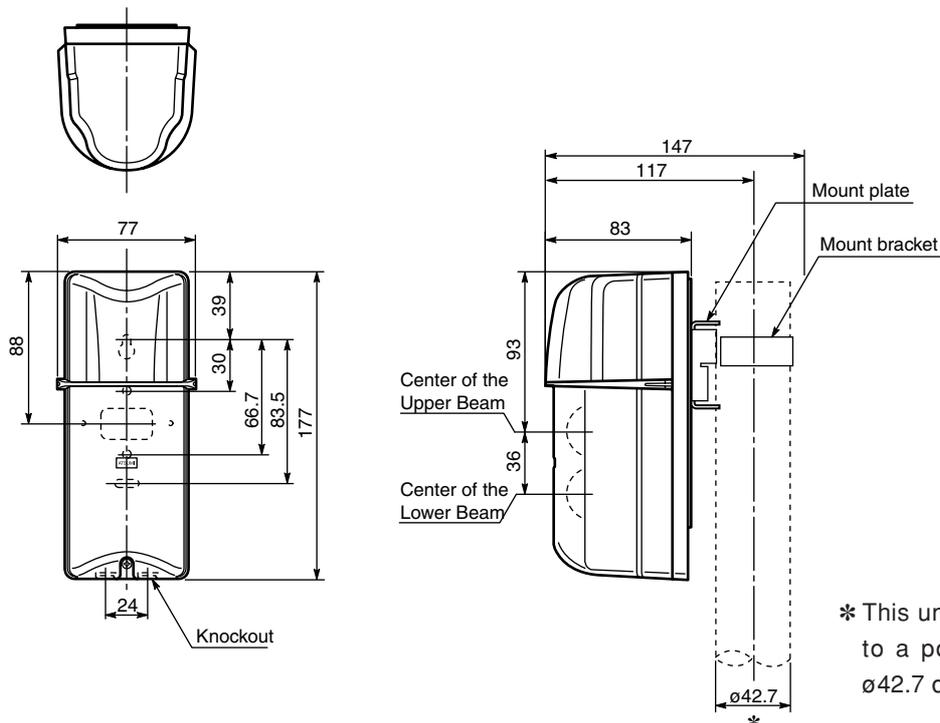
## 11 TROUBLESHOOTING

Problem	Possible cause	Solution
False alarm is output frequently.	An obstacle exists between transmitter and receiver.	Remove obstacle.
	Optical axis alignment is incomplete.	Perform optical axis alignment again to obtain 3V or more tester level.
	Installation condition is unstable.	Stabilize installation condition.
	Distance between transmitter and receiver exceeds rated distance.	Change installation position or use other detector with suitable rated distance.
	Beam is interfered with beam from another detector.	Take proper measure to avoid beam interference.
	There is an electrical noise source in nearby area.	Change installation position.
	Sunlight enters receiver within $\pm 3^\circ$ angle.	Replace transmitter and receiver.
No alarm is output even when beam is interrupted.	There is a highly reflective wall in parallel with beam.	Adjust optical axis so that it is on the other side of reflection surface.
	Reflectance of floor surface is high.	Adjust optical axis so that it is on the other side of reflection surface.
	Beam is interfered with beam from another detector.	Take proper measure to avoid beam interference.
	Height of installation position is inappropriate.	Change installation position to a proper height.

### <Note>

If the trouble remains unsolved even after taking above solution, please consult the dealer of your purchase.

## 12 DIMENSIONS



\* This unit can be installed to a pole with  $\phi 38.0$  to  $\phi 42.7$  diameter.

## 13 SPECIFICATIONS

Product Name		Photoelectric Detector		
Model		NR30TD	NR60TD	NR90TD
Power		DC 10.5V ~ 28V		
Current Draw		Transmitter: 11mA / Receiver: 43mA	Transmitter: 15mA / Receiver: 43mA	Transmitter: 20mA / Receiver: 43mA
Operating Temp./Humid.		-25°C ~ +60°C, RH 95% or less		
Storage Temp./Humid.		-25°C ~ +60°C, RH 95% or less		
Alarm Output	Alarm	Form 1c relay (DC30V, 0.1A) Retention time: 3 sec.		
	Tamper	Form 1b relay (DC30V, 0.1A) Retention time: While cover is opened		
Max. Coverage		Outdoor: 30m or less / Indoor: 60m or less	Outdoor: 60m or less / Indoor: 120m or less	Outdoor: 90m or less / Indoor: 180m or less
Beam Interruption Time		50m sec. ~ 500m sec. (variable)		
Lens Movable Range		Horizontal direction: ±90° / Vertical direction: ±5°		
Installation Site		Indoor / Outdoor		
Weight		Transmitter: about 380g / Receiver: about 380g		
Color		Black Mansel approximation N1.0		

## 14 OPTIONAL PARTS

Part Name	Part No.	Usage
Pole (φ42.7mm x 950mm 2 pcs)	BP-1	Standard pole
Pole (φ42.7mm x 1200mm 2 pcs)	BP-2	Long pole
Wall mount pole (φ42.7mm 2pcs)	BP-3	Wall mount pole

\* Specifications of optional parts are subject to change without prior notice.

## 15 MAINTENANCE

Be sure to perform periodical inspection at least annually.

● Check items

- Tester level: Check that the tester level is 3V or more
- Power input voltage: Check that DC10.5V to 28V is obtained.
- Operation: Referring to **10** OPERATION CHECK, check alarm operation and tamper operation.



# ATSUMI ELECTRIC CO., LTD.

4-2-2 Shin-Miyakoda, Hamamatsu, Shizuoka 431-2103 Japan  
Phone: +81-53-428-4116 Fax: +81-53-428-4119

AE0761