



PHOTOELECTRIC DETECTORS

NR120QM:400ft./120m Range

NR200QM:660ft./200m Range

INSTALLATION INSTRUCTIONS

We appreciate your purchase of ATSUMI PHOTOELECTRIC DETECTORS.
Please read the following installation instructions carefully for appropriate use of the product.

1 GENERAL DESCRIPTION

The NR120QM/200QM are quad photoelectric detectors designed to activate an alarm relay upon the detection of intruder through 4 pulsed infrared beams .

For stable operation, the NR120QM/200QM are equipped with the following features.

- 100 Times Sensitivity Allowance
Stable operation is maintained even if 99% of beam energy is cut by rain, fog, frost, etc.
- Quad Beam Detection(AND/OR GATE Selectable)
AND GATE : All four beams need to be blocked simultaneously to trigger an alarm,resulting less false alarms caused by birds and other small animals.
OR GATE : Eather of Upper Two Beams or Lower Two Beams need to be blocked, resulting the detection of crawl through on the ground.
- Beam Power Control
This option allows selection of the appropriate beam intensity relative to the detection range to minimize the risk of reflection on the nearby walls and cross-taking with other detectors.
- Beam Interruption Time Control
This feature can be used to change the beam interruption time to best fit the application.
- Stackable
The selectable beams up to 8 kinds can be used.

2 INSTALLATION CONSIDERATIONS

Read the following prior to installing,wiring and regular maintenance.

WARNING !	Indicate that incorrect operation causes significant danger of accident resulting in death or serious injury to the user.
CAUTION !	Indicate that incorrect operation causes possibility of injury to the user or damage to the unit.

CAUTION ! : DO NOT INSTALL THE UNIT

- where trees,plants,of falling leaves will block the beams.
- where intense source of light,sunlight will be refrected directly into the receiver optics. A foreign light incoming within $\pm 3^\circ$ angle of each receiver axis may cause fals alarms.
- on movable surfaces.
- where subject to foul water or sea spray.
- where over the max range on each model.
- where subject to strong electrical noize or RFI.
- where subject to strong vibration.
- where subject to corrosive or explosive gas.

AVOID

- exterme temperature and humidity.
- magnets or any magnetized material.
- running power and output wires near high voltage power sources.

IMPORTANT

Face upper/lower optical modules on the transmitter and receiver towards each other.
Be sure of the beam in alignment optical modules can be adjusted within $\pm 90^\circ$ horizontally and $\pm 10^\circ$ vertically.

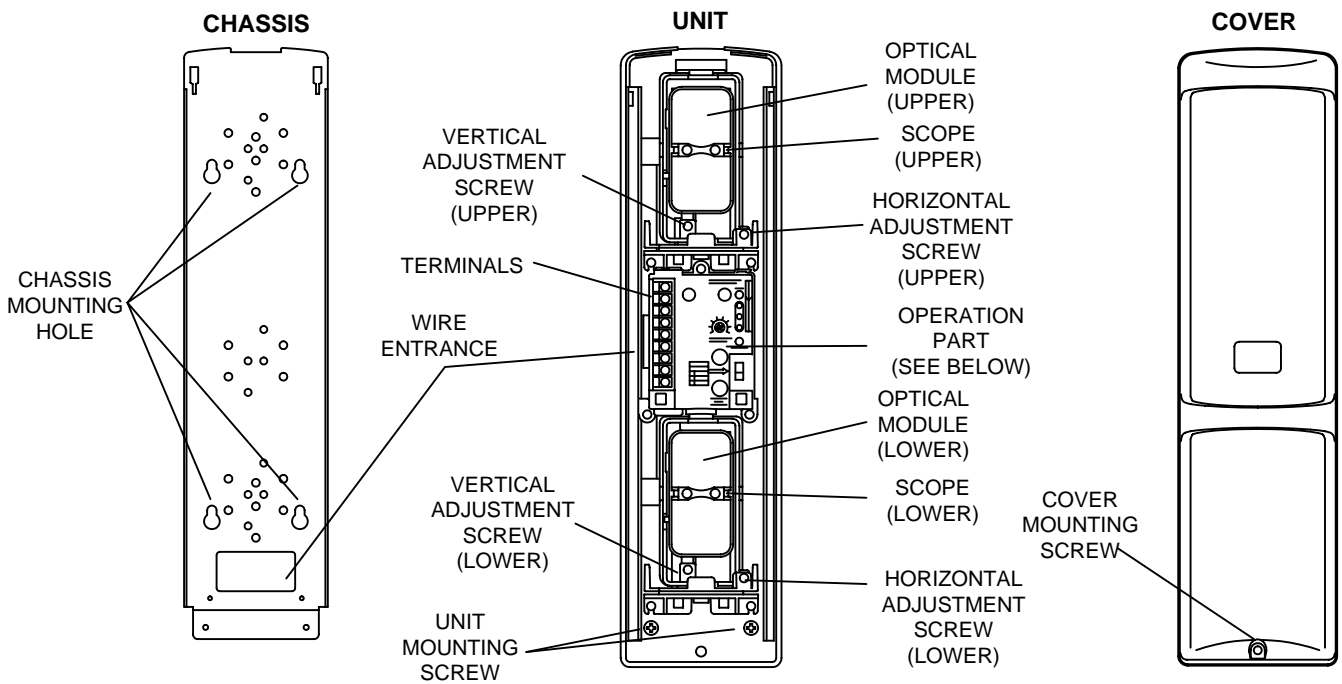
WARNING !	Do not perform installation and wiring when it thunders.
:	Do not supply power until all wiring is completed.
:	Keep power between 10.5 ~ 28 VDC anytime.
:	Do not disassemble or modify the unit.

3 SUPPLIED PARTS

Make sure the following components are included in the package.

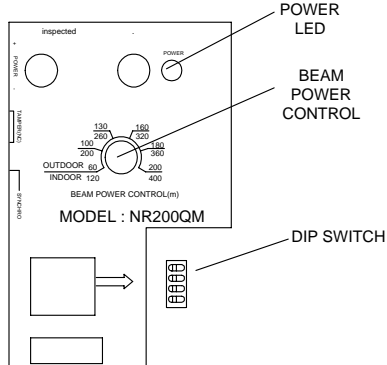
PARTS	PCS
Transmitter,Receiver	2
Installation Instructions	1
Interruption Sheet	2
U-clamp	4
Mounting Plate	4
Clamping Screw(short 4 x 8mm)	8
Clamping Screw(long 4 x 16mm)	8
Chassis Mounting Screw(4 x 8mm)	8

4 COMPONENTS

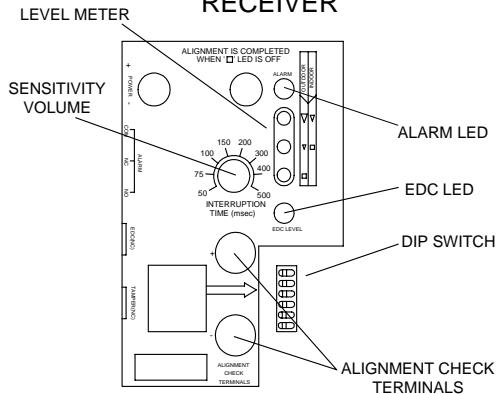


Transmitter has 5 terminals.
receiver has 9 terminals.

OPERATION PART ON TRANSMITTER

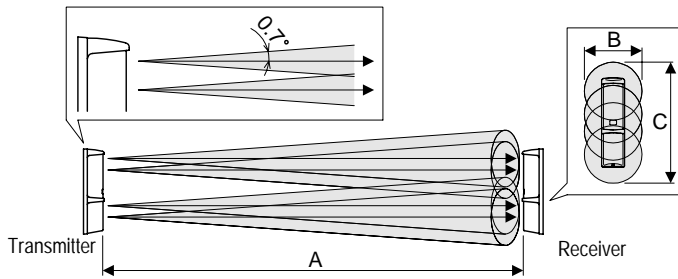


OPERATION PART ON RECEIVER



5 BEAM SPREAD

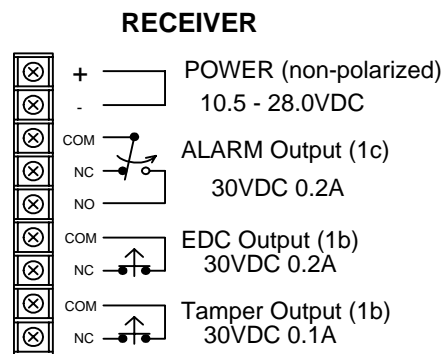
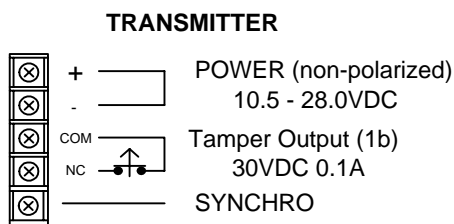
The beam spread angle is $\pm 0.7^\circ$. Refer to the right table and the diagrams below to determine the installation conditions.



Distance (A)	Spread (B)	Spread (C)
20m	0.5m	0.8m
40m	1.0m	1.3m
60m	1.5m	1.8m
80m	2.0m	2.2m
100m	2.5m	2.7m
120m	3.0m	3.2m
140m	3.5m	3.7m
160m	4.0m	4.2m
180m	4.5m	4.7m
200m	5.0m	5.2m

6 WIRING

1. TERMINALS



2. WIRING LENGTH (MAX ONE WAY LENGTH)

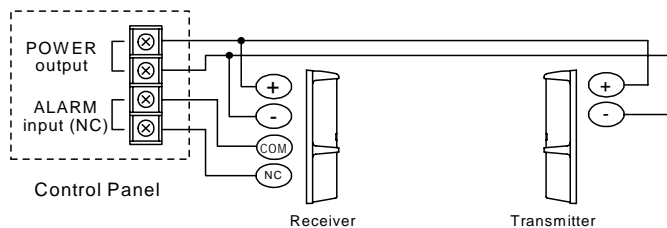
WIRE GAUGE	MAXIMUM DISTANCE (m)			
	NR120QM		NR200QM	
	12VDC	24VDC	12VDC	24VDC
AWG22	90	850	80	730
AWG19	180	1,670	150	1,420
AWG17	330	3,020	280	2,580
AWG14	590	5,370	500	4,570

* This chart is based on 1 set connected to the same wire run from the power source.

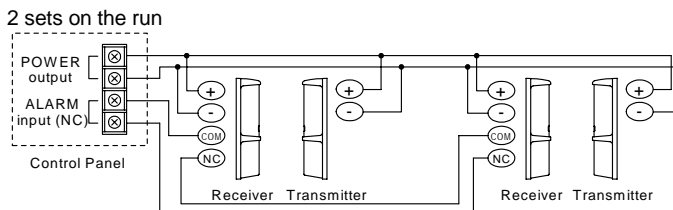
* When installing 2 or more sets on one wire, the max length is obtained by dividing the max wire length listed above by the number of sets installed.

3. EXAMPLES

1 SET



2 SET



NOTE:

- * do not supply power until all wiring is completed.
- * Connect the transmitters and receivers to a UL listed power supply or control panel capable of providing stand by power for at least 4 hours.
- * Refer to the National Electrical Code, NFPA70.
- * This system should be tested at least once a week to ensure proper function.

7 INSTALLATION

1. POLE MOUNTING

- Choose an appropriate mounting location for the system. Install the poles with a clear linesight between the transmitter and the receiver.
- Loosen the transmitter's cover mounting screw and remove the cover.
- Loosen the 2 unit mounting screws and remove the chassis by sliding it down against the unit.
- Attach the mounting plates to the chassis with the clamping screws (short) (see FIGURE 1).
- Firmly attach the chassis to the poles with the Uclamps and the screws (long) (see FIGURE 2). Make sure the transmitter is mounted in direct line-of- sight with the receiver.
- Route wiring through the chassis wire entrance, leaving enough wire to access the transmitter's terminal strip.
- Route wiring through the transmitter's wire entrance
- Slide the transmitter onto the chassis. Tighten with the unit mounting screws.
- Repeat this mounting process for the receiver. Make sure it is mounted in direct line-of-sight with the transmitter.

FIGURE 1

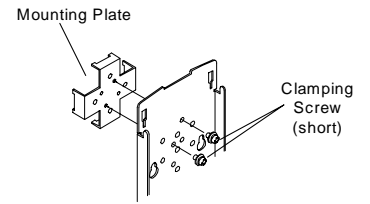
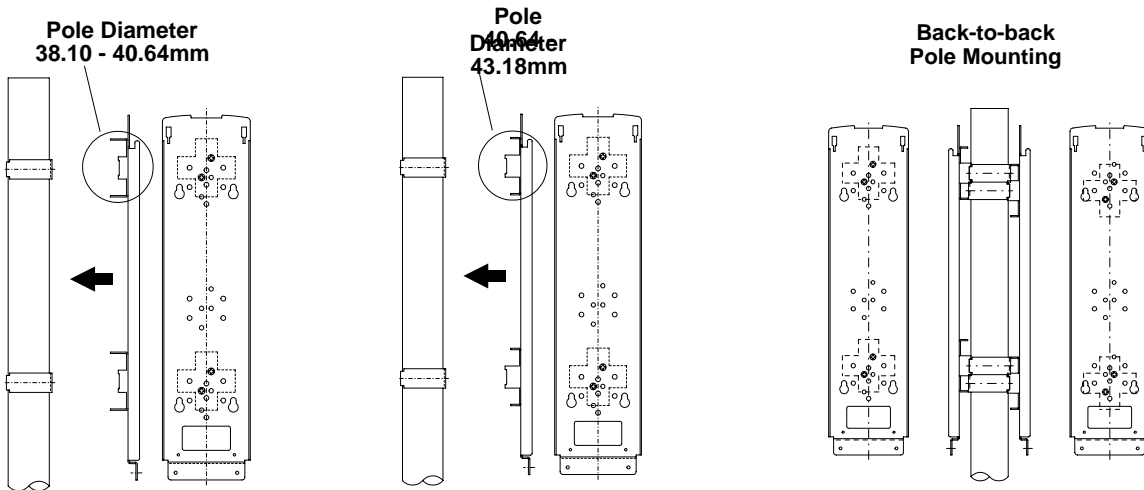
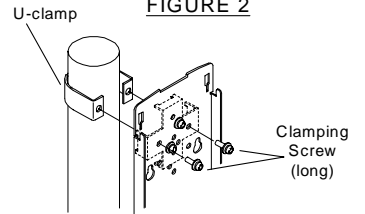
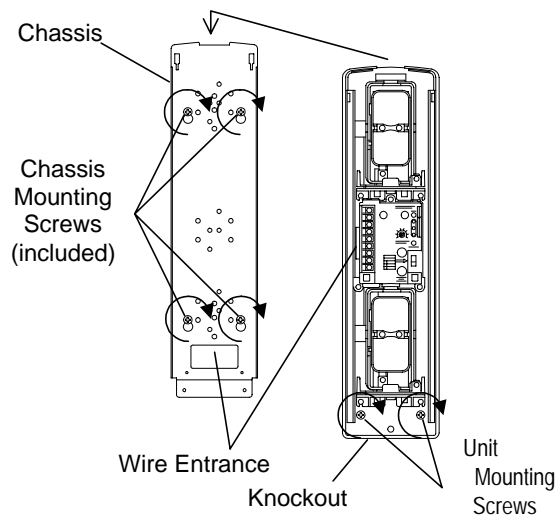


FIGURE 2



2. WALL MOUNTING

- Loosen the transmitter's cover mounting screw and remove the cover.
- Loosen the 2 unit mounting screws and remove the chassis by sliding it down against the unit.
- Route wiring through the wire entrance of the chassis. Leave enough wire to access the transmitter's terminal strip.
- Mount the chassis to the mounting surface with the chassis mounting screws.
- Route wiring through the wire entrance of the transmitter. If surface mounting is used, knock-out the thin-wall wire entrance at the bottom of the transmitter.
- Reattach the transmitter to the chassis.
- Repeat this mounting procedure for the receiver. Make sure it is mounted in direct line-of-sight with the transmitter.



1.SELECTABLE BEAMS

Crosstalking will occur when using multiple beams for stack beam or long distance application, which can cause no-alarm problems.

This NR-QM series has selectable beams up to 8 kind(2 Groups × 4 Channels) which can be used to avoid crosstalking.

2.SELECTABLE AND/OR GATE

The unit has photoelectric intrusion detection system designed to provide an alarm relay activation upon the detection of an intruder moving through four pulsed infrared beams(AND GATE), and also moving through either of the upper two beams or the lower two beams (OR GATE).This AND/OR GATE is selectable with the dip switches for required protection.

3.EDC (Environmental Discrimination Circuit)

EDC sends EDC signal when it becomes difficult to maintain stable operation due to environmental disturbance like fog or rain. There are two selective features in utilizing the Bypass switch at the receiver.

Hereunder, the condition where it is difficult to maintain stable operation for more than 4 seconds due to unfavorable environmental condition is defined as "Poor Environmental Condition".

BYPASS switch =====> OFF

1) In Poor Environmental Condition

EDC LED will turn on and EDC signal will be provided through the normal closed relay output at the receiver. The alarm signal will then be generated by the further loss of the beam energy.

2) When either optical module is blocked for 4 seconds

EDC LED will turn on and EDC signal will be provided. No alarm output will be generated.

3) When both optical modules are blocked for 4 seconds

After the specified interruption time, alarm LED turns on and alarm signal is generated. If beams are blocked for more than 4 seconds, EDC LED will turn on and EDC signal will be provided.

BYPASS switch =====> ON

1) In Poor Environmental Condition

EDC LED will turn on and EDC signal will be provided through the normal closed relay output at the receiver. With the further loss of beam energy, the alarm LED turns on but alarm signal is NOT generated (alarm relay is automatically shunted).

2) When either optical module is blocked for 4 seconds

EDC LED will turn on and EDC signal will be provided. If another optical module is blocked, alarm LED turns on but no alarm signal is generated.

3) When both optical modules are blocked for 4 seconds

After the specified interruption time, alarm LED turns on and alarm signal is generated. Even if the beams are blocked for more than 4 seconds, EDC LED will not turn on and EDC signal is not provided.

Note: It is extremely important to have the EDC connected to a trouble circuit. It is also important to check the system any time the EDC relay has been activated.

4.BEAM INTERRUPTION TIME

This sensitivity control on the receiver allows the unit to accommodate a variety of environmental conditions.

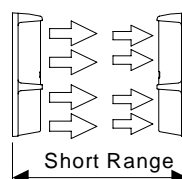
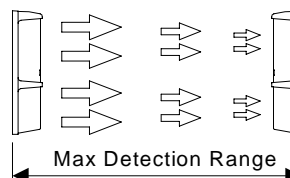
Adjust the beam interruption time lower where birds or papers might interrupt the beams.Do not adjust too low as the unit is unable to detect the intruder.

See below INITIAL SETTING for proper setting.

5.BEAM POWER CONTROL

The beam strength is at optimal level if used at the maximum range.

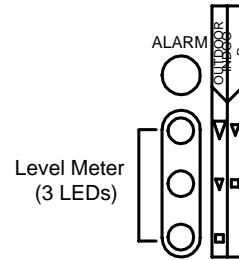
If used for shorter distance, excess beam energy reaches the receiver,resulting in reflection on the nearby walls and cross-talking with other detectors.



Beam energy decreases as it flies a long distance.
For shorter range, more beam energy reaches the receiver.

6.LEVEL METER (For Alignment)

Three LEDs display the amount of beams received. As more beam energy received, each LED status changes:
 ON => Flashes quickly => Flashes slowly => OFF.
 When all LEDs turn off, the alignment is complete.(outdoor)
 When two LEDs turn off, the alignment is complete. (indoor)



7.SOUND CHECK (For Alignment)

The buzzer sounds during the dip switch No.6 on the receiver ON. As more beam energy is received, the sound frequency and the beat change : continuous sound => two beat sound .
 When sounds two beat sound, the alignment is complete.(outdoor)

9 INITIAL SETTING

AND/OR GATE (on the receiver)

Set the dip switch No.4 on the receiver to:
 ON : OR GATE
 OFF : AND GATE(original Position)

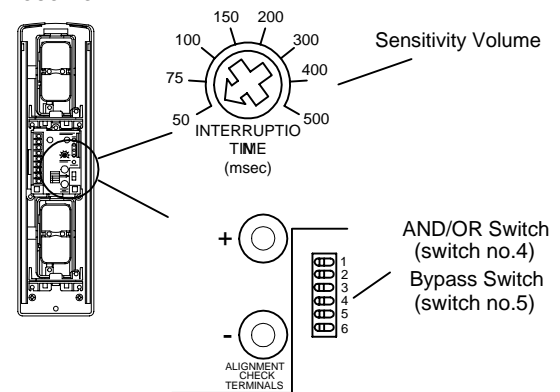
BYPASS (on the receiver)

Set the dip switch No.5 on the receiver to:
 ON : BYPASS activated
 OFF : BYPASS not activated(original Position)

BEAM INTERRUPTION TIME (on the receiver)

Adjust with the rotary volume switch on the receiver.
 Slower setting reduce sensitivity.
 (original Position : 50msec)

Receiver



1 Running	2 Jogging	3 Fast walking	4 normal walking	5 Normal walking	6 Slow moving
50msec	100msec	200msec	300msec	400msec	500msec

Note : For UL applications the interruption time shall not exceed 75 msec.

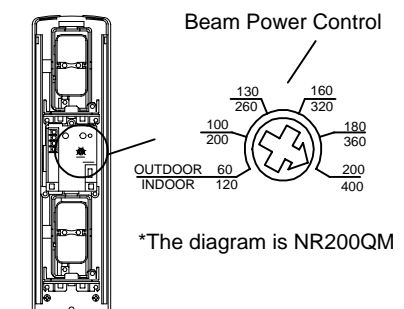
BEAM POWER CONTROL (on the transmitter)

Turn the volume on the transmitter clockwise to increase beam power and counterclockwise to decrease beam power.
 Refer to the following chart to set the volume based on the detection range (initial setting at maximum length).

Model	Volume Setting of Beam Power Control (OUT DOOR)						
NR120QM	Volume	40	60	80	100	110	120
	Range	0-40m	40-60m	60-80m	80-100m	100-110m	110-120m
NR200QM	Volume	60	100	130	160	180	200
	Range	0-60m	60-100m	100-130m	130-160m	160-180m	180-200m

Model	Volume Setting of Beam Power Control (IN DOOR)						
NR120QM	Volume	80	120	160	200	220	240
	Range	0-80m	80-120m	120-160m	160-200m	200-220m	220-240m
NR200QM	Volume	120	200	260	320	360	400
	Range	0-120m	120-200m	200-260m	260-320m	320-360m	360-400m

Transmitter



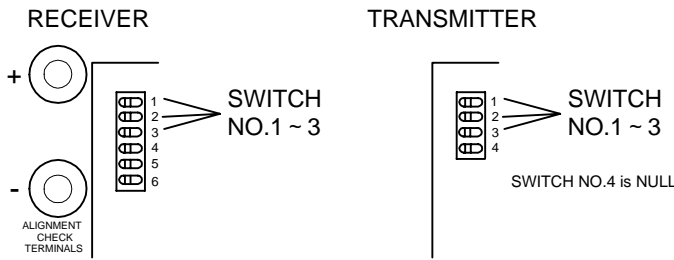
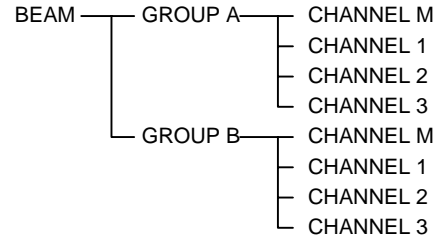
10 SELECTABLE BEAMS AND SYNCHRO WIRING

When installing only 1 set, beam group/channel setting and synchro wires are not required. Use the unit at all original positions (OFF) on the switch No. 1 to 3 of the transmitter and the receiver.

1. BEAM GROUP/CHANNEL

The selectable beams up to 8 kinds can be used. The unit has Group A and B beam for selection. Each group can be divided into 4 channels which are called Channel M (Master), Channel 1, Channel 2, and Channel 3. Channel 1 to 3 can emit beams only when Channel M on the same group provides each channel with synchro signal. When installing 2 or more sets on the same group, set only 1 set to Channel M and set the other sets to Channel 1 to 3. And synchro wires are required. (See SYNCHRO WIRING.)

Set the dip switch No. 1 to 3 on each transmitter and receiver for group/channel selection. See below chart.



GROUP SELECTION

SWITCH NO.1	GROUP
ON	B
OFF	A

CHANNEL SELECTION

SWITCH NO.2	SWITCH NO.3	CHANNEL
OFF	OFF	M
OFF	ON	1
ON	OFF	2
ON	ON	3

- * Each transmitter and receiver to be faced must be set to the same group/channel.
- * When installing 2 or more sets, do not set to the same group/channel to avoid crosstalking.

2. SYNCHRO WIRING

Synchro wires are required when installing 2 or more sets on the same group. Do wire between terminal "SYNCHRO" of each transmitter on the same group.

This synchro wire should be more than 0.65mm Dia. (0.3mm²) and should be run within **66ft. (20m)** length.

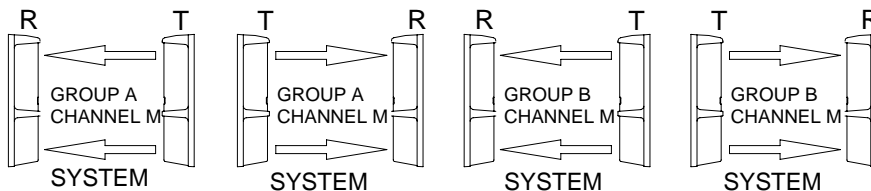
Synchronized transmitters must use a common power supply. Synchro wires are not required between the receivers. Do not wire between group A and B.

- * The system will not be activated when synchro wires are not connected properly or other unneeded wires are connected. (When required wires are not connected, Power LED will be flickered.)

CAUTION : When Power LED is flickered, shut off the power and reconnect wires correctly.

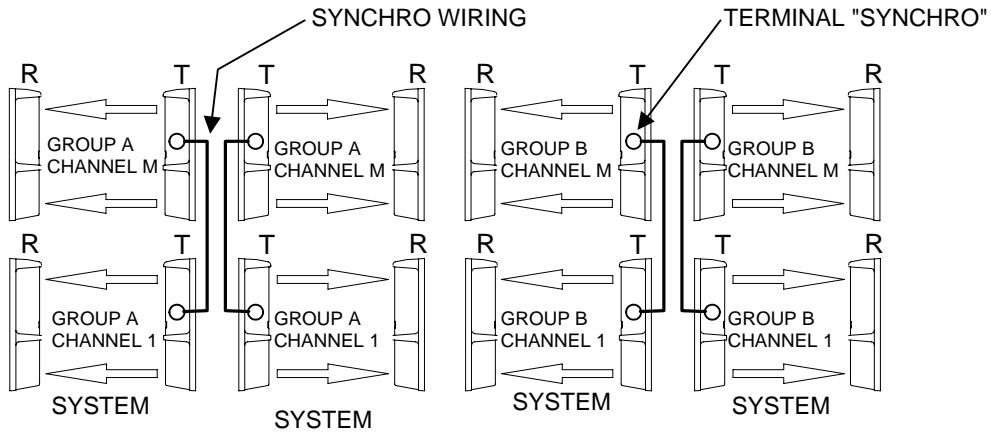
3. EXAMPLES

1 STACKING IN LONG DISTANCE



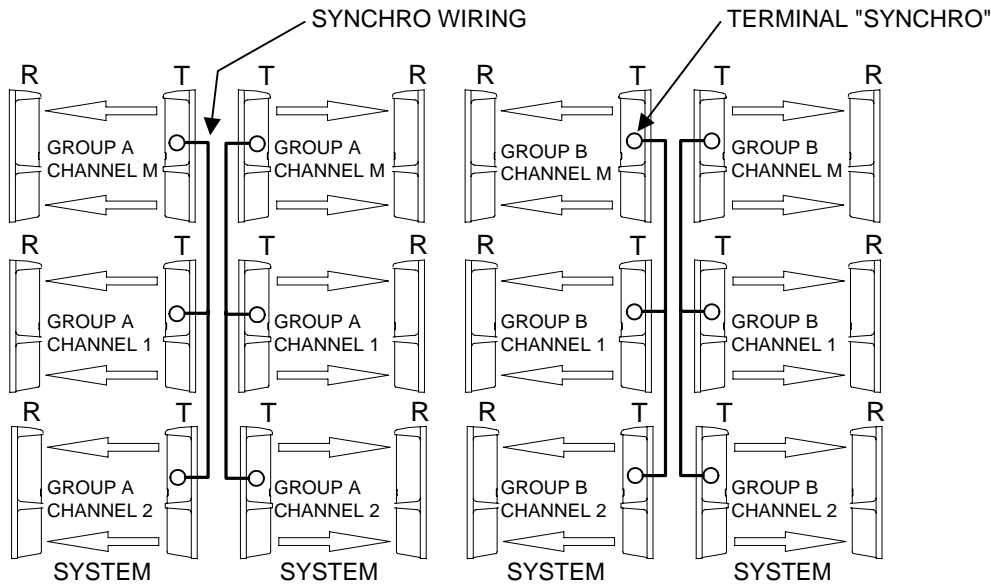
SYSTEM must be set to group B to avoid crosstalking to SYSTEM .
 SYSTEM must be set to group B to avoid crosstalking to SYSTEM .
 Stay set to channel M on both groups and synchro wires are not required.

2 STACKING IN LONG DISTANCE



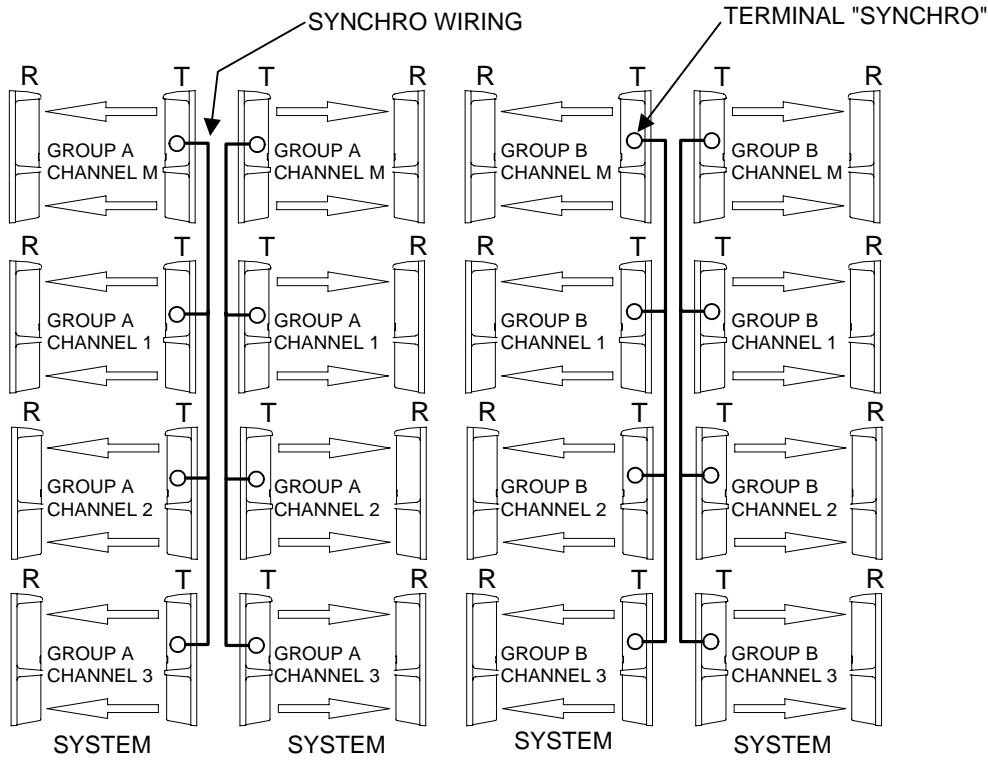
SYSTEM must be set to group B to avoid crosstalking to SYSTEM .
 SYSTEM must be set to group B to avoid crosstalking to SYSTEM .
 Each top line set must be set to channel M and the bottom line sets to channel 1 to avoid crosstalking between the top and bottom line sets.
 Do synchro wire on each group due to multiple channel use.

3 STACKING IN LONG DISTANCE



SYSTEM must be set to group B to avoid crosstalking to SYSTEM .
 SYSTEM must be set to group B to avoid crosstalking to SYSTEM .
 Each top line set must be set to channel M and the other line sets to channel 1 ~ 2 to avoid crosstalking between the stacking sets.
 Do synchro wire on each group due to multiple channel use.

4 STACKING IN LONG DISTANCE

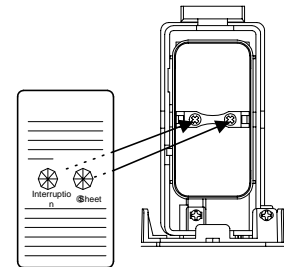


SYSTEM must be set to group B to avoid crosstalking to SYSTEM .
 SYSTEM must be set to group B to avoid crosstalking to SYSTEM .
 Each top line set must be set to channel M and the other line sets to channel 1 ~ 3 to avoid crosstalking between the stacking sets.
 Do synchro wire on each group due to multiple channel use.

11 ALIGNMENT

1.IMPORTANT

Apply power on the transmitter and receiver.
 Rotate each optical module it horizontally for rough tuning.
 Then use both of Horizontal and Vertical Adjustment Screws.
 Cover the lower optical modules of both transmitter and receiver with supplied interruption sheets when aligning upper beam.
 Cover the upper optical modules of both transmitter and receiver with supplied interruption sheets when aligning lower beam.
 For synchronized application, cover the upper and the lower optical modules of all transmitters with supplied interruption sheets except the units on alignment.
 Do beam alignment on both the transmitter and receiver.

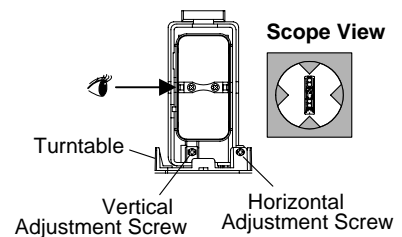


Caution : Make sure to remove the interruption sheets and close the covers upon the completion of alignment.

Note : Adjust the optical module using tester, LED or Sound more precisely after the rough adjustment by using Scope.
Note : Make sure the adjustment by using LED for the indoor application.

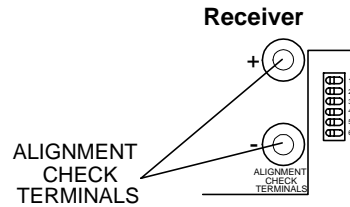
2.ALIGNMENT USING SCOPE

Look into the scope of transmitter 10 -15cm away from the optical module, and adjust the horizontal angle with the turntable.
 Use horizontal and vertical adjustment screws to locate the receiver in the center of viewing circle.



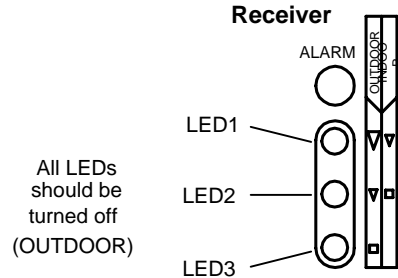
3.ALIGNMENT USING VOLTMETER

Insert voltmeter leads into the alignment check terminals.
 Set the meter scale to 10.0VDC.
 Adjust the optical modules with a screwdriver to obtain the higher voltage.
 In an ideal environment, the voltmeter value should read 3.0V or higher.
 (The maximum voltage : 3.75V)



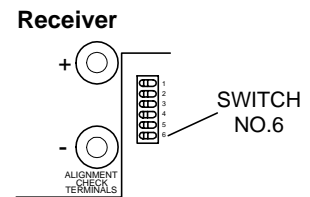
4.ALIGNMENT USING LEVEL LED

Look at the Level Meter on the receiver to proceed with fine tuning.
 Adjust the optical module angle with a screwdriver.
 As more beam energy is received, each LED status changes:
 ON => Flashes quickly => Flashes slowly => OFF.
 Continue fine tuning until all LEDs turn off.
 Outdoor : When all LEDs turn off, the alignment is complete.
 Indoor : When two LEDs turn off, the alignment is complete.



5.ALIGNMENT USING SOUND

Set the dip switch No.6 on the receiver to ON.
 Adjust the optical module angle with a screwdriver.
 As more beam energy is received, each sound frequency and the beat change:
 continuous sound => two beat sound.
 Continue fine tuning until the buzzer sounds two beat sound.
 When sounds two beat sound, the alignment is complete.
 Always set the dip switch No.6 on the receiver to OFF after the beam alignments.



BEAM ENERGY	—————▶	
SENSITIVITY	0 Times ———▶	100 Times ———▶
VOLTMETER	0V ———▶ 1V ———▶ 2V ———▶ 3V ———▶	
LED	LED1 —▶ LED2 —▶ LED3 —▶ ON => Flashes quickly => Flashes slowly => OFF	all LEDs turn off
SOUND	Low frequency => High frequency ♪ —▶ ♪ —▶ ♫ —▶	♪ —▶ ♪ —▶ ♫ —▶

Caution: Make sure to remove the interruption sheets and close the covers upon the completion of alignment.

12 OPERATION CHECK

1.ALARM OPERATION

AND GATE : Check that the alarm LED on the receiver turns ON when all for beams are blocked simultaneously for the adjusted beam interruption time.
 OR GATE : Check that the alarm LED on the receiver turns ON when either of the upper/lower two beams are blocked for the adjusted beam interruption time.

2.EDC OPERATION

When OR GATE is set,set the dip switch No.4 on the receiver to OFF(AND GATE).
 Check that the EDC LED on the receiver turns ON in 4 seconds after only the upper beam is blocked.
 Check that the ALARM LED on the receiver turns ON in the adjusted beam interruption time after the lower beam is blocked while the EDC LED stays ON.
 Check that the EDC LED on the receiver turns ON in 4 seconds after only the lower beam is blocked.
 Check that the ALARM LED on the receiver turns ON in the adjusted beam interruption time after the upper beam is blocked while the EDC LED stays ON.
 Set the dip switch No.4 on the receiver to ON for OR GATE.

3.PERIODEC CHECK

This system should be tested at least once a week per above checking to ensure proper function.

13 TROUBLESHOOTING

Check the following items if the system does not work normally.

Check that the input voltage is 10.5 ~ 28VDC at the terminal on both of the transmitter and the receiver.

Check that the loop resistance of the alarm output is under 100 .

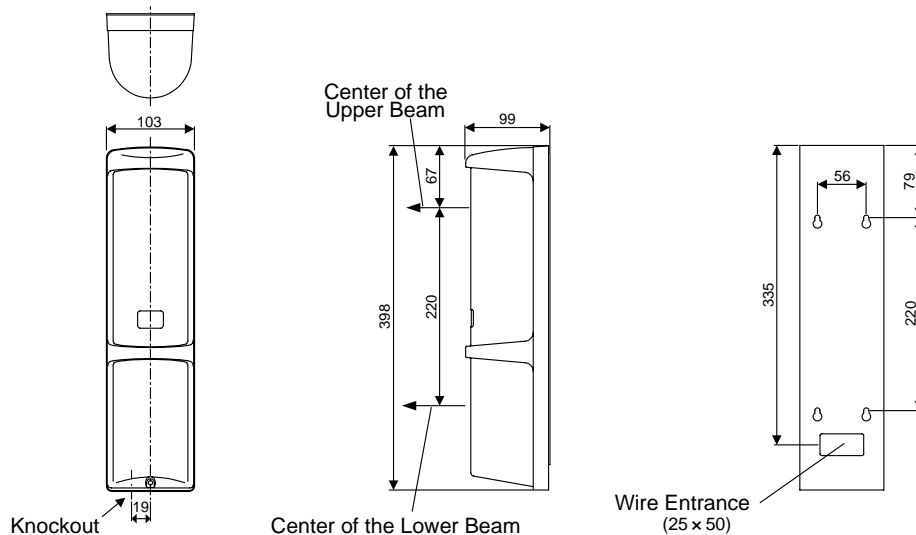
Check that the monitor LED on the transmitter turn ON.

Check that the alarm LED on the receiver turns ON when both of the upper/lower beams are blocked simultaneously for the adjusted beam interruption time.

Check that the output of the beam alignment check terminal on the receiver is over 3V.

PROBLEM	CAUSE	SOLUTION
Constant alarm output	Something is blocking the beams.	Remove the object(s).
	Optical modules or covers need cleaning.	Clean the optical modules and the covers.
	Improper channel selection.	Select the proper channels.
	Syncro wires are not connected.	Connect the proper synchro wiring.
False alarms often caused.	Something move is blocking the beams.	Remove the object(s).
	Beam interruption time is set too quick.	Decrease the sensitivity.
	Near by source of electrical noise or RFI.	Change the installation site.
	Wiring too close to power sources or power line.	Change the wiring rout
	Unstable installation site.	Fix the installation site.
	Over the maximum protection range of the model.	Reinstall within the maximum range.
	Inappropriate Beam Power Control level.	Readjust the control level.
Frost or dew	Attach the optical heater.	
No alarm when beams brocked.	Beams are reflected into the receiver	Remove the reflective object or change the installation site.
	Beam interruption time is set too slow.	Increase the sensitivity.
	Not enough beam power.	Increase the beam power.
EDC LED often turns ON.	Something is blocking the beams.	Remove the object(s).
	Installed on unstable ground.	Fix the installation site.
	Over the maximum protection range of the model.	Reinstall within the maximum range.
	Inappropriate Beam Power Control level.	Readjust the control level.
	Frost or dew	Attach the optical heater.
Power LED on the transmitter flicker.	Required synchro wires are not connected.	Connect the proper synchro wiring.

14 DIMENSIONS



15 SPECIFICATIONS

Product Name		PHOTOELECTRIC DETECTORS	
Model		NR120QM	NR200QM
Input Voltage		10.5 ~ 28VDC(Non-Polarity)	
Current Draw		Transmitter:under 35mA Receiver:under 75mA(80mA with Sound Check)	Transmitter:under 55mA Receiver:under 75mA(80mA with Sound Check)
Operating Temp./Humid.		- 13 ° F ~ + 140 ° F (- 25 ~ + 60) under95%RH	
Preservable Temp./Humid.		- 22 ° F ~ + 158 ° F (- 30 ~ + 70) under95%RH	
Alarm Output	Alarm	Form C 0.2A@30VDC Output Period:3sec	
	EDC	NC 0.2A@30VDC Output Period:3sec	
	Tamper	NC 0.1A@30VDC Output Period:While the cover is removed.	
Selectable Beams		2Groups x 4Channels	
Max Coverage		Outdoor 400ft.(120m)	Outdoor 660ft.(200m)
Beam Interruption Time		50msec ~ 500msec(Selectable)	
Optical Module		± 90 ° Horizontal ± 10 ° Vertical Adjustable	
Installation Site		Outdoor/Indoor(Pole/Wall Mount)	
IP Rate		IP 54	
Net Weight		Transmitter:2.64lb(1.2kg) Receiver:2.64lb(1.2kg)	
Color		Black Mansel-1.0	

*Specifications are subject to change without prior notice.

16 OPTIONAL PARTS

Part No.	Description
BP-1	Pole(42.7mm x 950mm 2-pcs)
BP-2	Pole(42.7mm x 1200mm 2-pcs)
BP-3	Wall-mount Pole(42.7mm 2-pcs)
PC1A	Water Resistant Enclosure(2-pcs)
PC3A	Back-to-back Enclosure(1-pcs)
BH24D	Heater

*Specifications are subject to change without prior notice.

17 OTHER INFORMATION

- At least once a year, clean the optical module and covers with a soft cloth, and perform walk testing to verify operation.
- The specifications are subject to change without prior notice.
- This unit designed to detect movement of an intruder and activates an alarm control panel.
- Being only a part of a complete system,we can not accept responsibility for any damages or other consequences resulting from an intrusion.



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