

Installation Instructions for the DS484Q/DS486Q Quad Beam Photoelectric Detectors

1.0 Description

The DS484Q and DS486Q are photoelectric quad beam detectors designed to activate an alarm relay upon detection of an intruder through four pulsed infrared beams. Both models contain a transmitter, which emits an invisible infrared beam, and a receiver. If the beam is broken, the receiver signals an alarm. Multiple channel operation is provided to increase system flexibility.

1.1 Feature Summary

For additional information on the features listed below, see *Section 2.1 Features*.

- 100 Times Sensitivity Allowance
- Selectable Beam Power Control
- Selectable Beam Interruption Time Control
- Up to four transmitter/receiver sets on top of each other
- Selectable Beams (two beams by four channels)
- Selectable “AND/OR” gate
- Environmental Discrimination Circuit
- Two mounting options: wall or pole
- Easy Alignment
- Sounder for installation ease
- Multiple channel operation
- Two coverage ranges

1.2 Components

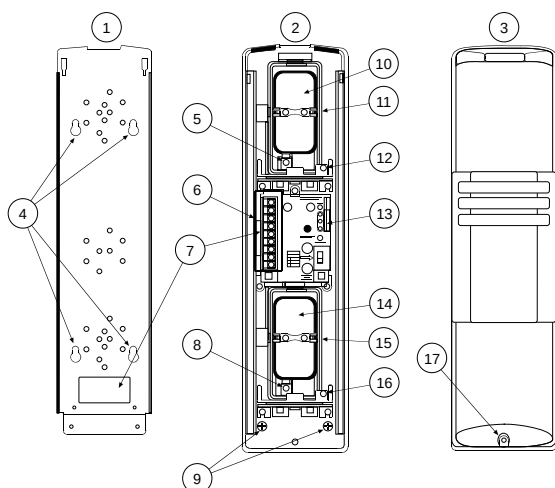


Figure 1: DS484Q/DS486Q internal arrangement

Item	Description
1	Chassis
2	Unit
3	Cover
4	Mounting holes
5	Vertical adjustment screw (upper)
6	Terminals (transmitter has 5, receiver has 9)
7	Wire entrance
8	Vertical adjustment screw (lower)
9	Unit mounting screws

Item	Description
10	Optical module (upper)
11	Scope (upper)
12	Horizontal adjustment screw (upper)
13	Operation part (see either Figure 2 or Figure 3)
14	Optical module (lower)
15	Scope (lower)
16	Horizontal adjustment screw (lower)
17	Cover Mounting Screw

Table 1: Key to Figure 1

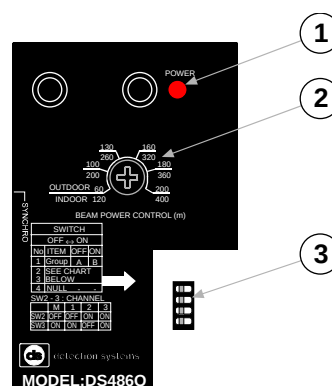


Figure 2: DS486Q Transmitter operation panel

Item	Description
1	Power LED
2	Beam power control
3	DIP Switches

Table 2: Key to Figure 2

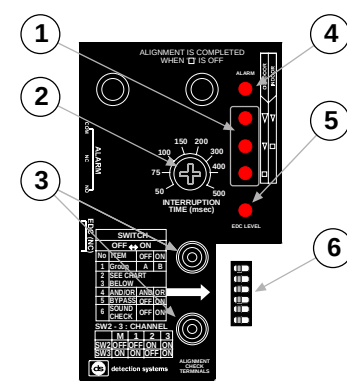


Figure 3: DS486Q Receiver operation panel

Item	Description
1	Level meter
2	Sensitivity volume
3	Alignment check terminals
4	Alarm LED
5	EDC LED
6	DIP Switches

Table 3: Key to Figure 3



2.0 Overview

2.1 Features

2.1.1 100 Times Sensitivity Allowance

Stable operation is maintained even if 99% of beam energy is cut by environmental disturbances such as rain, fog, and frost.

2.1.2 Beam Power Control

Use this feature to select the appropriate beam intensity for the detection range. Controlling beam intensity minimizes the risk of reflection off nearby walls and cross detection with other detectors.

2.1.3 Beam Interruption Time Control

Use this feature to change the beam interruption time to best fit the application.

2.1.4 Using Multiple Transmitter/Receiver sets

Up to four transmitter/receiver sets can be stacked.

2.1.5 Selectable Beams

The DS484Q/DS486Q's beams are configurable into eight different combinations (two groups by four channels). These combinations can eliminate crosstalking that can occur when multiple beams are in a stacked configuration, or in a long distance application resulting in false alarms.

2.1.6 Selectable "AND/OR" Gate

The DS484Q/DS486Q has a photoelectric intrusion detection system designed to provide an alarm relay activation for the following considerations:

- AND Gate – All four beams must be blocked simultaneously to trigger an alarm, resulting in less false alarms caused by birds and other small animals.
- OR Gate – Either the upper or lower pairs of beams must be blocked indicating detection of an intruder trying to crawl on the ground.

Use the DIP Switches to select the required protection.

2.1.7 Environmental Discrimination Circuit (EDC)

The Environmental Discrimination Circuit (EDC) sends a signal when it becomes difficult to maintain stable operation due to environmental disturbances. It is designed to detect the gradual loss of signal along the beam's path due to rain, fog and snow or dirt built up on the cover. If the signal decreases by 95% over a minimum 4-second period, the EDC activates the EDC LED (see *Figure 3*, item #5) and relay. This is a warning that something can be partially blocking a beam, or that the covers need cleaning.

To use the EDC's Bypass Switch, set the receiver's DIP Switch 5 to ON (*Figure 4*, #1) or OFF (*Figure 4*, #2), and follow the conditions in *Table 4* on the receiver (see *Section 6.1.1 Receiver*, Step 2 for more information)

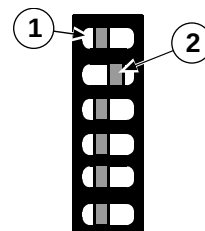


Figure 4: Receiver DIP Switch #5

Condition	BYPASS Switch OFF	BYPASS Switch ON
Poor Environmental Condition* Note: "Poor Environmental Condition" refers difficulty in maintaining stable operation due to environmental disturbances like fog or rain.	EDC LED turns on and EDC signal is provided through the normally closed relay output at the receiver. The alarm is generated by further loss of beam energy.	EDC LED turns on and EDC signal is provided through the normally 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).
When either optical module is blocked for 3 or more seconds.	EDC LED turns on and EDC signal is provided No alarm output is generated.	EDC LED turns on and EDC signal is provided. If another optical module is blocked, the Alarm LED turns ON, but no alarm signal is generated.
When both optical modules are blocked for 3 seconds.	After the specified interruption time, the Alarm LED turns ON and alarm signal is generated. If beams are blocked for more than 3 seconds, EDC LED turns ON, and EDC signal is generated.	After the specified interruption time, the Alarm LED turns ON, and alarm signal is generated. EDC LED does not turn ON, and EDC signal is not provided.

Table 4: EDC BYPASS switch states



Connect the EDC to a trouble circuit.
Check the system after the EDC relay activates.

2.2 Specifications

Alarm Output	Alarm	Form "C" 0.2 A @ 30 VDC Output Period: 3 seconds	
	EDC	NC 0.2 A @ 30 VDC Output Period: 3 seconds	
	Tamper	NC 0.1 A @ 30 VDC Output Period: While the cover is removed	
Beam Interrupt Time		Adjustable from 50 ms to 500 ms	
Selectable Beams		2 Groups by 4 Channels	
Environmental Discrimination Circuit Output		Normally closed contacts rated at 0.2 A @ 30 VDC.	
Maximum Coverage	Outdoor	DS484Q	120 m (400 ft)
		DS486Q	200 m (660 ft)
	Indoor	DS484Q	240 m (800 ft)
		DS486Q	300 m (1000 ft)
Enclosure Design			
Material		Polycarbonate	
Dimensions (HxWxD)		35 cm x 10 cm x 11 cm (13.75 in x 4 in x 4.1 in)	
Total Weight		Transmitter	1.2 kg (2.64 lb.)
		Receiver	1.2 kg (2.64 lb.)
Environmental Considerations			
Operating Temperature		-25°C to +55°C (-13°F to +130°F)	
IP Rating		IP 54 (Protection against dust, protection against splashing water.)	
Mounting			
Location		Surface or pole mount	
Pattern Pointability		±90° horizontal, ±10° vertical.	
Power Requirements			
Voltage		10.5 VDC to 28 VDC non-polarized	
Current Draw		75 mA standby, 50 mA alarm (receiver only)	
Backup Power Requirements:		4 hours (120 mAh) minimum required for UL Certificated Installations.	
Tamper Output		Normally closed contacts rated at 0.1 A @ 30 VDC	
Trigger Response Time		Selectable response time of 35 ms to 700 ms	

Table 5: DS484Q/DS486Q Specifications

3.0 Installation Considerations



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



DO NOT INSTALL THE UNIT...

- *near trees and plants where falling leaves can block the beam.*
- *where intense sources of light and sunlight can be reflected directly into the receiver optics. A beam of light coming in at an angle of $\pm 3^\circ$ of each receiver can cause false alarms.*
- *on movable surfaces.*
- *where subject to splashing water or sea spray.*
- *beyond the maximum range of each model.*
- *where strong electrical noise or radio frequency interference occurs.*
- *where strong vibration occurs.*
- *in the presence of corrosive or explosive gas.*

Avoid...

- *extreme temperature and humidity.*
- *magnets or any magnetized material.*
- *installing or wiring power and output wires near high voltage power sources.*



- *Face upper/lower optical modules on the transmitter and receiver towards each other.*



- *Do not install or wire detectors during a thunderstorm.*
- *Do not supply power until all wiring is completed.*
- *Keep power between 10.5 VDC and 28 VDC at all times.*
- *Do not disassemble or modify the unit.*

3.1 Beam Strength over Distance

The beam strength is optimal if used within the maximum range of the detectors. If used for shorter distances, excess beam energy reaches the receiver resulting in reflection off nearby walls and incorrect communication with other detectors.

3.2 Beam Spread

The beam spread is $+0.7^\circ$ (see *Figure 5*, #1). Refer to *Figure 5* and *Table 6* to determine the installation conditions.

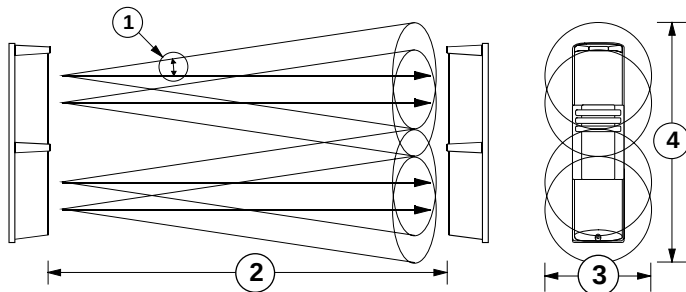


Figure 5: Beam spread

Distance between Transmitter and Receiver - #2		Horizontal Spread - #3		Total Vertical Spread - #4	
meter	(ft.)	meter	(ft.)	meter	(ft.)
20	66	0.5	1.7	0.8	2.6
40	131	1.0	3.3	1.3	4.3
60	197	1.5	4.9	1.8	5.9
80	263	2.0	6.6	2.2	7.2
100	328	2.5	8.2	2.7	8.9
120	394	3.0	9.8	3.2	10.5
140	459	3.5	11.5	3.7	12.1
160	525	4.0	13	4.2	13.7
180	591	4.5	14.8	4.7	15.4
200	656	6.0	16.4	5.2	17.1

Table 6: Beam spread distances

4.0 Mounting

The DS484Q/DS486Q can be mounted in one of two ways:

- Pole mounted
- Wall mounted

4.1 Pole Mounting

1. Choose an appropriate mounting location for the system. Install poles with a clear line-of-sight between the transmitter and the receiver.
2. Loosen the transmitter's cover mounting screw (see *Figure 1*, #17) and remove the cover (see *Figure 1*, #3).
3. Loosen the two mounting screws (see *Figure 1*, #9) and remove the chassis (see *Figure 1*, #1) by sliding it down against the unit (see *Figure 1*, #2).

4.1.1 Single Unit Pole Mounting

1. Attach the mounting plates (see *Figure 6*, #1) to the chassis (see *Figure 1*, #1) with the short clamping screws (see *Figure 6*, #2).
2. If the pole diameter is between 3.8 cm and 4 cm (1.5 in. and 1.6 in.), use the shorter flange (1.0 cm [0.4 in.]) of the mounting plate. If the pole diameter is between 4 cm (1.6 in.) and 4.3 cm (1.7 in.), use the longer flange (1.5 cm [0.6 in.]) of the mounting plate. This ensures that the end of the screw is not in contact with the pole.
3. Firmly attach the chassis (see *Figure 1*, #1) to the poles using the U clamps (see *Figure 7*, #1) and the long clamping screws (see *Figure 7*, #2). Make sure the transmitter is mounted in direct line-of-sight to the receiver.

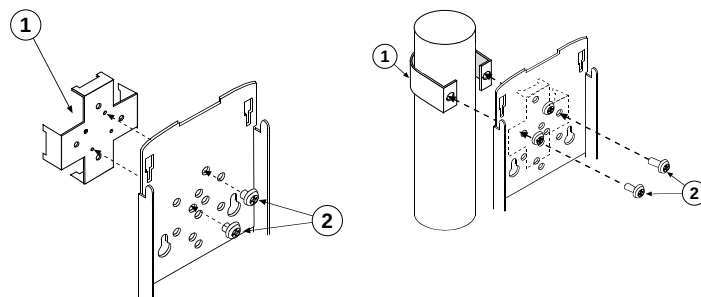


Figure 6: Using mounting plates

Figure 7: Using U clamps

4. Route wiring through the chassis wire entrance (see *Figure 1*, #7), leaving enough wire to access the transmitter's terminal strip (see *Figure 1*, #6).
5. Slide the transmitter onto the chassis (see *Figure 1*, #1). Tighten the unit mounting screws (see *Figure 1*, #9).
6. Repeat this mounting process for the receiver. Make sure to mount in direct line-of-sight to the transmitter.

4.1.2 Back-to-Back Pole Mounting

With spacers between the two units, mount the transmitter and receiver back-to-back. Firmly attach to the pole with nuts and bolts. Be sure they are aimed in line-of-sight to each other so the transmitter and receiver in the same set are aligned.

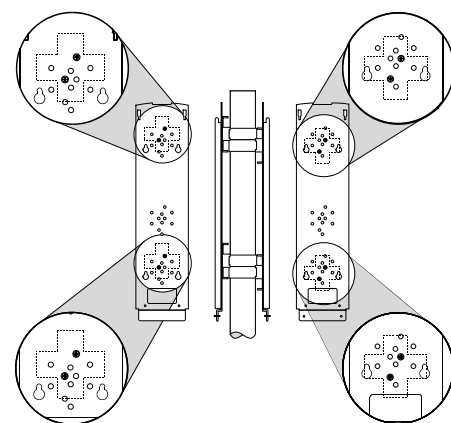


Figure 8: Back-to-back pole mounting

4.2 Wall Mounting

1. Loosen the transmitter's cover mounting screw (see *Figure 1*, #17) and remove the cover (see *Figure 1*, #3).
2. Loosen the two mounting screws (see *Figure 1*, #9) and remove the chassis (see *Figure 1*, #1) by sliding it down against the unit (see *Figure 1*, #2).
3. Route wiring through the chassis wire entrance (see *Figure 1*, #7), leaving enough wire to access the transmitter's terminal strip (see *Figure 1*, #6).
4. Mount the chassis (see *Figure 1*, #1) to the mounting surface with the chassis mounting screws through the mounting holes (see *Figure 1*, #4).
5. Route wiring through the wire entrance (see *Figure 1*, #9) of the transmitter. Remove the wire entrance at the bottom of the transmitter.
6. Reattach the transmitter to the chassis.
7. Repeat this mounting procedure for the receiver. Make sure it is mounted in direct line-of-sight to the transmitter.

5.0 Wiring



Only apply power after all connections are made and inspected.

Note: *Install these detectors in accordance with National Electrical Code, NFPA-70.*

Table 7 is based on one set (transmitter and receiver) connected to the same wire run from the power source.

When installing two or more sets on one wire, calculate the maximum length by dividing the maximum wire length listed by the number of sets installed.

Connect the transmitters and receivers to a UL Listed power supply or control panel capable of providing standby power for at least 4 hours.

Test this system at least once a week to ensure proper operation.

Wire Gauge [AWG (mm ²)]	Maximum Distance [m (ft.)]			
	DS484Q		DS486Q	
	12 VDC	24 VDC	12 VDC	24 VDC
22 (0.8)	90 (295)	850 (2789)	80 (295)	730 (2395)
19 (1.06)	180 (591)	1670 (5479)	150 (492)	1420 (4659)
17 (1.37)	330 (1083)	3020 (9908)	280 (919)	2580 (8465)
14 (1.8)	590 (1936)	5370 (17618)	500 (1640)	4570 (14993)

Table 7: Wire Length / AWG Chart

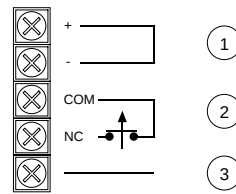


Figure 9: Transmitter, T-strip Wiring

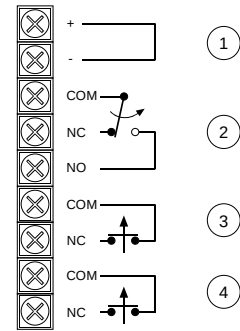


Figure 10: Receiver, T-strip Wiring

Item	Description
1	Power (non-polarized), 10.5 VDC to 28.0 VDC
2	Tamper Output (1b), 30 VDC 0.1 A
3	SYNCHRO wiring

Table 8: Key to Figure 9

Item	Description
1	Power (non-polarized), 10.5 VDC to 28.0 VDC
2	ALARM Output (1c), 30 VDC 0.2 A
3	EDC Output (1b), 30 VDC 0.2 A
4	Tamper Output (1b), 30 VDC 0.1 A

Table 9: Key to Figure 10

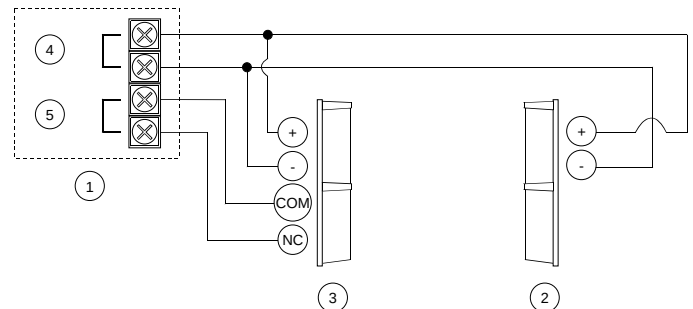


Figure 11: Single set wiring example

Item	Description
1	Terminal strip on transmitter and receiver
2	Transmitter
3	Receiver
4	POWER output
5	ALARM input (NC)

Table 10: Key to Figure 11

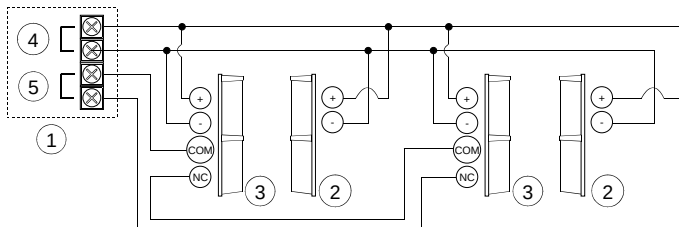


Figure 12: Two sets on the run wiring example

Item	Description
1	Terminal strip on transmitter and receiver
2	Transmitter
3	Receiver
4	POWER output
5	ALARM input (NC)

Table 11: Key to Figure 12

6.0 Setup and Alignment

6.1 Setup

6.1.1 Receiver

- Select the beam alarm condition by setting DIP Switch 4 (see Figure 3, #6) ON or OFF for the AND/OR gate.
 - If DIP Switch 4 is ON, the OR condition is selected. The upper OR lower pairs of beam must be broken to trigger an alarm.
 - If DIP Switch 4 is OFF, the AND condition is selected. The upper AND lower pairs of beam must be broken to trigger an alarm.
- Choose whether or not to bypass alarms by setting DIP Switch 5 (see Figure 3, #6) to ON or OFF when the EDC (refer to Section 2.1.7 Environmental Discrimination Circuit (EDC)) activates.

The EDC is always on. The BYPASS DIP Switch 5 (see Figure 3, #6) controls the alarm condition in relation to the EDC relay status.

 - If DIP Switch 5 is ON, the system alarms only if the EDC relay is not activated. If the EDC is activated, the system does not indicate an alarm.
 - If DIP Switch 5 is OFF, the system alarms regardless if the EDC relay is activated or not.



Connect the EDC to a trouble circuit, and check the system any time the EDC relay activates.

Note: If the EDC circuit remains activated for prolonged periods when the beam path is clear, the beam might be misaligned. See Section 6.2 Alignment to re-align the beam.

- Select the beam interruption time by adjusting the rotary volume sensitivity switch (see Figure 3, #2) with a Phillips head screwdriver according to the desired catch response in Table 12.

The beam interrupt time defines the amount of time an intruder must be in the beam path before an alarm is signaled.



For best performance when using the AND mode, do not exceed 100 ms beam interrupt time.

Interrupt Time (ms)	Catch Example
50	Running
100	Jogging
200	Fast Walking
300	Normal Walking
400	
500	Slow Moving

Table 12: Beam Interruption Time Examples

6.1.2 Transmitter

- Depending on whether the DS484Q/DS486Q is used indoors or outdoors, turn the Beam Power Control (see Figure 2, #2) for the appropriate detection range (Table 13).

DS484Q		DS486Q	
Volume Setting	Range m (ft)	Volume Setting	Range m (ft)
40	0 to 40 (0 to 131)	60	0 to 60 (0 to 197)
60	40 to 60 (131 to 197)	100	60 to 100 (197 to 328)
80	60 to 80 (197 to 263)	130	100 to 130 (328 to 427)
100	80 to 100 (263 to 328)	160	130 to 160 (427 to 525)
110	100 to 110 (328 to 361)	180	160 to 180 (525 to 591)
120	110 to 120 (361 to 394)	200	180 to 200 (591 to 656)

Table 13: Outdoor Beam Power Control Setting

DS484Q		DS486Q	
Volume Setting	Range m (ft)	Volume Setting	Range m (ft)
80	0 to 80 (0 to 263)	120	0 to 120 (0 to 394)
120	80 to 120 (263 to 394)	200	120 to 200 (394 to 656)
160	120 to 160 (394 to 525)	260	200 to 260 (656 to 853)
200	160 to 200 (525 to 656)	320	260 to 320 (853 to 1050)
220	200 to 220 (656 to 722)	360	320 to 360 (1050 to 1181)
240	220 to 240 (722 to 787)	400	360 to 400 (1181 to 1312)

Table 14: Indoor Beam Power Control Setting

6.1.3 Beam Group/Channel

Note: When installing only one set, beam group/channel selection is not required. Use the unit at the original position (OFF) for all switches (1, 2, and 3) on the transmitter and receiver.

There is a choice from among eight different kinds of selectable beams. These are divided into two groups (Group A and B) of 4 beams each (Channel M, 1, 2, and 3).

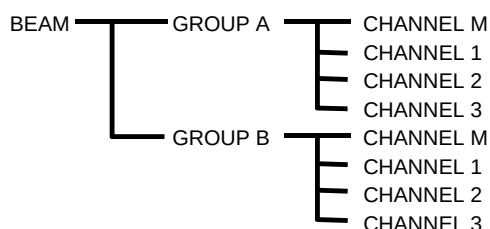


Figure 13: Beam Group and Channel Organization

Channels 1, 2 or 3 can emit beams only when Channel M in the same group provides those channels with Synchro Wiring (see Section 6.1.4 Synchro Wiring). When installing two or more sets on the same group, set only the first set to Channel M and the other sets to either Channel 1, 2, or 3.

Set the DIP Switch 1, 2 and 3 to OFF (Figure 14 or Figure 15, #1) or ON (Figure 14 or Figure 15, #2) on each transmitter and receiver according to the desired group/channel selection (see Table 15 and Table 16).

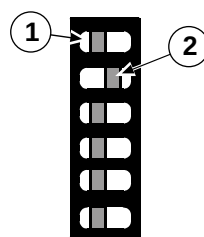


Figure 14: Receiver DIP Switches

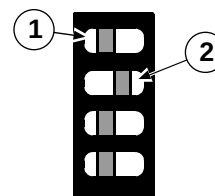


Figure 15: Transmitter DIP Switches

DIP Switch 1	Group
ON	B
OFF	A

Table 15: Group Selection

DIP Switch		Channel
2	3	
OFF	OFF	M
OFF	ON	1
ON	OFF	2
ON	ON	3

Table 16: Channel Selection

Note: Each transmitter and receiver facing each other must be set to the same group and channel.

When installing two or more sets, avoid incorrect communication by setting each set to different group/channel.

6.1.4 Synchro Wiring

Synchronized (abbreviated "Synchro") wires are required when installing two or more sets on the same group by using the SYNCHRO terminal on each transmitter. They are not required between the receivers.

The synchro wire should be more than 0.8 mm (22 AWG [0.03 in.]) in diameter, run no longer than 20 m (66 ft), and only be wired to the same group (Group A to Group A or Group B to Group B). Do not wire cross groups (Group A to Group B).

Synchronized transmitters must use a common power supply.

Note: The system does not activate when synchro wires are connected improperly or if other unneeded wires are connected.

The Power LED flickers when the required wires are not properly connected.



When Power LED flickers, shut off power and reconnect wires correctly.

6.2 Alignment

Note: *Precise, correct alignment is critical for these systems to operate effectively.*



Keep the following points in mind when aligning both the transmitter and receiver.

- **Apply power to the transmitter and receiver.**
- **Rotate each optical module horizontally for rough tuning.**
- **Cover the lower optical modules of both transmitter and receiver with supplied interruption sheets (see Figure 16) when aligning upper beam.**
- **Cover the upper optical modules of both transmitter and receiver with supplied interruption sheets (see Figure 16) when aligning lower beam.**
- **Align the punched holes in the interruption sheets with the standoffs in the center of the optical module.**
- **For synchronized applications, cover the upper and lower optical modules of all transmitters with supplied interruption sheets except the units needing alignment.**
- **Do beam alignment on both transmitter and receiver.**



Figure 16: Alignment Interruption Sheet



Remove the interruption sheets and close the covers when the alignment is complete.

Note: *To adjust the optical module, use a tester and the alignment scope (see Section 6.2.1 Scope Alignment) to more precisely align the optical module after the rough adjustment by using the unit's LEDs and sound emission.*

Make sure alignment by LED is used for indoor applications.

6.2.1 Scope Alignment

1. Look into the scope of the optical module. Stand at a 45° angle and at eye level to the optical module alignment scope (see Figure 17, #2), at a distance of 10 cm to 15 cm (4 in. to 6 in.) away.

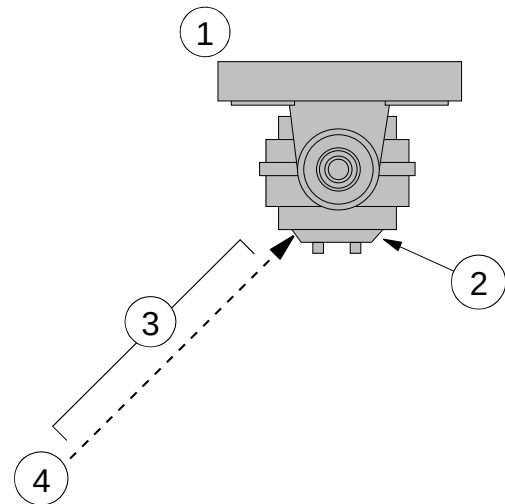


Figure 17: Looking through the optical module scope

Item	Description
1	Top view of transmitter or receiver optical module
2	Optical module alignment scope
3	Viewing distance of 10 cm to 15 cm (4 in to 6 in)
4	Viewing angle (approximately 45° from centerline of optical module)

Table 17: Key to Figure 17

2. Adjust the horizontal angle of the optical module using the turntable (see Figure 18, #5) until the opposite unit (either the transmitter or receiver) appears in the scope view (see Figure 19).

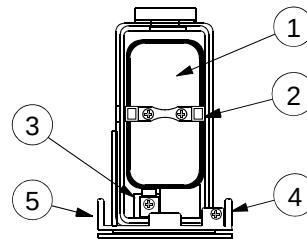


Figure 18: Optical module detail

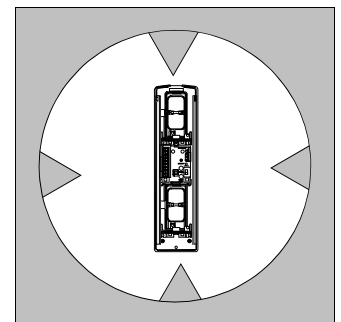


Figure 19: Scope view

Item	Description
1	Optical module
2	Alignment scope
3	Vertical adjustment screw
4	Horizontal adjustment screw
5	Turntable

Table 18: Key to Figure 18

3. Use the horizontal and vertical adjustment screws to center the receiver (or transmitter) image in the Scope View (see Figure 19).
4. Repeat steps 1 through 3 until all optical modules on all units have been aligned.

6.2.2 Voltmeter Alignment

- 1. Insert voltmeter leads into the alignment check terminals.
- 2. Set the meter scale to 10.0 VDC.
- 3. Adjust the optical modules by using a screwdriver to adjust the horizontal (see *Figure 18*, #4) and/or vertical (see *Figure 18*, #3) adjustment screws to obtain the higher voltage reading. In an ideal environment, the voltmeter value reads 3.0 V or higher. (The maximum voltage is 3.75 V.)
- 4. When this voltage is achieved, the optical modules are aligned.

6.2.3 Level LED Alignment

- 1. To proceed with fine tuning the alignment, look at the Level Meter on the receiver.
- 2. Adjust the optical modules by using a screwdriver to adjust the horizontal (see *Figure 18*, #4) and/or vertical (see *Figure 18*, #3) adjustment screws.
- 3. As more beam energy is received, each LED turns ON, flashes quickly, flashes slowly, and then OFF.
- 4. Continue fine tuning until all the LEDs turn off.
 - If outdoors, the alignment is complete when all LEDs are off.
 - If indoors, the alignment is complete when just two of the LEDs are off.

6.2.4 Sound Alignment

- 1. Set DIP Switch 6 on the receiver to ON.
- 2. Adjust the optical modules by using a screwdriver to adjust the horizontal (see *Figure 18*, #4) and/or vertical (see *Figure 18*, #3) adjustment screws.
- 3. As more beam energy is received, the sound pitch changes from low to high and from a continuous tone to a two beat sound.
- 4. Continue fine tuning until the buzzer is a two-beat sound.
- 5. After the beams are aligned, be sure to set receiver’s DIP Switch 6 to OFF.

7.0 Walk Test

Walk across the beam path directly in front of one of the detectors. The Alarm LED should activate. If not, the beam interrupt time is set too low or the alignment is not correct.

Walk across the beam path (see *Figure 20*, #3) in several locations between the detectors (see *Figure 20*, #1 and #2). Each time you cross the beam path (see *Figure 20*, #4), the Alarm LED should activate. If not, the beam interrupt time is set too low or the alignment is not correct.

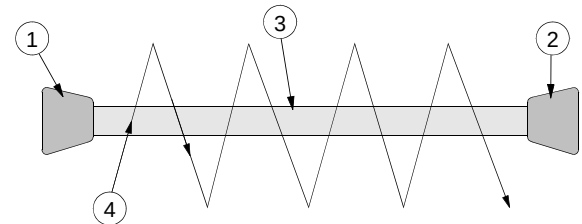


Figure 20: Walk testing the system

Item	Description
1	Receiver
2	Transmitter
3	Beam path
4	Crossing the beam path

Table 19: Key to *Figure 20*

8.0 Stacking Information

When stacking two or more sets, use the group and channel settings shown in *Figure 21* (see *Table 20* for the key to the numbered circles). The correct DIP Switch settings are shown for each transmitter and receiver.

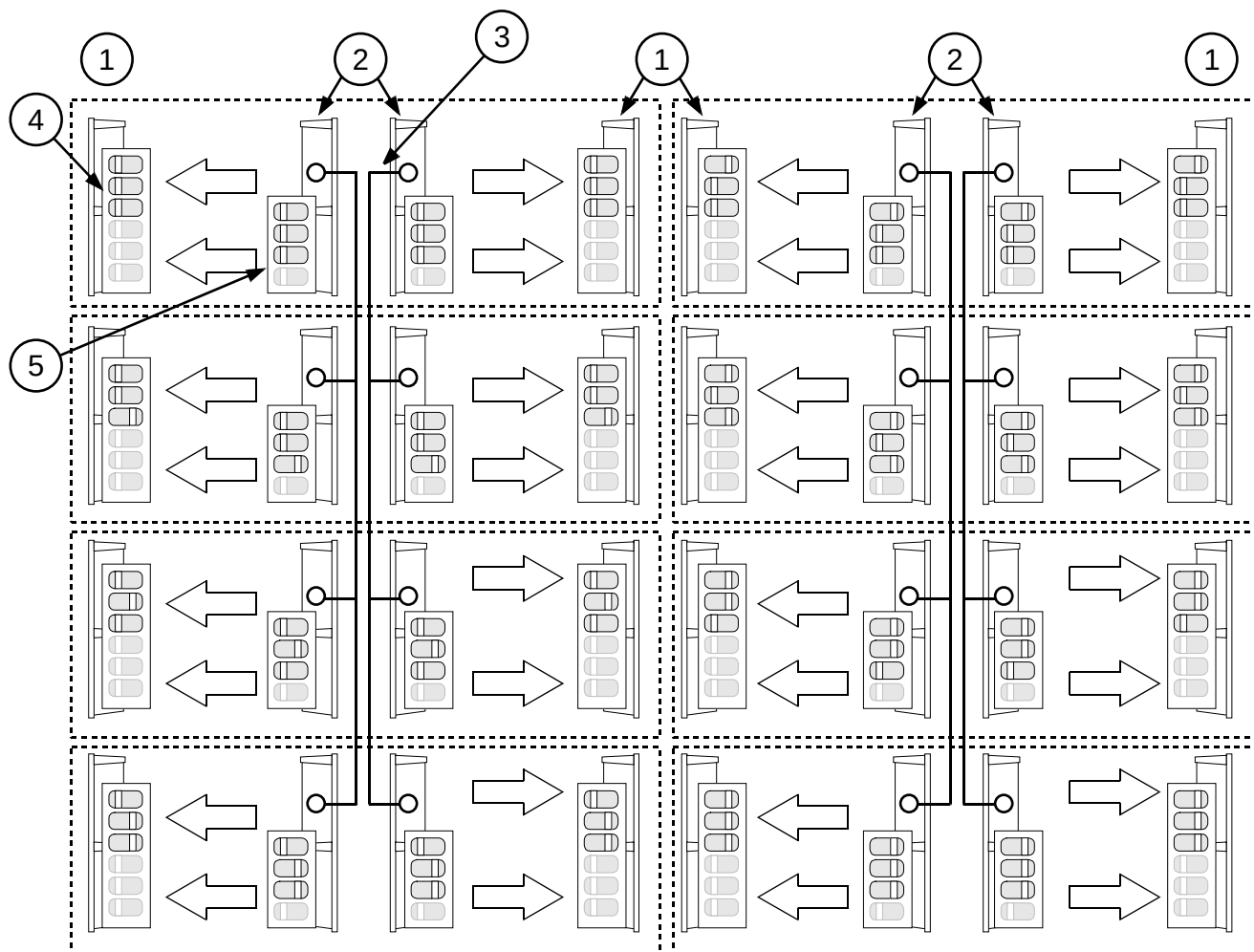


Figure 21: Examples of stacking multiple transmitter/receiver sets

Item	Description
1	Receiver
2	Transmitter
3	SYNCHRO Wiring
4	Receiver DIP Switches
5	Transmitter DIP Switches

Table 20: Key to *Figure 21*

Each top line set must be set to Channel M and the other line sets to Channels 1, 2, or 3 to avoid incorrect communication between the stacking sets.

9.0 Troubleshooting

Check the these conditions if the system does not work as expected.

- the input voltage is between 10.5 VDC and 28 VDC at the terminal on both the transmitter and the receiver
- the loop resistance of the alarm output is under 100 Ω
- the monitor LED on the transmitter is ON
- the alarm LED on the receiver is ON when both upper and lower beams are simultaneously adjusted for the beam interruption time
- the output of the beam alignment check terminal on the receiver is over 3 V

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 channel.
	Syncro wires are not connected.	Connect the proper syncro wiring.
Frequent false alarms	Something is blocking the beams.	Remove the object(s).
	Beam interruption time is set too short.	Decrease the sensitivity.
	Electrical noise or RFI nearby.	Change the installation site.
	Wiring too close to power sources or power line.	Change the routing of the wiring.
	Unstable installation site.	Fix the installation site.
	Out of maximum protection range.	Reinstall within the maximum protection range.
	Inappropriate Beam Power Control level.	Readjust the control level.
	Frost or dew is present.	Attach the optical heater.
No alarm when beams are blocked	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 frequently turns ON	Something is blocking the beams.	Remove the object(s).
	Installed on unstable ground.	Fix the installation site.
	Out of maximum protection range.	Reinstall within the maximum protection range.
	Inappropriate Beam Power Control level.	Readjust the control level.
	Frost or dew is present	Attach the optical heater.
Power LED on transmitter flickers	Syncro wires are not connected.	Connect the proper syncro wiring.

Table 21: Common troubleshooting problems and solutions

