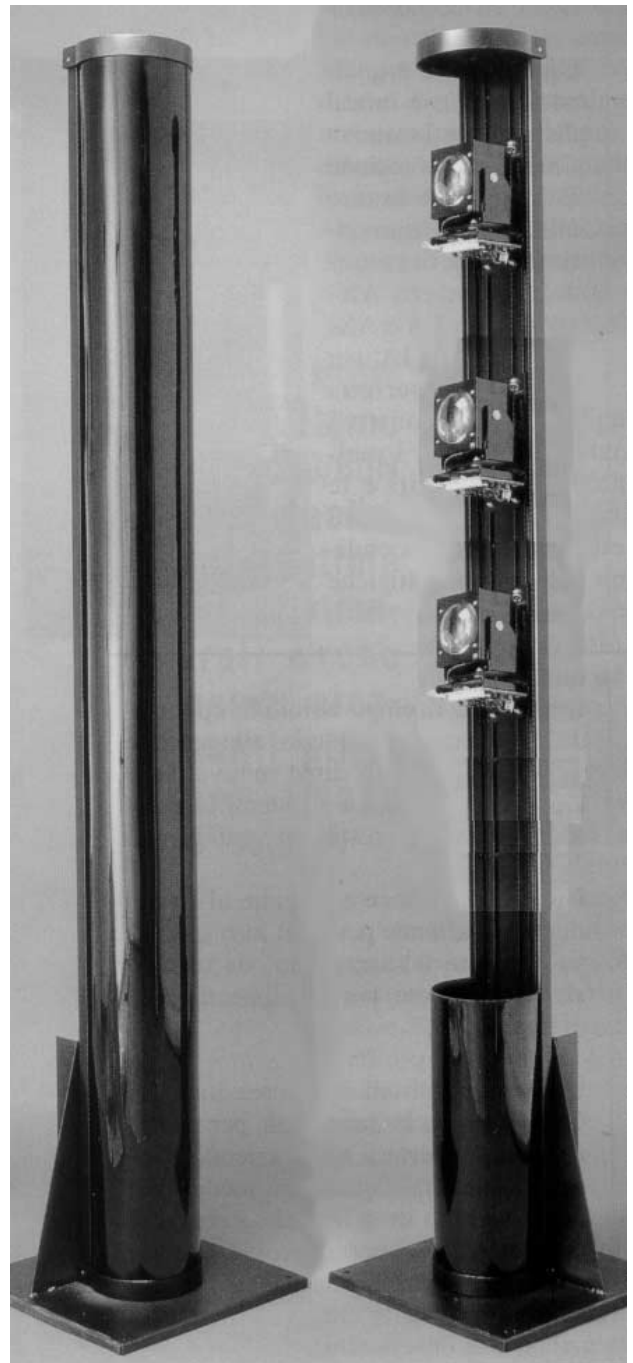


Outdoor Active Coded Infrared Beam System Serie 4400

The Outdoor Active Coded Infrared Beam System Serie 4400 is the result of long studies and the latest development in the optoelectronic technology. The results are a high security system, very reliable, not defeatible, without the problems caused by the extreme weather conditions such as snow, fog, heavy rain, ice, etc., easy to install and service.

Three are the major features:

- 1)** The system operates at maximum range of 500 Ft. with a 99% Cutoff. This simulates the extreme conditions such as thick fog or heavy rain and no false alarms should be given under those conditions.
- 2)** The coded infrared beam ensures the highest security against possible system's sabotages and neutralizations. All equipment are field programmable on 16 different codes which do not interfere each other and may be located in posts, where up to 6 Transmitters with different codes are at one side and 6 or more Receivers with different codes at the opposite side.
- 3)** When extreme environmental conditions develop with a loss of infrared signal in excess of 99%, the system will send a remote signal to inform its inability to maintain a protection and will disqualify without causing unnecessary alarms, with automatic restore of normal operation when coded infrared signal transmission improves at the Receiver.



Features

- ✘ Outdoor range up to 500 Ft. (m 150)
- ✘ Modular construction of optical assemblies with electronic circuits
- ✘ Coded and pulsed infrared beam
- ✘ Selective Environmental Compensation Circuit
- ✘ Large beam (3 1/4" or mm 80 diameter) optical system
- ✘ Alignment angle: 30 degrees horizontal, 30 degrees vertical
- ✘ Internal optical adjustments for an accurate alignment
- ✘ IR Filter totally opaque to visible light
- ✘ Concealed beam alignment and location of optical assemblies
- ✘ Thermostatically controlled heater circuit
- ✘ Tamper protection against unauthorized openings
- ✘ Rugged metal housing in aluminum extrusion available for single units and in posts for multiple units up to a height of 7.5' (2.25 m)

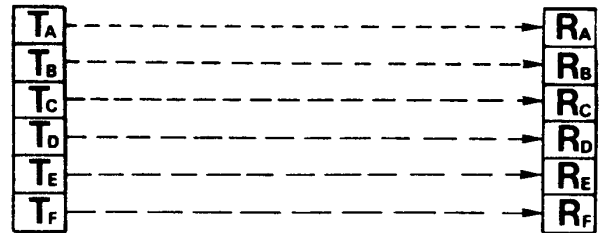
Applications

Industrial installations • Military facilities • Car or truck parking areas Warehouses building • Courtyards • Penalty and correctional Institutions • Nuclear facilities • Electric power generating or distribution facilities • Petroleum refineries

Operation

The system is designed to give an alarm if at least a burst of signal with the correct code is not detected within 25 milliseconds. Since the coded signal has a length of approx. 4 milliseconds, it results on a single post it is possible to install up to 6 Transmitters.

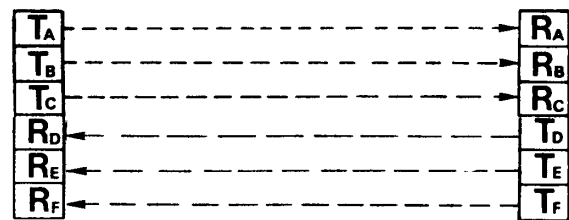
Under above conditions each Receiver will receive a single burst of coded signal within 25 milliseconds. If it is requested to operate under higher security conditions, it is advi-



6 Transmitters
6 Receivers
= 6 Beams

Diagram A

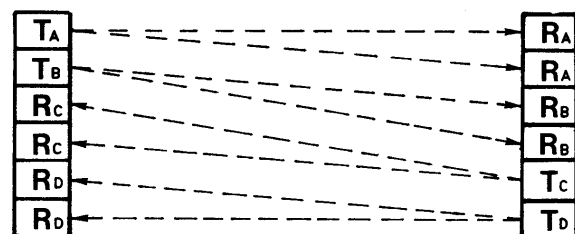
sable to install up to 3 Transmitters only on each side. This way each Receiver will receive 2 bursts of coded signal within 25 milliseconds. (See Diagram B).



3 Transmitters
3 Receivers
3 Transmitters
3 Receivers
= 6 Beams

Figura B

More solutions on Diagram C:



2 Transmitters
4 Receivers
2 Transmitters
4 Receivers
= 8 Beams

Figura C

Installation

In the simplest installation a Transmitter Mod. 4420 and a Receiver Mod. 4430, each one enclosed in a housing of 32S mm Mod. 4492 form the Mod. 4400 System (Fig. 1). These units can be mounted on posts, walls or other rigid surfaces.

Transmitters Mod. 4420 and Receivers Mod. 4430 may also be assembled in a multiple mode in higher rugged posts (Fig. 2) in order to conceal mounting height and number of equipment.

Avoid that the intense direct sun rays are focused on the lens. The receiver includes special filters circuit but in the above circumstance alarms and damage of the equipment may happen.

Transmitter Mod. 4420 requires an 8-core cable: 2 wires for synchronization, 2 for power supply, 2 for heater circuit, 2 for tamper circuit.

Receiver Mod. 4430 requires an 11-core cable: 2 wires for power supply, 2 for heater circuit, 3 for alarm relay, 2 for disqualification relay and 2 for tamper circuit.

It is advisable to use wire section greater than 0.75 sq. mm.

Special features

Remote DC Power supply. The DC power supply should be located in proximity of the devices and must be protected against adverse weather conditions with an inherent higher reliability.

The power supply Mod. 4412 is designed to be inserted in the extruded aluminum post and is capable to power 4 optical units (transmitter or receiver) for up to 8 hours.

Rugged metal housing in aluminum extrusion

Easy access to the unit. The front panel transparent to infrared but totally opaque to visible light can be removed by means of just 2 screws.

Easy service. Service is very simple since

it is possible to remove the optical assembly with the electric circuitry from the front by just removing 4 nuts.

Field programmable coding. Both the Transmitter and the Receiver have a 4 position "DIP" switch builtin (located in the front side of the circuitry) which allows 16 coding possibilities. In order to allow a correct operation of the "fence", it is necessary to position in the same way the Transmitter "DIP" and that of the corresponding Receiver. It is recommended not to position "DIP" switches all in "ON" or in "OFF". When units have to operate in posts it is necessary to code each Receiver the same way as its corresponding Transmitter and make sure each unit in the same post has a different code.

Transmitters synchronization. To avoid mutual interferences and to reduce current drain, all Transmitters located in the same post should be interconnected to operate in a synchronized mode. It is necessary therefore to set the DIP switch corresponding to the numbers of transmitters to be synchronized e.g.: one transmitter only DIP 1 in ON position, four transmitters DIP 4 in ON position. When the transmitters to be synchronized are more than one, jumper "A" must be in position "2". In addition it is necessary to connect in series (one unit's output with the subsequent one's input) the synchronizing terminal strips.

These operations should be performed before powering the unit.

Heater circuit. Both Transmitter and Receiver are provided with an internal heater circuit thermostatically controlled which prevents lens steaming up and condensing. Heater circuit should be powered at 18VAC in a separate and independent mode.

Special circuits

Receivers Mod. 4430 are designed to have a reliable operation and to minimize the effects of adverse weather conditions. They are provided with 2 special circuits which

constantly monitor the presence of a coded infrared signal coming from the Transmitter at the Receiver.

Alarm circuit. When a sudden and complete beam interruption for a time longer than 30 milliseconds is detected, the alarm relay is deenergized and its contacts switched. A partial beam interruption or a beam interruption shorter than 20 milliseconds is processed by the alarm circuit as an interference caused by birds, blowing leaves or objects and therefore rejected. It is possible to select between 2 alarm relay operating modes: receiver's relay deenergize for 2 seconds or by cutting a 220 KOhms resistor for 8 seconds.

Environmental compensation circuit. It is designed to eliminate false alarms generated by gradual loss of infrared signal caused by extreme environmental conditions such as snow, fog, smog, heavy rain, ice and misalignment from ground settlement and vibrations.

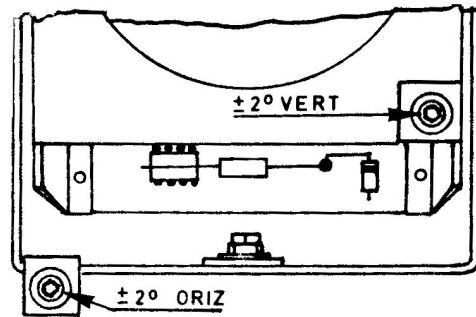
The Receiver, upon detection of an almost complete infrared signal loss, created gradually by one or more of the above conditions, will disqualify by preventing the intrusion alarm signal release limitedly to the existence of the above conditions.

At the same time the disqualification relay is deenergized allowing a remote signalling of disqualification condition. Should be required to have an alarm release even when the disqualification relay intervenes, it is necessary to insert jumper A in position "2".

This way the disqualification relay will operate as previously stated, but it will not prevent an alarm release caused by above conditions .

Alarm relay contacts (NC C NO) and the disqualification relay (NC or NO selectable by jumper B) are available at the terminal strip. Red LED indicator, located on Receiver's front left side, is used for a rough beam alignment and it extinguishes when this alignment is reached.

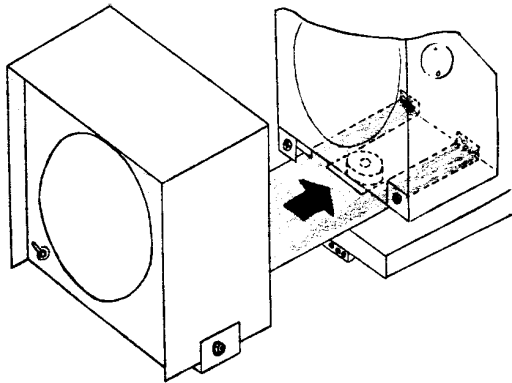
For a more accurate alignment it is necessary to insert jumper C in position 1 and connect a voltmeter to alignment output (terminals 1011) and by turning the 2 adjustment screws located near the lens, set it to its max. value after inserting 99% cutoff tool on the receiver lens.



Alignment procedure

To perform a correct alignment procedure, those instructions must be followed:

- ✘ Verify that there are unobstructed lines of sight between transmitter and receiver.
- ✘ Check that the transmitter and the proper matched receiver have the same code, verifying that the setting of the switches in both 4 positions DIP, is identical.
- ✘ Connect all conductors to the terminal block following the connection diagram.
- ✘ Perform the synchronization connection among the transmitters.
- ✘ Insert the jumper "C", on the receiver, into the alignment position "1".
- ✘ Insert the alignment lamp bracket as shown. Power the alignment lamp with a 12V/5Ah battery. Aim the blinking beam at the transmitter. Reach the transmitter and adjust the horizontal and vertical swivels until the blinking spot is positioned into the center of the photoelement. Move the mod. 4490 lamp on the transmitter and aim the light beam to the opposite receiver. Reach the receiver and repeat the above mentioned operations to center the blinking spot. (See following Diagram).



- ✘ Remove the alignment lamp.
- ✘ Power the devices: if the optical alignment instructions have been correctly performed, the system should operate and the Alarm LED on the receiver should switch off.
- ✘ Cover the transmitters not involved in the alignment operation.
- ✘ Connect a voltmeter to the terminals 10 and 11 on the receiver (Alignment output) and verify that the voltage is about 9.5VDC. If not handle carefully the swivels so that the voltage reaches the indicated value.
- ✘ Place on the optical assembly receiver, the 99% cutoff tool, and by turning the 2 adjusting screws located near the lens, set for maximum reading that must be always greater than 6VDC.
- ✘ Come back to the transmitter, and adjusting the 2 setting screws verify that on the alignment output terminals of the receiver there's the maximum possible voltage.
- ✘ Interrupt the infrared beam and check that the alarm relay regularly operates at every complete beam interruption.
- ✘ Verify that with an uninterrupted beam the alarm LED will be off and the alarm relay will be in standby conditions.
- ✘ Remove "Jumper C" on the receiver from the position "1" and insert it in the position "2".
- ✘ Remove the 99% cutoff tool and repeat the beam interruption tests.

The safety threshold reached by removing the cutoff tool, results extremely high since a 99% obscuration shows that it takes only a 1/100 of the received energy, to maintain the infrared beam normally operating.

This safety threshold always assures a reliable operation in every environment condition that an outdoor installation must forecast.

Specifications

Range: up to 500 Ft. (150 m).

Operating temperature: from 35°C up to +66°C

Construction: rugged metal housing in aluminum extrusion anodized and coated with polyurethane enamel for outdoor operation, water resistant window with IR filter totally opaque to visible light.

Weight: approx. 11 Lbs (5 Kilos).

Size: 6.30" W x 6.30" D x 12.80" H (160 W x 160 D x 325 H mm)

Alignment: it is important to have the alignment light fixture to perform an accurate optical alignment. All optical adjustments are internally located and protected. The alignment angle is 30 degrees horizontal, 30 degrees vertical. The optical alignment is optimized with a subsequent electronic alignment (to set for highest value with output on receiver terminal block).

Heater circuit: thermostatically controlled, turns on at +13C, turns off at +29C.

Coding: 16 field programmable codes by means of 4 "DIP" switches.

Transmitter

Power supply:

Electronic Circuit

nominal voltage: 12VDC (+3V/3V)

max. current drain: 800mA (with 3 "DIP":in ON)

Heater Circuit

nominal voltage: 18VAC (+5V/2V)

max. current drain: 300mA

Infrared source: GaAs LED diode

Coding: by pulses modulation programmable by means of 4 "DIP" switches

Wave length: 940 nanometer

Receiver

Power supply:

Electronic Circuit

nominal voltage: 12VDC (+3V/3V)

max. current drain: 70mA

Heater Circuit

nominal voltage: 18VAC (+5V/2V)

max. current drain: 300mA

Alarm Circuit Operation and Sensitivity

It detects a target 250 mm wide which crosses the optical beam between Transmitter and Receiver at the speed of 10 m/second. Momentary beam interruptions shorter than 20 milliseconds do not cause alarms. These beam interruptions are interpreted as small targets crossing.

Alarm relay mode selectable between:

a) momentary de-energizing: 2 seconds (leave the 220KOhms resistor)

b) delayed de-energizing: 8 seconds (cut the 220KOhms resistor)

Alarm relay:

Hermetically sealed case SPDT.

Contacts rating (resistive load):

max. voltage: 28VAC or DC;

max. current: 2 Amps

Alarm visible indication:

Internal red LED visible from unit's front side when the IR filter panel is removed, will light on in alarm condition.

Environmental compensation circuit:

When a gradual loss of infrared signal is detected, which exceeds the 99% threshold for a time longer than 10 seconds, the disqualification relay deenergizes. According to the selected mode, the disqualification relay will disable or not the alarm-relay operation.

Disqualification relay:

Hermetically sealed case SPDT.

Contacts rating (resistive load):

max. voltage: 28VAC or DC;

max. current: 2 Amps

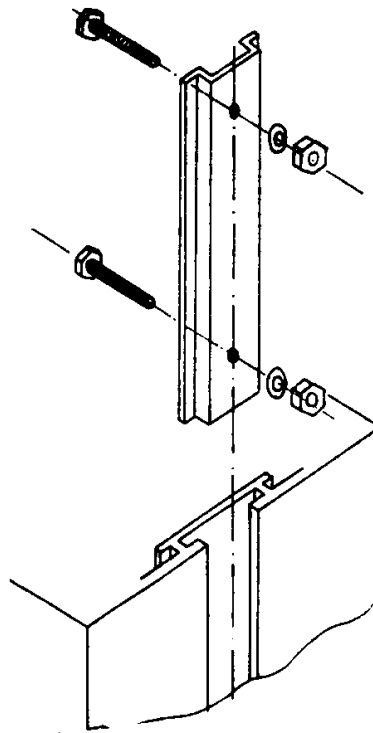
Disqualification Visible Indication:

Internal yellow LED visible from unit's front side when IR filter panel is removed.

Mounting of fastening slide

All Mod. 4498 posts are provided with a special fastening slide which should be assembled according to following instructions:

- ✘ Remove top plate by removing the 2 fastening screws.
- ✘ Insert 2 hexagonal screws M 5 x 30, supplied with the unit, into the slide (see drawing hereunder) until the screws head is completely inserted into the proper cavity.
- ✘ Mount the top plate again by inserting the 2 fastening screws.



Terminal strip connections

JUMPER OPTIONS

Jumper A

- 1:** The disqualification relay should prevent alarm relay operation..
- 2:** The disqualification relay should not prevent alarm relay operation.

Jumper B

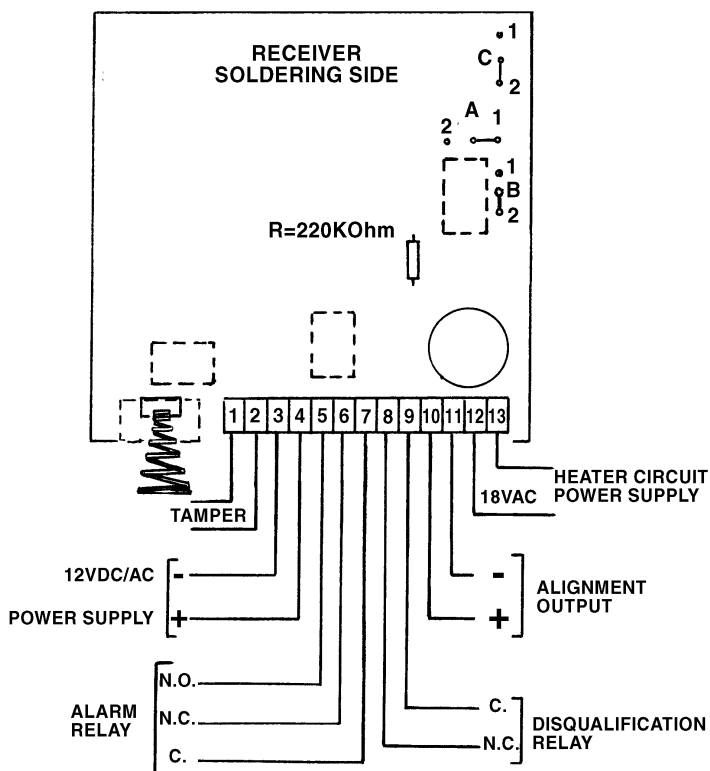
- 1:** The disqualification relay has N.O. output contact.
- 2:** The disqualification relay has N.C. output contact.

Jumper C

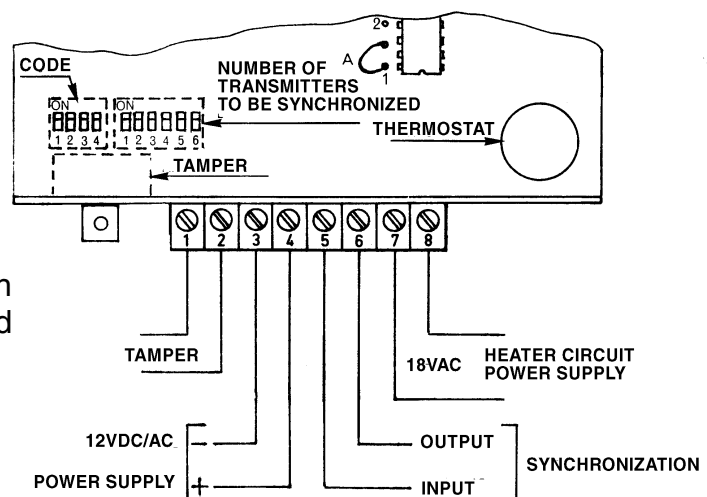
- 1:** Alignment position
- 2:** Normal operation

220KOhm

Leave resistor as it is for 2 seconds alarm time. Cut resistor for 8 seconds alarm time.



TRANSMITTER



TRANSMITTER

- A:** Insert jumper in position "2" when the transmitters to be synchronized are more than one.

Ordering information

Model	Description
4410 <i>HE4410</i>	Outdoor active coded infrared unit, range 500 Ft. (150 m), made by one Transmitter Mod. 4420, one Receiver Mod. 4430 and two Housings Mod. 4492.
4420 <i>HE4420</i>	Optical assembly complete with Transmitter electronic circuit to be located into the Housing Mod. 4492 or the post Mod. 4498.
4430 <i>HE4430</i>	Optical assembly, complete with Receiver electronic circuit, as above.
4492 <i>HE4492</i>	Housing to locate the optical assembly Mod. 4420 or Mod. 4430. Size: 160 mm W, 160 mm D, 325 mm H.
4498 <i>HE4498</i>	Semi-cylindrical post suitable to locate one or more optical assemblies Mod. 4420 and Mod. 4430, with 180 aiming angle. Size: 2.00 m H, 178 mm W, 156 mm D.
4498/3 <i>HE44983</i>	Same as above, H= 3.00 m.
4490 <i>HE4490</i>	Beam alignment lamp.
4499 <i>HE4499</i>	99% Cut-off tool.
4418 <i>HE4418</i>	Transformer 220/18VAC for heater circuit, to be installed into 4498 posts.
4412 <i>HE44/12</i>	Power supply Mod. AL-12/2.5 to be installed into 4498 posts.
SC-4400 <i>HZS4400</i>	Surface mounting bracket. Size: 197 mm W, 11 mm D, 210 mm H.
BC-4498 <i>HZF4498</i>	Metallic base with large plate to allow post's free standig. Size: 400 mm W, 400 mm D, 400 mm H.