

No.351 ULTRASONIC DETECTOR

GENERAL INFORMATION:

The No. 351 Ultrasonic emits invisible and inaudible sound waves which detect the presence of a moving object such as an intruder. The ultrasonic transmitter saturates an area with a pattern of these inaudible, high-frequency sound waves. Its receiving head picks up the sound waves after they have gotten the "imprint" or "look" of the protected area.

This "look" is achieved by sound waves reflecting off walls, furniture, and other stationary objects in the room. Any movement of objects or persons causes some waves to be reflected at a changed frequency (known as the Doppler effect). When the frequency of the received waves changes from the transmitted frequency, the shift is detected by the electronic circuitry in the unit. This activates a relay wired into the protective circuit of the alarm system.

FINDING THE BEST LOCATION:

Inspect the inside premises carefully before installing. There are certain things to look for, such as air currents and vibrations, which appear as motion to the ultrasonic detector, triggering the alarm. When determining the best location, make certain the following are NOT present:

AIR CURRENTS created by space heaters, air-conditioning vents, rising heat from baseboard heaters and strong drafts on the floor.

VIBRATIONS such as those commonly caused by loose fitting doors and show windows or walls that shake when traffic passes. Always locate the unit on sturdy inside walls.

SOUNDS from telephone bells or radiator valves located directly in the area to be protected.

MOVING OBJECTS such as house pets or other animals on the premises. Also, hanging objects that tend to sway, or open doors that can be moved by air currents.

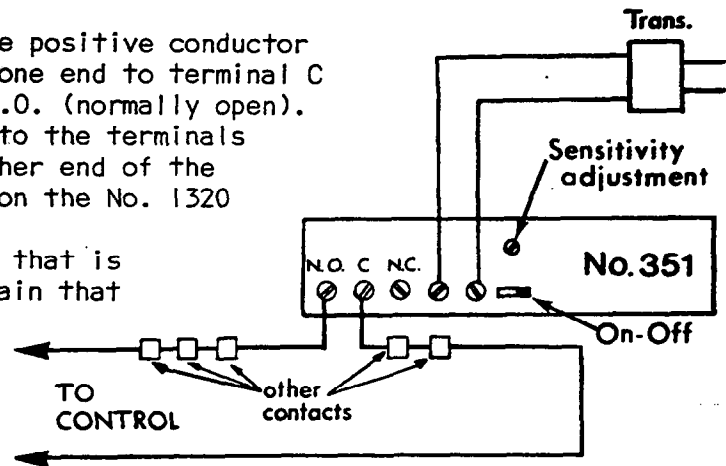
The ideal location for the No. 351 Ultrasonic is 4 to 7 feet from the floor, safely away from drafts. Do not locate it too near the ceiling since the unit, when angled downward for maximum coverage, will confront the same floor drafts.

NOTE FOR INSTALLATION:

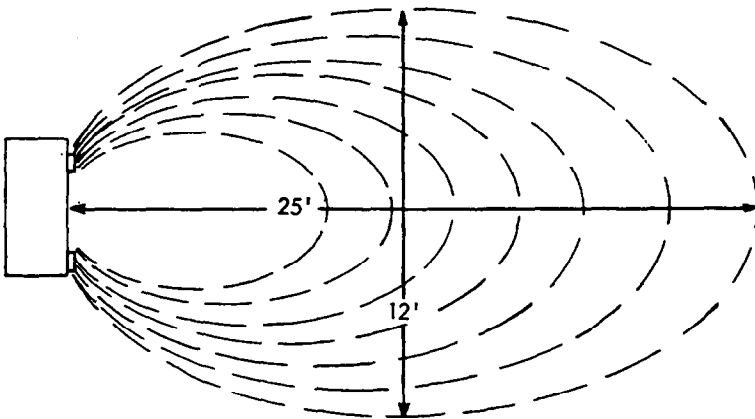
On all U.L. installations, use No. 353 Mounting Bracket on the No. 351 Ultrasonic.

WIRING CONNECTIONS

1. In any closed circuit system, cut the positive conductor of the protective circuit. Connect one end to terminal C (common) and the other to terminal N.O. (normally open).
2. Attach a length of 2 conductor wire to the terminals marked 12 volts A.C. Connect the other end of the wires to the 12 volt A.C. terminals on the No. 1320 Transformer (supplied).
3. Plug the transformer into any outlet that is operating 24 hours a day. Make certain that the outlet cannot be accidentally turned off. This is important in order to keep the standby rechargeable batteries, inside the ultrasonic unit, constantly charged.



PATTERN AND RANGE SETTING



The pattern of the ultrasonic waves emitted by the No. 351 is oblong. Its range is approximately 25 feet long and 12 feet wide at its widest point.

The actual operating range of the No. 351 will vary according to two factors.

SURFACE REFLECTION

In areas that have highly reflective surfaces coverage is greater because the surfaces are hard and easily reflect ultrasonic waves. Glass, tile floors, mirrors, walls and most solid surface areas are considered reflective surfaces.

Surfaces containing soft, sound-absorbing material tend to reduce the range of the No. 351. Examples of this kind of surface are carpeted floors, draperies, heavy plush furniture, etc.

HUMIDITY

Ultrasonic waves are affected by atmospheric humidity. Between the lowest and highest humidity levels the range can actually change 2:1. Therefore, it is wise to have a limited amount of overflow protection in the area.

ADJUSTING THE RANGE

You can increase or decrease the area to be protected by the sensitivity adjustment located in the rear of the unit. In a highly reflective room, reduce the range by turning the adjustment counter-clockwise. In a highly-absorbent location where the pattern will be smaller, turn the adjustment clockwise to increase the range.

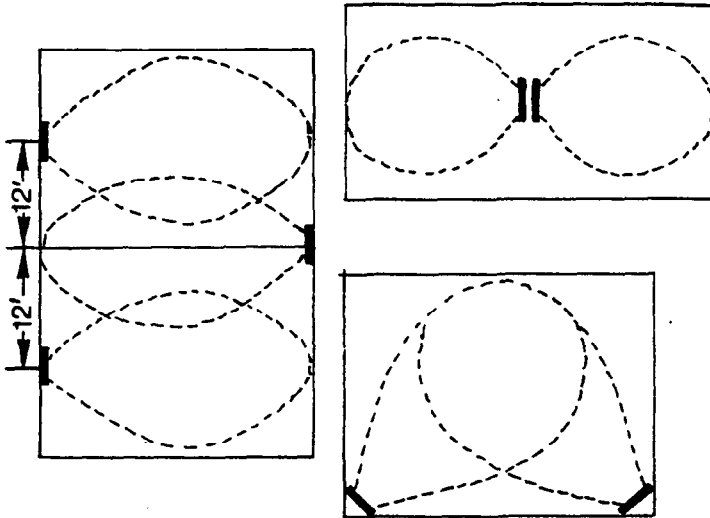
As a general rule, it is always best to keep the range of the No. 351 to a minimum: protecting strategic areas and not entire rooms or large sections of open space.

MULTIPLE INSTALLATION

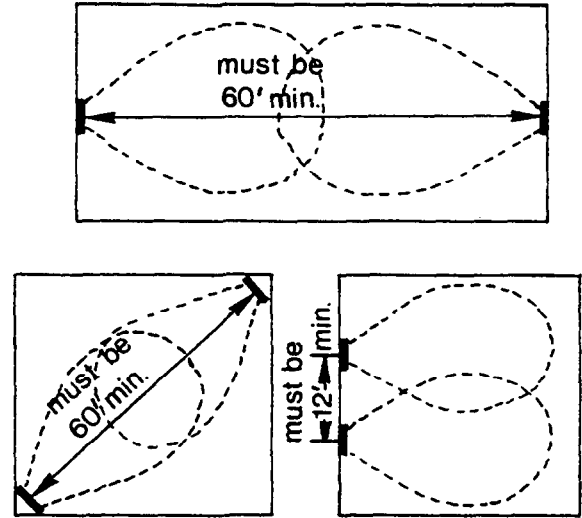
Keeping in mind considerations of surface reflections, humidity, location and other factors, the installation may be laid out.

Any number of No. 351 ultrasonics may be placed in the same area without interfering with each other, as long as certain basic rules of positioning are followed. A number of suggested patterns are shown below.

SUGGESTED INSTALLATIONS



POOR INSTALLATIONS



Note that for best results, the units should not be directed at each other unless the distance between them exceeds 60 feet. The units can be placed on opposite walls with at least 12 feet of space from center to center. Placement in adjacent corners is effective, too. However, don't place the units too close together, as some range shortening can occur.

SETTING AND TESTING

The area should be cleared of all people during the test. We suggest that in some business establishments it may be more convenient to set up the No. 351 after hours. The main control need not be ON during this testing procedure.

1. Every time the No. 351 Ultrasonic triggers, the lamp on the face of the unit will light. When there is no motion in the room (including your own), the test light should be OFF.
2. During the test be alert to any high-pitched noise or vibration in the area.
3. Conduct a walk test by walking into the protected area at several different points. You can determine the range of protection by observing the light.

NOTE: TO CONDUCT A PROPER WALK TEST, ALWAYS WALK DIRECTLY TOWARD OR AWAY FROM THE UNIT, AND NEVER ACROSS IT.

The unit has a built-in delay that allows the first one or two steps of your movement to go undetected. Bear this in mind when conducting walk tests.

4. Remember you can control the range of protection by adjusting the sensitivity adjustment in back of the unit. Clock-wise to increase the range. Counter clock-wise to decrease the range. Once the sensitivity control is set, screw in the hinged terminal cover.
5. Standby operation should be tested after the system is properly set. Make sure, however, that the batteries have had a chance to charge up before checking. The ultrasonic detector will continue to operate except the test lamp will not light. This condition indicates to the user that the A.C. power is out. Standby batteries should be used for emergency purposes.

UNDERSTANDING THE TURBULENCE WARNING SYSTEM

On the No. 351 the "turbulence warning system" serves to check the level of air turbulence in a room throughout the day, making certain it is below the danger level. The "warning system" will prevent the setting of the alarm if the turbulence is too high. The walk test lamp will be lit to warn of this condition, allowing the customer to spot a potential false alarm.

Once the customer sets the alarm system for the evening, however, the "turbulence warning system" has no effect on the operation of the unit.

In the event that excessive turbulence has forced the unit to trip, the customer should check the premises for signs of new turbulence. If none can be located, the sensitivity adjustment on the No. 351 will have to be reset.

WHAT TO ADVISE THE CUSTOMER

It is important to inform the customer how he may maintain the system in proper working condition.

1. Never remove the wall transformer.
2. Never relocate the unit.
3. Never change the physical surroundings of the protected area. If furniture is moved or air-conditioning installed, the system may have to be readjusted.
4. Never turn the No. 351 OFF. It should operate 24 hours a day. No alarm will be transmitted when the control instrument is OFF. If the unit is turned OFF while the system is ON, an immediate alarm condition will result.

Note: The No. 351 ultrasonic is also available as a 12V D.C. unit (No. 351-12) for use with 12V controls. The No. 351-12 is powered from the control and contains no standby batteries as these are usually in the control.

CONNECTION TO NO. 453 REMOTE ULTRASONIC MONITOR

This motion detector can be connected to the No. 453 Remote Ultrasonic Monitor which provides a remote visual indication of turbulence or motion present in the area protected by the detector.

A two wire connection between the No. 351 and the No. 453 is required. Use the BROWN lead provided near the No. 351's terminal strip for the "SIG" (signal) connection to the No. 453. Use the terminal strip mounting screw to the right of the No. 351's AC terminals for the "GND" (ground) connection. For more information, see the No. 453's Installation Instructions.