ECHO-5

Ultrasonic Motion Detector

INSTRUCTION MANUAL

GENERAL

The Echo-5 Volumetric Ultrasonic Motion Detector (hereinafter referred to as the detector) detects an intruder's movement in the protection area sending an intruder alarm to a central monitoring station, or to a message sending system, or to a control indicating equipment by opening the alarm loop using contacts of the detector's executive relay.

The detector forms a continuous volumetric detection area in the protected premises.

The detector provides:

- Three-color light indication of operating modes and interferences;
- Selecting indication modes depending on protection tactics assigned for the premises (automatically restored or selected alarm indication, alarm memory feature);
- Disabling alarm indication as well as indication of noise/interference and motion in protected premises (to provide operating the detector in hide mode) with enabling indication of detector's powering on, troubles, power decreasing, and alarm memory;
- Discrete (four-stage) sensitivity adjustment;
- Using several detectors of this type (spaced at distances at least 5 meters away from each other) in the same protected premises due to quartz-crystal control of working frequency;
- Automatic self-diagnostics and testing operability of acoustic transducer, anti-sabotage protection, monitoring jamming environment in the protected premises, power voltage monitoring;
- Protection against unauthorized opening the detector's case (messages about tampering are generated by opening tamper switch contacts).

The detector is designed for round-the-clock operation.

SPECIFICATIONS

1. The maximum volume of a protected area covered by a single detector: 250 square meters (10 m × 5 m × 5 m).
2. The detector provides detecting radial movement of standard target toward to the detector with any speed within the range of 0.3 m/s to 2 m/s.
3. The detector is to be powered from a dc power supply with rating voltage of 12 V with effective ripple voltage no more than 100 mV.
4. Maximum switching current of the executive relay: 30 milliamperes at 72 V max.
5. Maximum detection range: at least 10 m.
6. Pre-operation time: 10 s max.
7. Consumed current:
   - in the quiescent mode: 25 milliamperes max;
   - in the alarm mode: 20 milliamperes max.
8. Operating temperatures: – 10 to +50°C.
9. The detectors design provides:
   a) Ingress protection rating: IP30;
   b) Deflecting the detector case from the position in which its front panel is parallel to the supporting surface at an angle of not less than 30 degrees in any direction.
10. Overall dimensions: 150 mm × 45 mm × 25 mm max (without the bracket).
11. Weight: 75 g max.

INDICATION AND OPERATION

Three status LEDs of the Echo-5 indicate its operation states as shown in Table 1.

Table 1

Event/Status	Indicator's Behavior			DIP Switch Positions
	Green	Red	Yellow	
Power On	■	■	■	Any
Quiescent Mode	□	□	□	Any
Alarm	□	■	□	Switch 4: ON
Alarm Memory	□	⊡	□	Switch 3: ON
Trouble	⊡	⊡	□	Any
Undervoltage	□	⊡	⊡	Any
Tampering	□	□	□	Any
Noise/Interference	◘	□	□	Switch 4: ON
Motion	◘	□	◘	Switch 4: ON

■ – Is lit steady for three seconds

□ – Off

⊡ – Flashes each two seconds during 30 minutes

◘ – Flashes periodically while the signal exists (exceeds the pre-set threshold)

After detector's power has been switched on, the detector is entering the quiescent mode opening its TPEB contacts for 3 s (the Power On status) and indicating this state, as shown in Table 1. After having entered the quiescent mode the contacts of the executive relay close while the LEDs shut off provided that no faults and interferences have been occurred.

If a hardware failure has been occurred or some willful acts have been taken to disturb normal operation of the detector (screening the detector's faceplate by any sound proof material or damaging transducers), the detector generates a trouble message opening TPEB contacts for 30 minutes and indicating this status as shown in Table 1.

If the power voltage has dropped below (8.0 ± 0.5) V, the detector generates an Undervoltage message by opening TPEB contacts for 30 minutes and indicates this state as shown in Table 1.

A Noise/Interference status is indicated as shown in Table 1 in case of en external noise in the protected area.

A Motion status is indicated as shown in Table 1 when a moving entity (a person or a large thing) is detected.

The detector generates an Alarm message by opening TPEB contacts for 3 s and indicates this state as shown in Table 1 if the alarm indication is enabled (DIP switch 4 is set to ON).

Indication of Alarm Memory is performed as shown in Table 1 since five minutes after generating the alarm message if DIP switch 3 is set to ON.

Indication of noise, motion and alarms is enabled only if DIP switch 4 is set to ON.

If there are several statuses to be indicated simultaneously, then alarm memory, troubles and undervoltage messages are indicated one-by-one. When trouble and undervoltage messages are being generated, noise/interference and motion indication is not performed.

When the detector's cover is open, the detector generates a Tampering message by opening its BCKP contacts which are coupled with the in-built tamper switch.

STANDARD DELIVERY

Find the following unpacking the Echo-5:

–	Echo-5 Ultrasonic Motion Detector:	1 pc.
–	Bracket:	1 pc.
–	This Instruction Manual:	1 pc.
–	Cross Recessed Round Head Thread Cutting Screw 3×8.01.016:	1 pc.
–	Slotted Countersunk Flat Head Thread Cutting Screw 3×10.01.016:	2 pcs.
–	Slotted Round Head Thread Cutting Screw 3×20.01.016:	1 pc.
–	Countersunk Flat Head Tapping Screw 3×25.016:	2 pcs.
–	Wall Plug:	2 pcs.

MOUNTING THE DETECTOR

MOUNTING LOCATION

Select a mounting location for the detector taking into account the following considerations:

a) The optimum installation height for the detector is (2.0±0.5) m;

b) The protected assets should be spaced no more than 10 m away from the detector;

c) The maximum of ultrasonic energy is emitted normally to its faceplate surface so the main part of the protected area should be in front of it;

d) The detector case can be deflected from the position in which its front panel is parallel to the supporting surface at an angle of not less than 30 degrees in any direction;

e) Enclosing surfaces (cubicle divisions, large pieces of furniture) can alter the detection area (verified empirically). Carpets and soft furniture absorb ultrasound and reduce range of the detector (within 25%). In areas with smooth walls and floors or in premises with furniture with a smooth finish or glass that reflect ultrasound, the detection range can increase;

f) Masking the detector with decorative curtains is prohibited because this can decrease its sensitivity;

g) In large premises (if at least one dimension exceeds 10 meters) or to provide several local protected areas, several detectors can be used in the same premises;

h) The detectors with coverage areas opposite to each other should be placed at a distance of at least 5 meters from each other.

To avoid false alarms:

a) DO NOT install the detector above a radiator, next to an AC, a door, a window, a sash, blinds, or plants which branches can vary under the influence of air movement in the premises;

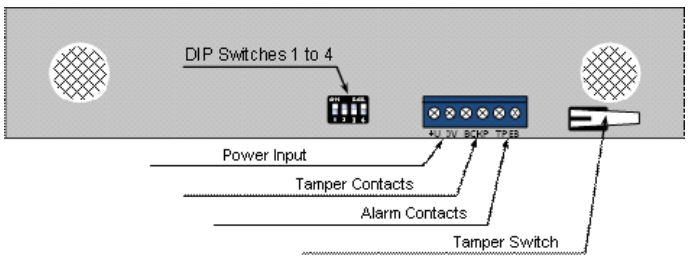
b) DO NOT use the detector in a room with acoustic noise level of more than 75 dB relative to the standard zero of 2.10^{-5} Pa (this noise level approximately corresponds to a loud conversation between two people indoors).

MOUNTING INSTRUCTIONS

Select the installation scheme and mount the detector to a wall or ceiling at a height of (2.0±0.5) meters above the floor. Then wire the detector.

Hint: To remove the detector cover, insert the blade of a screwdriver into the notch at the edge of the case and moving the blade along the perimeter of the notch separate the detector's cover from its base.

The layout of the detector's PCB along with the DIP switches, the terminals, and the tamper switch on it is shown below:



ADJUSTING THE DETECTOR

1. Ensure the detector is mounted and wired properly and detector's case and PCB are secured properly.
2. Make sure the detection range is set to minimum value (DIP switch 1 is OFF and DIP switch 2 is ON).
3. Enable the alarm indication mode setting DIP switch 4 to ON position.
4. Power up the detector. Its TPEB contacts shall be open for 3 s, all LEDs being lit steady. Ensure no interference/noise is being indicated for at least 60 s provided that all is OK.
5. Walking through places where intruder's movement can happen, cause the detector to trigger. If necessary, increase the detection range by setting DIP switches 1 and 2 as shown in Table 2.

Table 2

Switch 1	Switch 2	Range
OFF	ON	Min
ON	ON	Mid_1
OFF	OFF	Mid_2
ON	OFF	Max

6. Finally, arm the detector.

NECESSARY ARRANGEMENTS

In the premises where the detector is installed, for the period of protection **the measures should be provided** to ensure:

1) The best closure of the premises (closing all doors, windows, sashes, and other openings);

2) Creating a normal noise environment (shutting off mechanical ventilation, air conditioners, electric heaters, fans, rings, bells, audio equipment, power switching devices and other appliances);

3) No people, animals, and birds.

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