



### DESCRIPTION

ES 470 offers reliable monitoring against attacks with mechanical tools. The ES 470 is a shock and vibration detector with 3 separate detection channels: an integration channel / saw channel for weak signals with long duration, a counting channel that senses strong impact on the monitored surface and an explosion channel which senses very strong signals from e.g. an explosion.

ES 470 has built-in relays for the alarm and tamper outputs. This allows the ES 470 to be connected directly to the alarm central unit, this means that no analyzer unit is necessary.

The ES 470 is polarity independent.

### FEATURES

- Relay outputs for alarm and tamper
- Polarity independent for easy connection
- 3 separate detection channels
- Cover radius up to 3m
- Resistant to interference
- Detailed sensitivity setting
- Suitable for 24-hour monitoring
- DAY and NIGHT control of LED

### OPERATING PRINCIPLE

The ES 470 uses a piezoelectric sensor to monitor the vibration signature of the mounting surface that occurs when it is crushed or cut with tools. The signal has a special signature with a broad spectrum and high amplitude that the electronics detects, then opens the alarm relay and illuminates the LED. The ES 470 has a built-in self-control and voltage monitoring. Fault is indicated by a flashing LED (alarm relay remains closed). The indication is controlled by a DAY and NIGHT function. With 8Vdc on the power input, DAY mode is active and LED lights up at alarm and with pulsating shine in case of failure. At 6Vdc, NIGHT mode is active and LED is switched off in case of alarm or fault.

Resetting the detector after alarm can be done in two different ways:

- Disconnect power to the detector
- Switch from DAY to NIGHT mode

### MOUNTING

1. Loosen the screw for the cover and lift it off.
2. Select the mounting location and mark the mounting holes with the bottom part as a template.
3. Drill with a 2-2.5 mm drill for the two supplied mounting screws.

**NOTE! A clean and smooth mounting surface under the detector provides maximum range.**

### CONNECTIONS

The detector has 6 screw terminals:

#	Function
1	DC Input voltage (-) or (+)
2	DC Input voltage (-) or (+)
3	Alarm output, relay (NC)
4	Alarm output, relay (C)
5	Tamper output, relay (NC)
6	Tamper output, relay (C)

## DIP-SWITCH

The DIP switch with 6 switches is used to program the functions of the detector.

### DIP Sensitivity (1 = lowest sensitivity, 8 = highest)

	1	2	3	4	5	6	7	8
1	OFF	OFF	OFF	OFF	ON	ON	ON	ON
2	OFF	OFF	ON	ON	OFF	OFF	ON	ON
3	OFF	ON	OFF	ON	OFF	ON	OFF	ON

### DIP Counting Channel, Number of hits

DIP	3	6
4	OFF	ON

### DIP Saw/Integration Channel

DIP	Integration Channel OFF	Integration Channel ON
5	OFF	ON

### DIP Autoreset of alarm (after 4 s)

DIP	Autoreset OFF	Autoreset ON
6	OFF	ON

## DETECTION RADIUS

The approximate range of different materials is given in the table below. Note, however, that the stated numbers only serve as guide values and are strongly dependent on joints etc. The actual range must be determined in practical tests.

Material	Wood/Glass/Plywood	Brick*/Plastering*	Steel/Concrete *
Radius	r = 2 m	r = 1 m	r = 3 m

## COMMISSIONING AND ADJUSTMENT

**NOTE! For detector to show short blink, following procedure must be done within 5 minutes after detector is powered on.**

Commissioning and adjustment is very simple. Check that the Autoreset is active (DIP 6 ON), the LED will then indicate when the detector is alarmed, and after about 4 seconds, the alarm goes out while the alarm relay closes. The counting channel causes each received pulse to be displayed with a short flash on the LED until the number of pulses set is reached (3 or 6), then alarm is indicated. The alarm is indicated by a steady light as long as the alarm relay is open.

1. Set the DIP switch to medium sensitivity, 6 hits, active saw channel and auto reset. This is done by setting **DIP 1=OFF and DIP 2-6=ON**.
2. Tap next to the detector and check that each tap is registered and that the alarm relay opens after 6 pulses.
3. Now tap relatively strongly with eg. the back of a screwdriver on the most remote point to be protected.
4. If the pulses are not detected (short flash on the LED), incrementally increase the sensitivity with DIP 1-3 as shown in the table until the LED shows the received pulse.
5. If the diode instead shows alarm directly (steady light), reduce the sensitivity incrementally with DIP 1-3 according to the table until the LED shows the received pulse.
6. Check and adjust all connections. Finally, check that both the alarm output and the tamper switch are received correctly at the control panel.

A fairly common mistake is to set higher sensitivity than required, which results in false alarms. We therefore recommend to not connect the detector in live operation until after a few weeks so that the setting has been verified.

\* When mounting on brick / plaster / concrete, the mounting plate MP550 must be used for correct operation

## TECHNICAL DATA

Detection radius	Up to 3m
Input voltage	8 – 15 VDC (DAY mode), 6 VDC (NIGHT mode)
Max. ripple	0.2 Vpp at 12 V
Current consumption (typical) quiescent	8.0 mA (at 12 V)
Current consumption (typical) alarm	7.1 mA (at 12 V)
Alarm output	Relay (Max 50V / 120 mA), R < 30 Ω
Alarm indication	LED, DAY/NIGHT controlled
DAY and NIGHT control	DAY≥8 V, NIGHT=6 V input voltage
Alarm time	4s (when Auto Reset) or latching
Alarm reset	Input voltage below 1 V
Tamper protection	Pry-off and cover removal
Tamper output	Relay (Max 50V / 120 mA), R < 30 Ω
Low voltage alarm or fault in electronics	<5V indicated by flashing LED
Environmental class (EN50130-5:2011)	II
Operating temperature range	-40°C till +55°C
Operating humidity	max. 95% RH
Housing	White ABS plastic, IP 42
Size [H x D x W]	20 x 23 x 80 mm
Approvals	EN 50131-2-8 Grade 3, SSF Klass 3,

## ORDERING INFORMATION

ES 470	V54543-F109-A100
Mounting plate MP 550	N54534-Z110-A100
EST400 Test Tool	NBPZ:4726120001