

- Detects low level ultrasonic frequencies emitted by small sparks
- Elliptical shaped dish allows for close pin-pointing of fault location
- Audio signal through loudspeaker or headphones
- Robust one piece unit

Minor electrical insulator faults can be a significant cause of radio interference. This interference is caused by small sparks, usually within the mechanical construction of the insulator. In addition to producing electrical interference, these sparks produce noise that can be heard at audio frequencies.

A large spark, or arc, on a 50 Hz power line can be easily heard, however small sparks causing radio and television interference are so small that they cannot be heard, even when the listener is close to the source.

Use of a sensitive microphone and high gain amplifier make it possible to detect very low level sounds. Such a system, however, also amplifies other ambient audio frequencies such as motor vehicles, bird sounds and people talking.

Fortunately, a spark, because of its sharp rise time, also emits much of its noise above the human hearing range where very little natural noise exists. STIL Ultrasound Detectors have an amplifying reflector providing both a very high gain, and sufficient directionality to pick out one faulty insulator in a string of insulators.

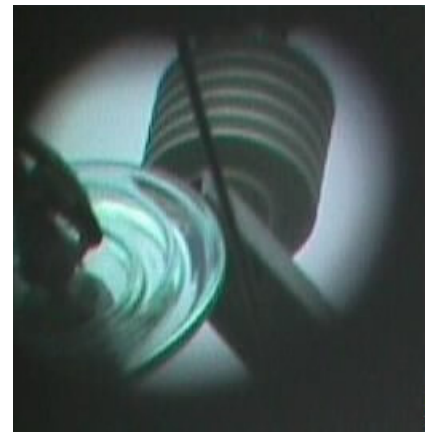


Construction and Use

Although there have been other ultrasonic detectors with reflectors, the STIL Detector is particularly convenient and robust. The nature of insulator faults often means that they are located in remote regions, and the one-piece construction simplifies transportation.

The unit is operated by a push switch and pointed at the target. A sight system through the base is used for visually locating which insulator is faulty. A loudspeaker will produce a sound. The presence of 50Hz or 60Hz on the speaker sound makes insulator fault sound stand out from the background hiss.

A meter is available for signal strength levels, and also to check the battery voltage.



Left: Typical use

Above: Photo of 11Kv insulators as seen through the Ultrasonic Detectors sighting system.

Principles of Operation

A sensitive ultrasonic transducer is used, operating at 40 kHz. This is a narrow band device which rejects all frequencies except 40 kHz. Sounds picked up by the transducer are amplified and then heterodyned down to audio frequencies, where they are again amplified and fed either through a loud speaker or headphones. Thus, low level ultrasonic sounds are made audible.

An ultrasonic transducer is not very directional when used on its own, so to enable the exact source of the spark to be located, a precision elliptical dish type sound collector is used. This collector focuses ultrasonic noises onto the transducer and, because of the short acoustic wavelength at 40 kHz, considerable extra gain and very sharp directionality is added to the system.

A sighting system is built into the dish so that the insulator, or hardware, is in view when the dish is orientated towards the ultrasonic noise source.

Physical Specifications

Frequency Response:	37 kHz to 43 kHz.
Rejection:	50 dB or better for frequencies below 20 kHz.
Directional Characteristics:	2 degrees or better in both vertical and horizontal.
Focal Distance:	9 to 10 meters.
Monitoring:	Internal 8 ohms loudspeaker with facility for plug-in external headphones.
Audio Output Power:	Maximum of 1.0 watts.
Power Source:	Replaceable dry batteries.
Dish Diameter:	Approximately 30 cm
Weight:	Less than 2 Kg
Power Switch:	Self restoring to off position when not in use.
Meter:	Signal level or Battery Condition
Current Consumption:	25 mA
Finish:	Painted Black and White

The STIL Detector is based on a unit originally produced by Keil Electronics.