

Spark Discharge Detection Device

PROBLEM SOLVING PRODUCTS

- Spark Discharge Detection Device -

A spark discharge is a small electric discharge, which could lead to an arc discharge and eventually to an arc fault.

Spark Discharge Detection Device prevents electrical fire occurring and protects precious lives and properties by detecting spark discharges.

Product Features

- Spark Discharge Detection Device is an alarm device specifically designed for
 - addressing defects in electrical circuits early by alerting to discharge in the very early stage.
 - detecting spark discharge occurrence in both visible and invisible areas by picking up noise superimposed on voltage waveform.



Detection Alert
by buzzer sound and LED lighting

Email Notification (optional)
by adding a contact monitoring device *1

Note: *1) Monitoring and communication devices are not included.

Unique Technology

In our research, we have found that peculiar high-frequency noise is observed accompanying spark discharges. By measuring and analyzing noise with as many household electric appliances as possible, our **Spark Noise Analysis Technology** has been established and succeeded in detecting spark discharge noise with high accuracy.

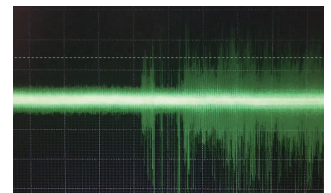
The figure shows the waveform of high-frequency noise between the pins when tracking occurs at an outlet. Likewise, high-frequency noise appears when cables are damaged or short circuit occurs.

Spark Discharge Detection Device analyzes noise waveform and diagnoses spark discharges.

Spark Noise Analysis



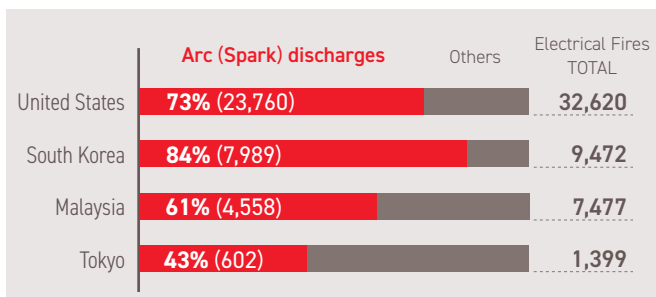
Tracking



Spark Noise

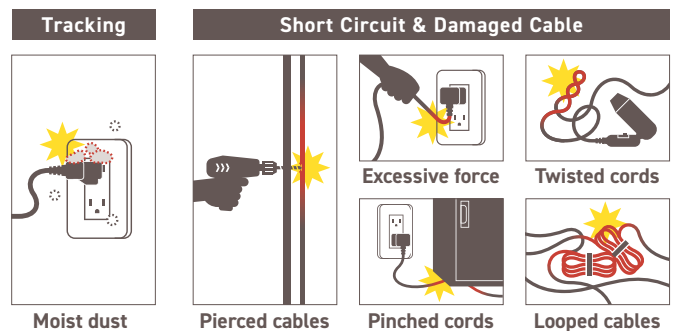
Proportion of Fires due to Arc Discharges

Electric discharges account for relatively large proportions in the numbers of fires with electrical origins in many countries.



Causes of Arc Discharge

Mishandling of household electric appliances and deterioration could result in fires.



Reference data :

- Summarized by Nitto Kogyo Corporation, based on NFPA's "Home Fires Caused by Electrical Distribution and Lighting Equipment, February 2022", Page 11, <Table 8. Home Fires Involving Electrical Distribution and Lighting Equipment by Heat Source: 2015-2019 Annual Averages>
- Summarized by Nitto Kogyo Corporation, based on National Fire Agency's "2021 Fire Statistics Yearbook", Page 207, <Table AE10-1. Electrical Fires by Origin and Location>
- Summarized by Nitto Kogyo Corporation, based on Fire and Rescue Department of Malaysia (JBPM)'s "Annual Report 2021", Page 34, <Fire Investigation Statistics by Origins for Structural Fires for the Year 2020 and 2021>(extracted data for 2021)
- Summarized by Nitto Kogyo Corporation, based on Tokyo Fire Department's "2022 Fact Sheet of Reported Fires", Page 15, <Table 1-6-1. Electrical Fires in the Past 10 Years> and Page 110, <Table 3-6-2. Electrical Appliance Fires by Source and Origin> (extracted data for 2021)

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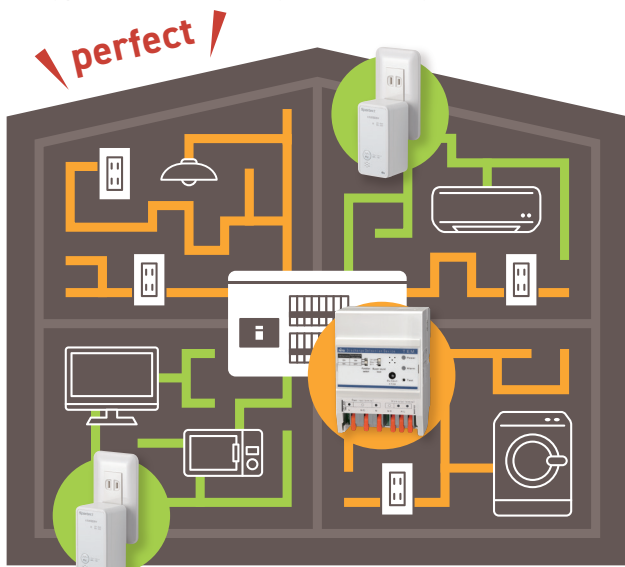
Comparison of Spark Discharge Detection Device and AFDD/AFCI

	Spark Discharge Detection Device	AFDD (Arc Fault Detection Device) AFCI (Arc Fault Circuit Interrupter)
Function	Alerts when detecting spark discharges (arc discharges in an early stage)	Interrupts circuits when detecting arc discharges
Sensitivity	Detects small discharges before fire risks become obvious - Series arc : 230VAC, below 2.5A - Parallel arc: 230VAC, below 2.5A	Detects imminent fire risks - Series arc : 230VAC, 2.5A and above - Parallel arc: 230VAC, 75A and above
Feature	Raises the alarm by lighting, beeping and contact output → Avoids causing inconveniences due to sudden power cut by early detection → Notifies by email by adding a contact monitoring device *1	Interrupts electric circuits → Unexpected power cut

Note: *1) Monitoring and communication devices are not included.

Product Variation

Built-in Type has a wide range covered, and Plug Type identifies circuits where spark discharges are. Combined use of both types enhances safety of electricity.



Enhanced Safety by combined use

Plug Type *2

- Requires no electric works
- Dedicated to certain circuits (Detection range: 30m radius in maximum *3)
- Identifies problematic circuits
- Notifies you by lighting, beeping and email *4

Built-in Type

- Installed in residential distribution panels
- Covers a wide range (Detection range: 70m radius maximum *3)
- Notifies you by lighting, beeping and email *4

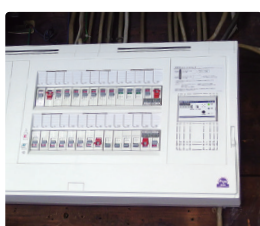
Note: *2) Currently compatible with Type A plug (100VAC) only.
*3) The range may vary according to individual environment.
*4) Contact monitoring and communication devices are not included.

Also recommended for

- Heritages
- Barns
- Restaurants
- Warehouses

Application Example

Japan has over 5,000 National Treasure and Important Cultural Property buildings. As those structures are mostly made of wood, they are extremely vulnerable to fire. In 2019, Shuri Castle in Okinawa was destroyed severely by what is believed to be electrical fire. The administrators of National Treasures have the increasing sense of impending crisis. We expect our solution help pass the precious legacy on to future generations.



Scan to watch a video.



For enquiry

<https://www.nito.co.jp/english/contact/>