

Comic Book



Lightning damage? An SOS from the industry

— a food company

Bang!

Blackout!

フッ

Doof

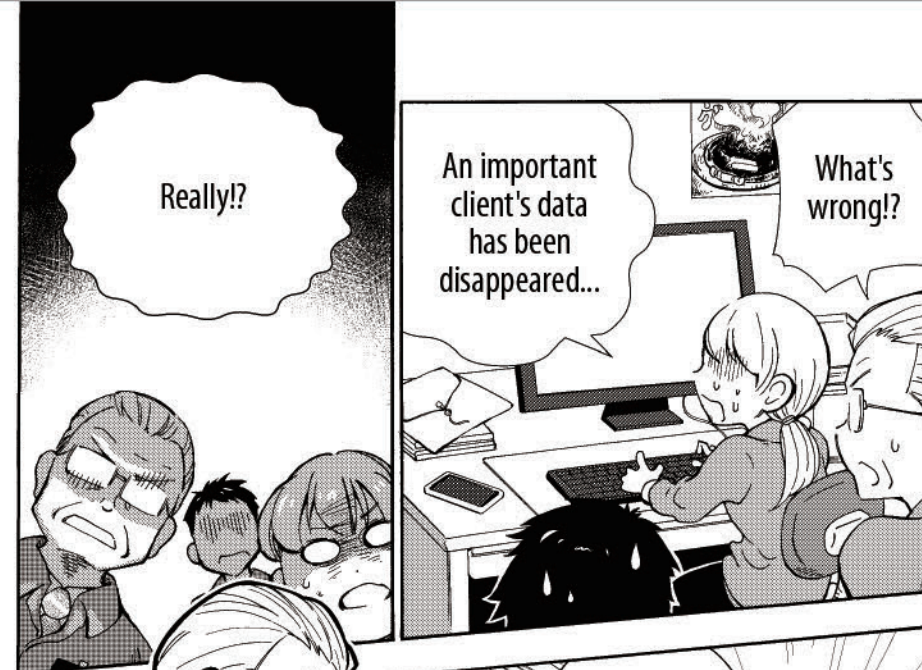
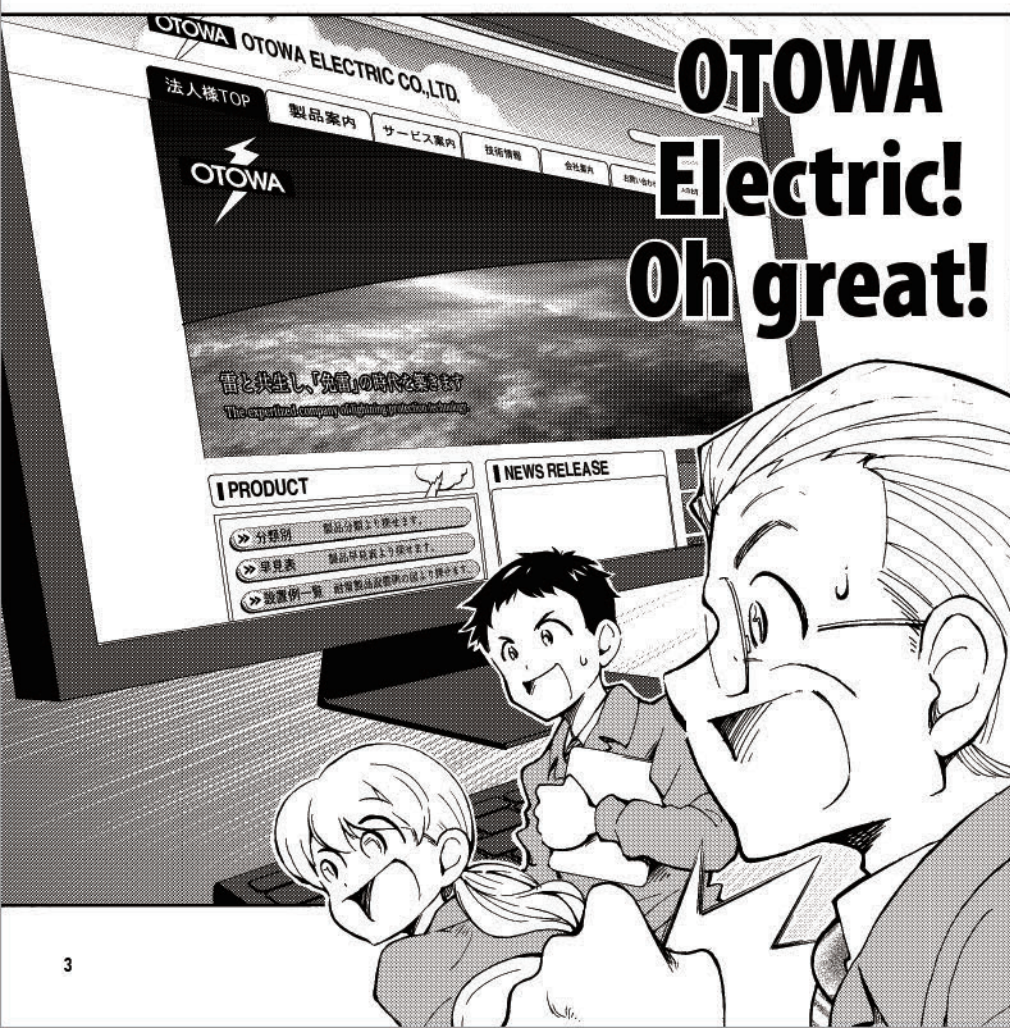
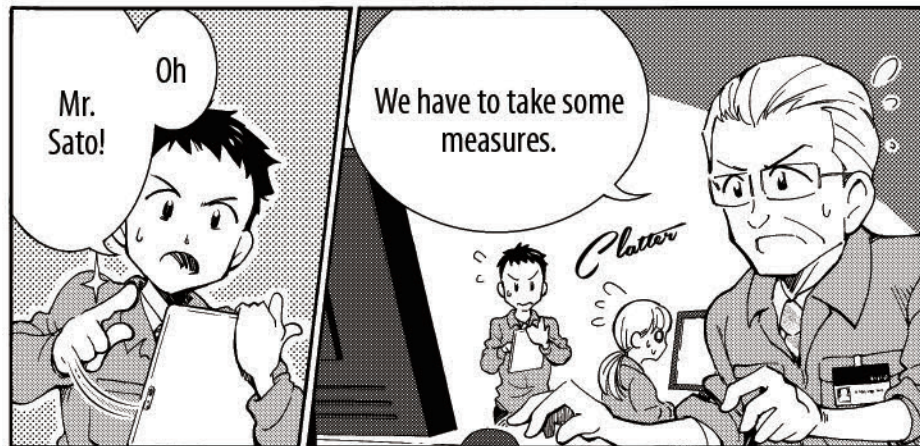
We're in trouble!

Fluk

ノッ

Zzzzzzzzz

Recovered!



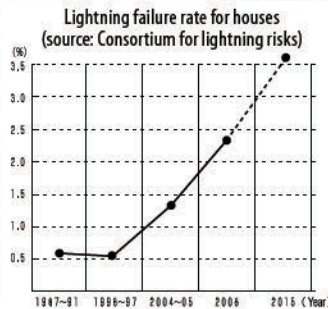
The SPD will protect your electrical equipment from the lightning!

What is the solution...?

The SPD !!

Surge Protective Device

We're living in the era of electricity and IT networks, aren't we?



Lightning related issues are increasing due to recent weather changes.

And its abnormal voltage which is known as "**SURGE**", has destructive effects that can reach a few kilometers!

In Japan alone, the annual damage amounts to 2 Billion U.S. dollars!

Railways

SOC facilities

Indeed, they are so widely used!

Office Building

Cultural Assets

PV System

OTOWA's vision is to protect society from lightning.

What is OTOWA ELECTRIC?

We are the sole lightning experts from Japan who have studied the super energy of nature that's better known as **LIGHTNING** since 1946.



How do you do?
I'm Katsumoto from OTOWA Electric.

Thanks for your inquiry about this matter.

In fact, **lightning rods protect the structure of the buildings only. They cannot protect the electrical facilities at all!**

We had big trouble this time around and we still didn't even understand how the lightning hit the factory.

I'm Sato, the factory manager.

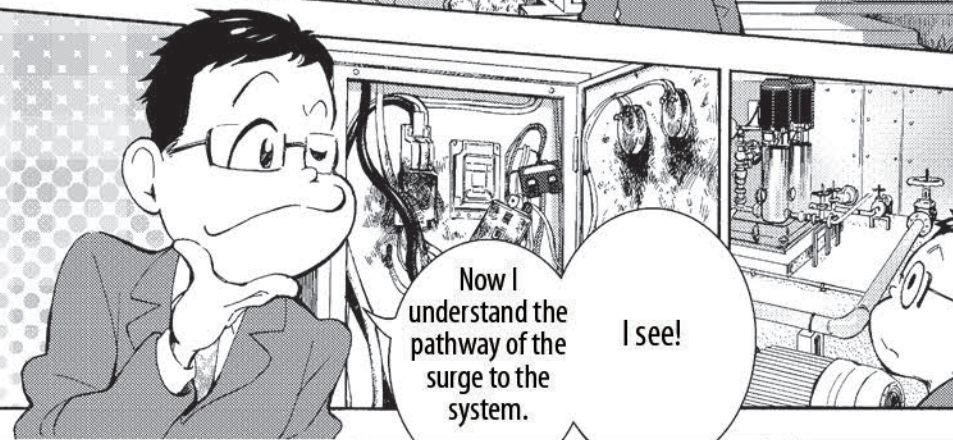
Gosh!

Even though the plant has been fully equipped with lightning rods...

We've got a solution for this problem!

Then, what should we do?

Here is the Solution!

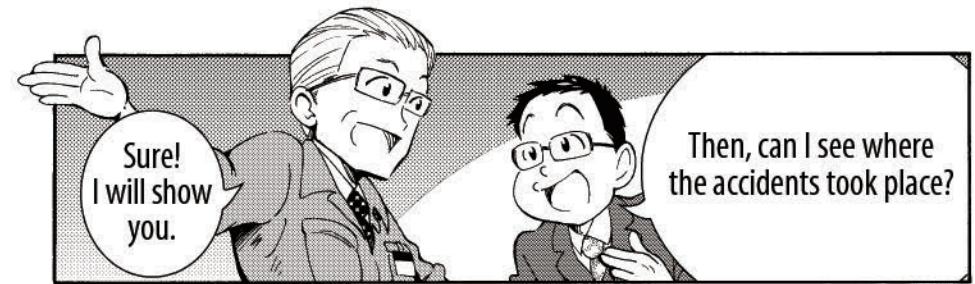


And the
“Class II
power line
SPD”.

Class II power line SPD
LT-122HT(S)

Solution is
“Class I
power line
SPD”.

Class I power line SPD
LD-C22EFS



Lightning phenomena are increasing.

Year by year even more lightning phenomena are occurring due to global warming.

Electrical equipment and devices get vulnerable to lightning surges.

With the evolution of IT society, semiconductor components (IC, LSI) have come into general usage for industrial apparatus, telecommunication facilities and control devices etc... As they are unavoidably weak at overvoltage, those types of malfunctions and other unknown troubles and failures that affect the machine are on a steep rise.

The amount of lightning damage is increasing.

It has been reported that, the damage from lightning reaches 2 Billion U.S dollars in Japan. (2002 Technical report of IEEJ). Disasters such as, loss of data and suspension of facility operations etc. have become major issues in the industry.

Recently, equipment has become compact and high performance, but weak against lightning surges!

Examples of Lightning Damage

Ex. Building exterior damage

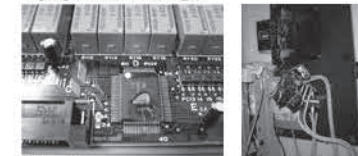
Corner of the building hit by lightning



Skyscrapers get lightning hit not only at the lightning rods but also at corners or parapets.

Ex. Building interior damage

Equipment damage



Failure of IC

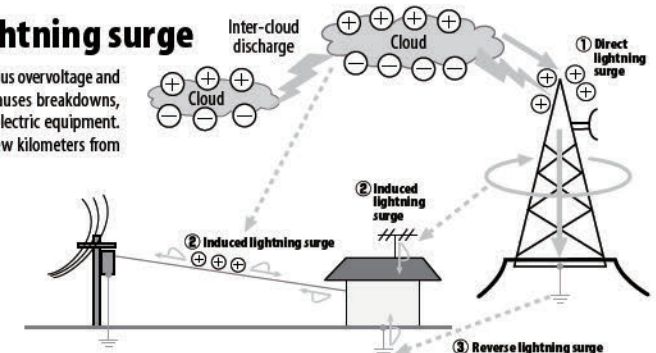
Breaker burnt out

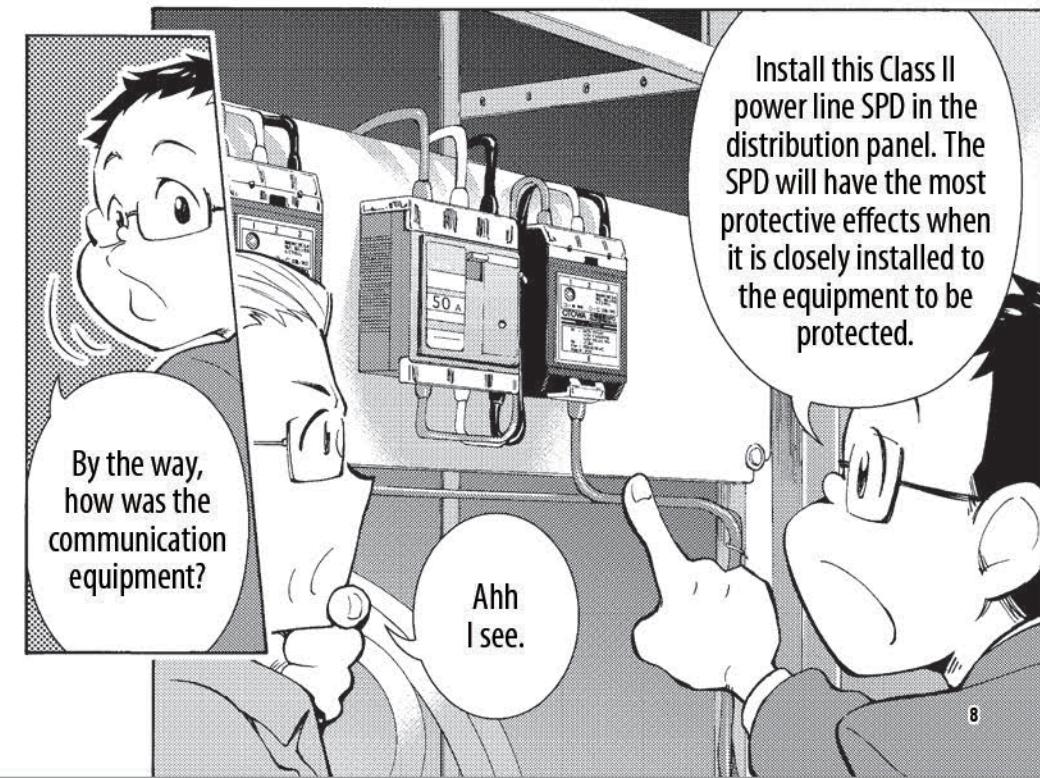
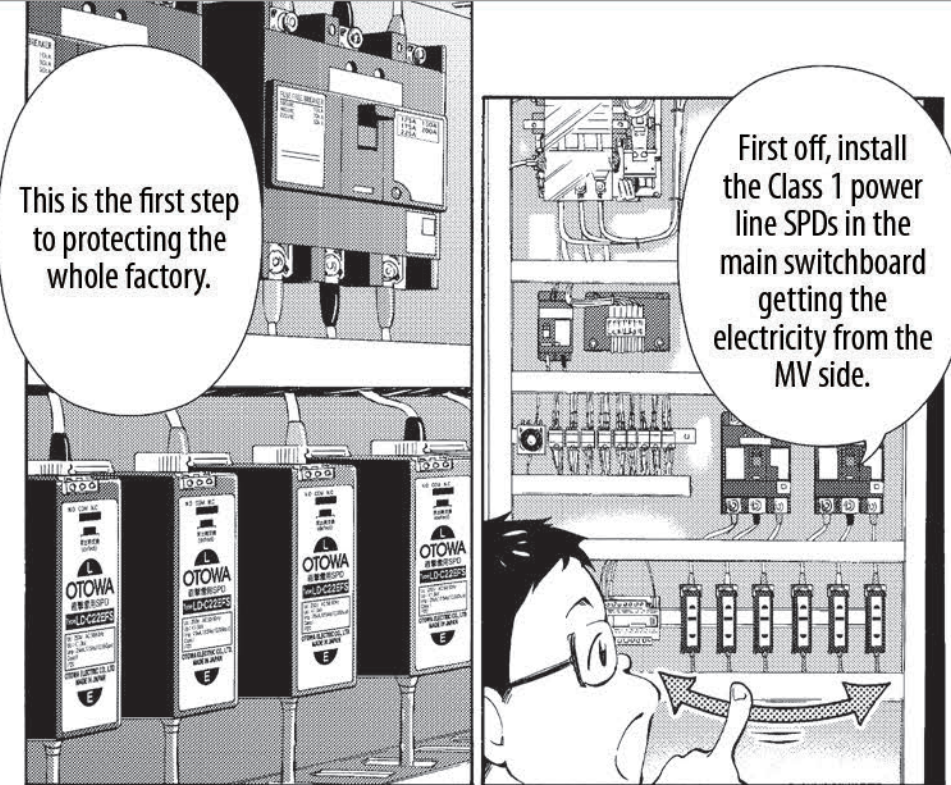
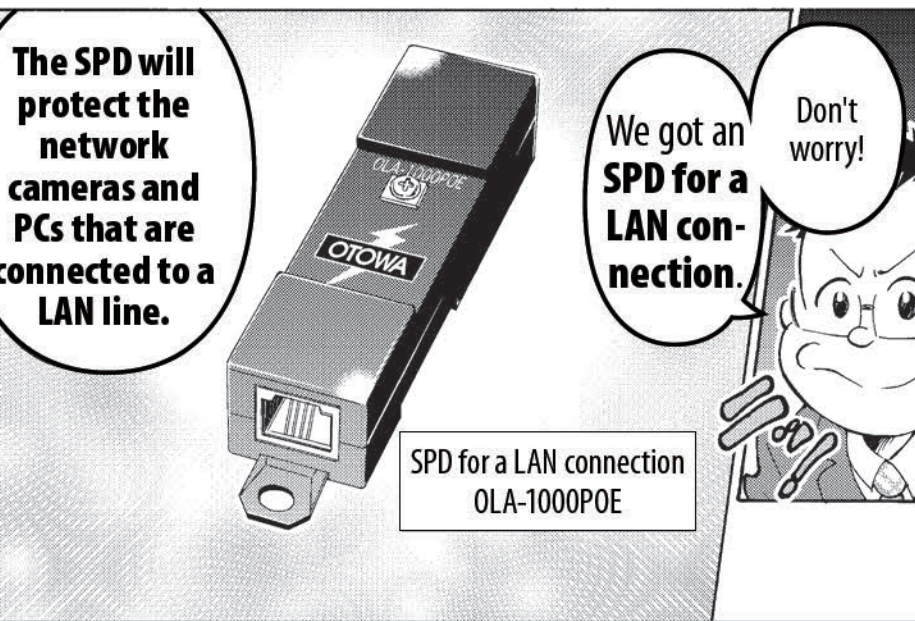
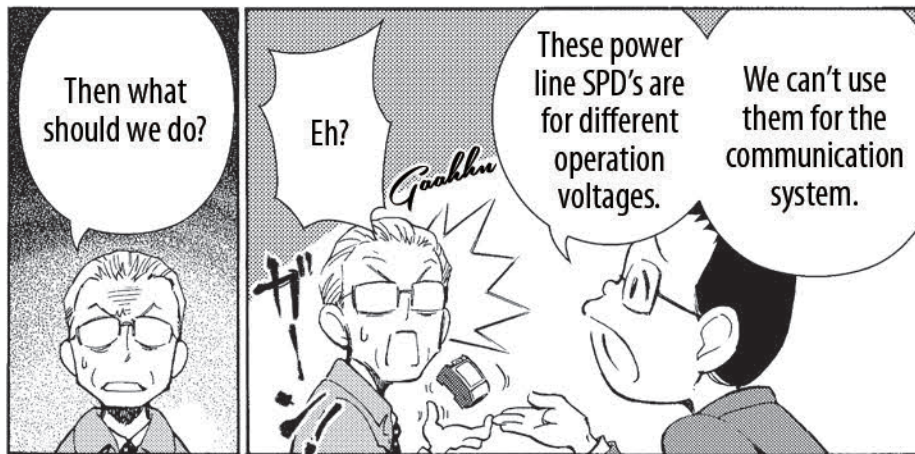
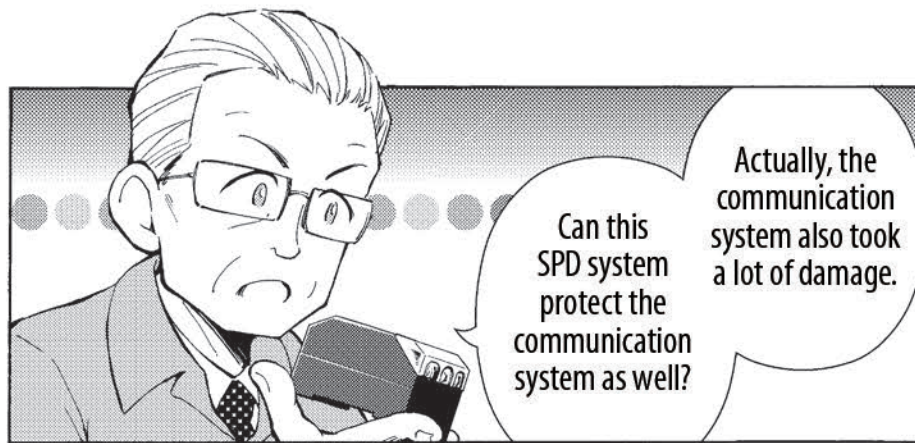
In many cases, the failure of semiconductor component cannot be identified by an appearance check. (internal breakdown of the ICs)

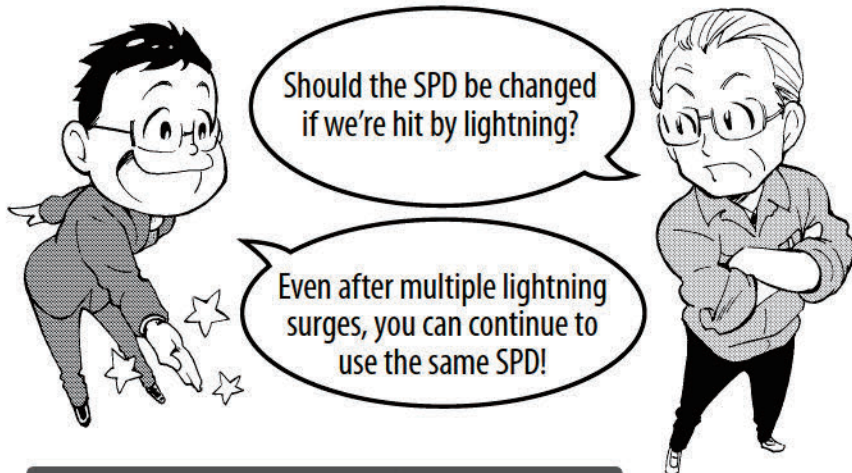
Principle of lightning surge

A lightning surge is the instantaneous overvoltage and current created by lightning. It causes breakdowns, malfunctions or deterioration of electric equipment. Its destructive effects reach to a few kilometers from the spot of origin.

- ① Direct lightning surge
- ② Induced lightning surge
- ③ Reverse lightning surge



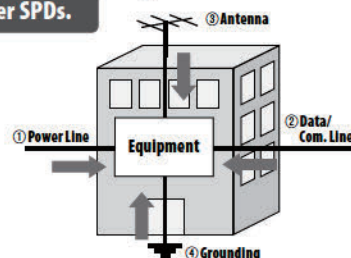




You can protect your assets by selecting the proper SPDs.

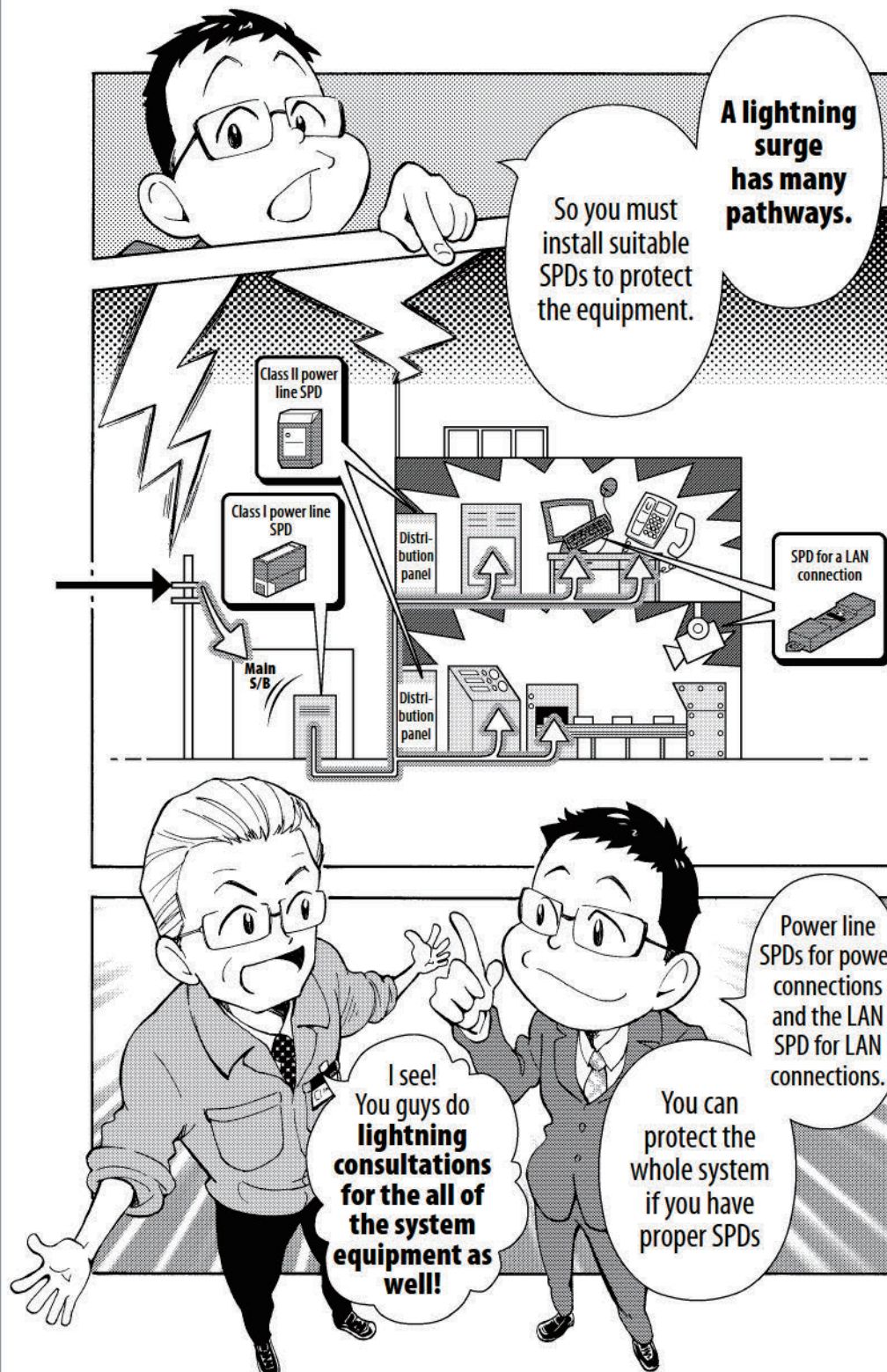
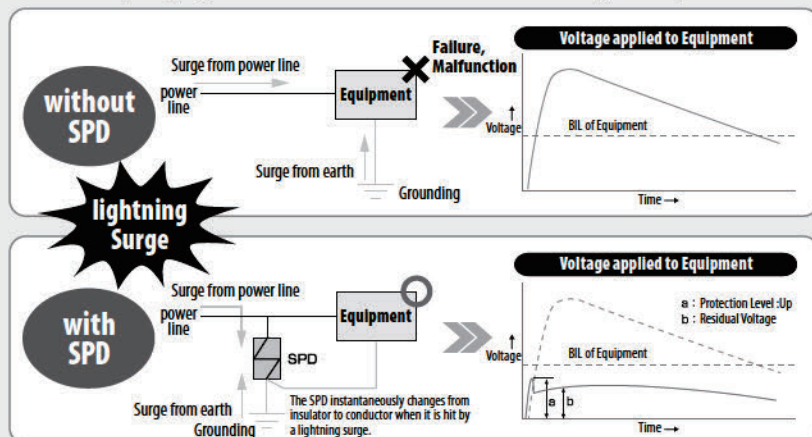
Four major invasion pathways of lightning surges.

- ① **Power Line** (wall socket etc.)
- ② **Data/Com. Line** (Telephone line, CATV, LAN line etc.)
- ③ **Antenna** (TV antenna etc.)
- ④ **Grounding** (Earth wire etc.)



More details about the SPD

SPD is the acronym for Surge Protection Device. This device cuts down the transient over voltage and shares the current of the lightning surge. Some other names for the SPD are LV Arrester and Surge Protector, and others.



It records the date, time, size and number of lightning surges.

It is a convenient device for monitoring surges.

We also recommend installing the **"Lightning Recorder"**.

OTOWA

年 月 日 回数
2014/01/01 001
00:00:00 1000A
時 分 秒 電流レベル SPD劣化

To avoid any further loss, first let's start protecting the factory and our office!

I learned a lot today.

That's great! Solutions are perfect!

Thank you, sir. I'll do that right away.

Lightning Protection of Photo Voltaic System

Is there something to protect the PV system too?

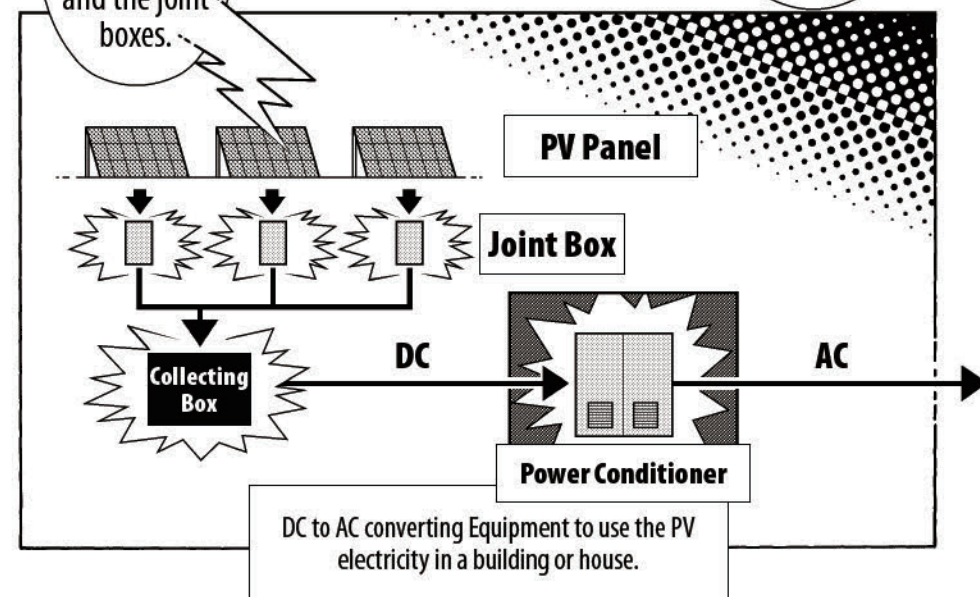
Thankfully no damage this time around! We've got a PV system on the rooftop.

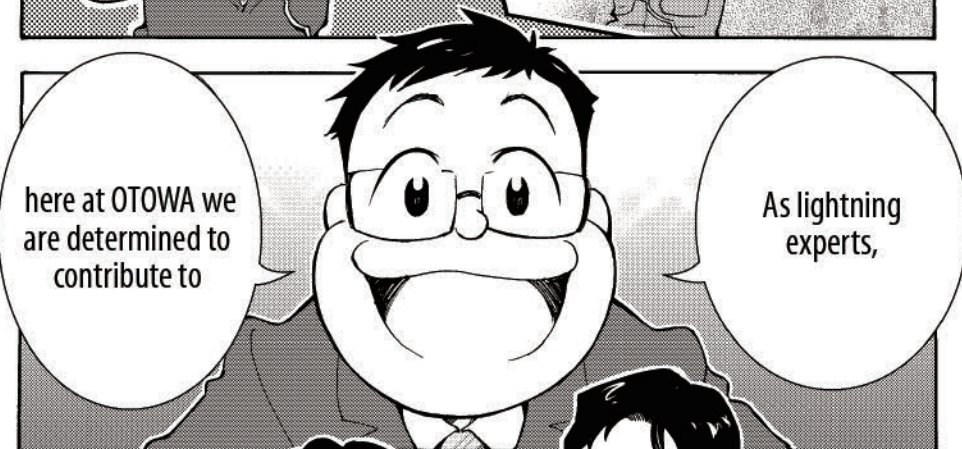
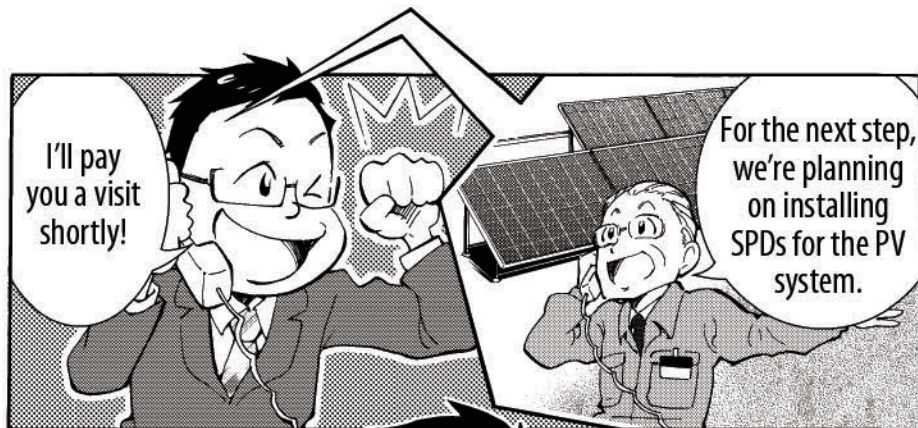
Ahhh!

a lightning surge may damage the power conditioner and the joint boxes.

In reference to the Photo Voltaic System,

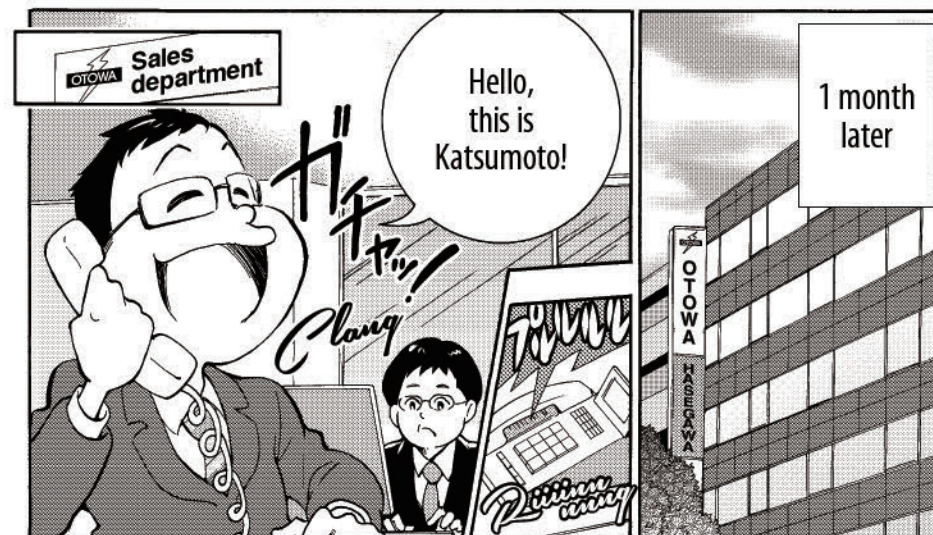
Yes, there is!





society by continuing to research lightning phenomena and finding ways to live in harmony with it.

Effects of installation



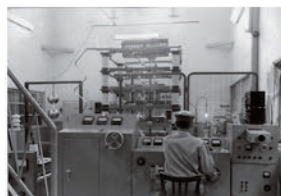
OTOWA History

OTOWA is the sole lightning specialist in Japan which has delved into lightning since it's foundation.

- 2016 "Lightning Detector of Wind Turbines" has received the Excellence Award at 28th Excellence New Technology / New Product Award of small to medium enterprises.
- 2014 Prize of Next GNT Company In GLOBAL NICHE TOP 100 by the METI
- 2012 Establishment of Geological Assesment Tech Co., Ltd.
- 2009 Establishment of Kitadaito exposure testing field in Okinawa
- 2008 Establishment of Lightning Technology Center
- 2005 Establishment of OTOWA Korea Co., Ltd.
Establishment of Ceraon Co., Ltd.
- 2000 ISO 14001 certification registration
- 1998 Acquisition of Nippon Lightning Rod Company
Establishment of Meneon Co., Ltd.
- 1997 ISO 9001 certification registration
- 1981 Release of the Surge Shelter
- 1980 Release of the GL Low Voltage Arrester
- 1977 Release of the Type GL Arrester
Start of Zinc Oxide Block production
- 1971 Acquisition of the Hasegawa Electric Company
- 1967 Release of the OTOWA Valve Type Surge Arrester
- 1955 Renamed to the OTOWA Electric Company Limited
- 1950 Release of the P-Valve Type Surge Arrester
- 1947 Release of the OTOWA Current Limiter
- 1946 Start of production and sale of Cutout Switch
Establish the OTOWA Electric Appliance Works in Kyoto, as a limited company



Distribution arrester of early stage (P-Valve Arrester)



Impulse voltage generator of early 1960s



a long steady seller Power line SPD



Lightning Technology Center



Power line Class I SPD in actual installation

What's OTOWA? What's Lightning Protection?



Please contact OTOWA when you face lightning trouble for your assets. There are multiple options of protection measures as per the equipment, circuit and grounding etc.



OTOWA verifies product design by

Extensive Tests and Simulation

with cutting edge test facility

High Current Impulse Generator

Simulate natural lightning current up to 220kA

- Waveform : 10/350μs
- Max. Current : 220kA

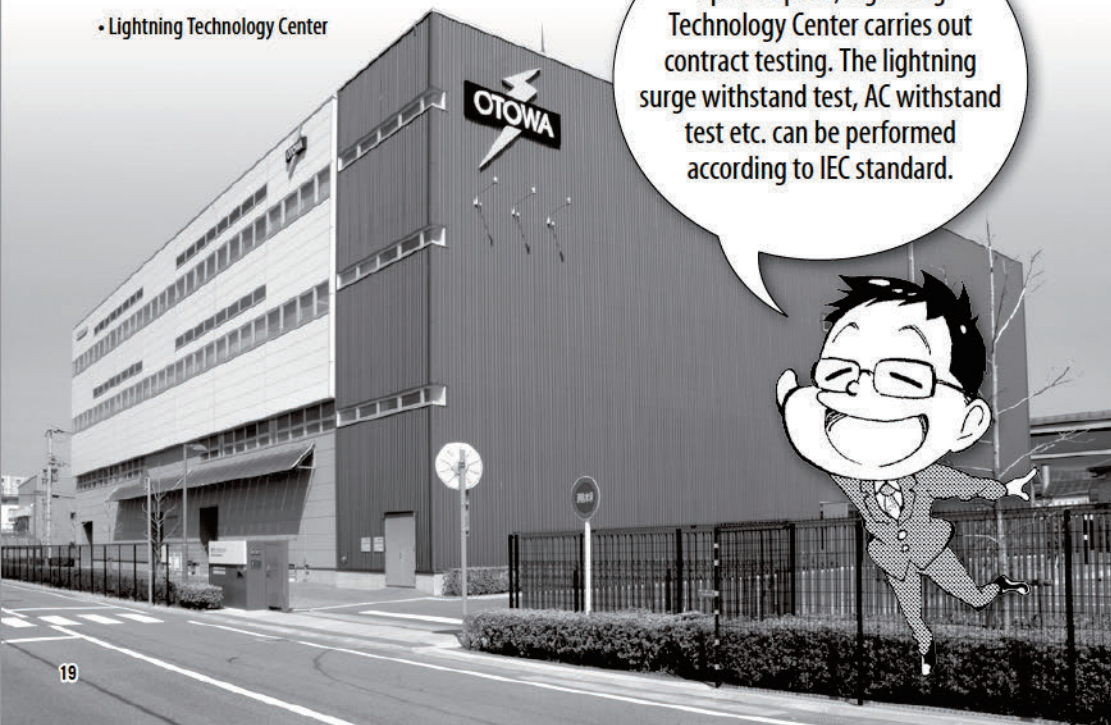
Impulse Voltage Generator

Generate lightning impulse voltage up to 1600kV

- Waveform : 1.2/50μs
- Max. Voltage : 1600kV

Upon request, Lightning Technology Center carries out contract testing. The lightning surge withstand test, AC withstand test etc. can be performed according to IEC standard.

• Lightning Technology Center



Lightning Current Arrester – Class 1 (MOV type)

IEC RoHS



Features

- Large energy protection capability with superior MOV unit
- Low protection level : Up < 1300V
- Very fast response time (<3nsec), Decoupling Inductance not required
- Materials comply to RoHS

Characteristics

	LD-C22EFS(K)
SPD according to IEC61643-11	Class I
Max. continuous operating a.c. voltage Uc	275V
Nominal discharge current In (8/20μs)	25kA
Max. discharge current Iimp (10/350μs)	25kA
Voltage protection level Up	≤1500V

Integrated Block Surge Arrester – Class 2

IEC RoHS



LT-44T2HT(S)

LT-122HT(S)

Features

- Full mode (Common differential mode) protection with compact body
- Low protection level : Up < 1500V and Fast response time (<25nsec)
- LED status indicator and signal contact
- Highly reliable disconnection system
- Materials comply to RoHS

Characteristics

	LT-44T2HT(S)	LT-122HT(S)
SPD according to IEC61643-11	Class II / 3p4w	Class II / 1p2w
Max. continuous operating a.c. voltage Uc	275V/440V	275V
Nominal discharge current In	20kA	20kA
Max. discharge current Imax	40kA	40kA
Voltage protection level Up	L-E : ≤1500V	L-E : ≤1500V
	N-E : ≤1100V	N-E : ≤1100V

Surge Protector for High Speed LAN

IEC RoHS



Features

- Protect network cameras or PC connected to LAN
- Applicable for 10BASE-T, 100BASE-T, 1000BASE-T, PoE(IEEE802.3af), PoE+(IEEE802.3at)
- IEC protection category C2: 8/20μs 5kA, D1: 10/350μs 2kA

Characteristics

	OLA-1000PDE
IEC 61643-21 Category	C2, D1
Max. Continuous operating d.c. voltage Uc	60V DC
Rated Current	1000mA
Protection Level at Id Up at 8/20μs	< 500V @ 2kA
Impulse Durability	C2 : 8/20μs 5kA
	D1 : 10/350μs 2kA
Connector	RJ45 8pin
Application	100BASE-T/1000BASE-T
	IEEE 802.3af: (PoE)
	IEEE 802.3af: (PoE+)
	Alternative A, B

Lightning Recorder

RoHS



Features

- Record & display surge current level(100A, 500A, 1000A) and the time
- Data saving into SD memory card in text format, readable without special s/w

Company Profile

Company Name OTOWA ELECTRIC CO., LTD.
 Establishment May 11, 1946
 President Osamu Yoshida

Business Activities

- Development
- Production and Distribution of Various Surge Arresters
- Various LV Surge Protection Devices and Electronic Equipment
- Consulting Business and Undertaking of Construction for Lightning Protection



Consulting Business



Development SPDs

Lightning Protection Comic Book

Published by OTOWA ELECTRIC CO., LTD.
 Editing and Production by : Kyoto Seika University International Business Promotion Section
 Cartoonist : Akiyoshi Enoki (Graduate from Kyoto Seika University Department of Manga)
 First published in 2015 March

5-6-20, Shioe, Amagasaki-city, Hyogo Pref. 〒661-0976, Japan
 TEL.81-6-6429-9591
<http://www.otowadenki.co.jp/eng>

Copyright © 2017 OTOWA ELECTRIC CO., LTD. All Rights Reserved.
 Printed in Japan



Various Surge Protection Devices

