



Surge protection and Control Ready Drivers

By Dimitri De Rop

Surge protection

- What is a surge?
 - Why protection?
 - How is it injected?
 - Cost of inaction?
 - How to protect?
 - What to consider when choosing a SPD?
 - What kind?
-

What is a surge

A rule-of-thumb definition of a surge is a voltage of at least two times the system's root mean squared (RMS) voltage with a duration measured from one to several hundred microseconds.

Examples:

- 120 V AC electrical system, a short impulse less than one millisecond greater than 240 V would be a surge. In a
- 480 V AC system, a short impulse greater than 960 V would be a surge.

Source: Phoenix

Whyagainst what ?

- Lightning strikes



- Switching operations of heavy machines or welding equipment

- ESD



Est 63% indoors, the other 37% is outdoor.

source: Phoenix

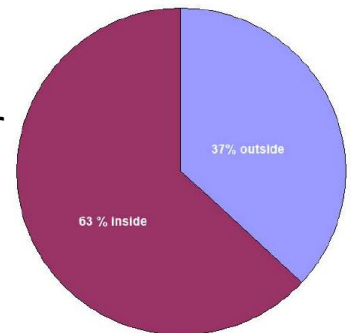
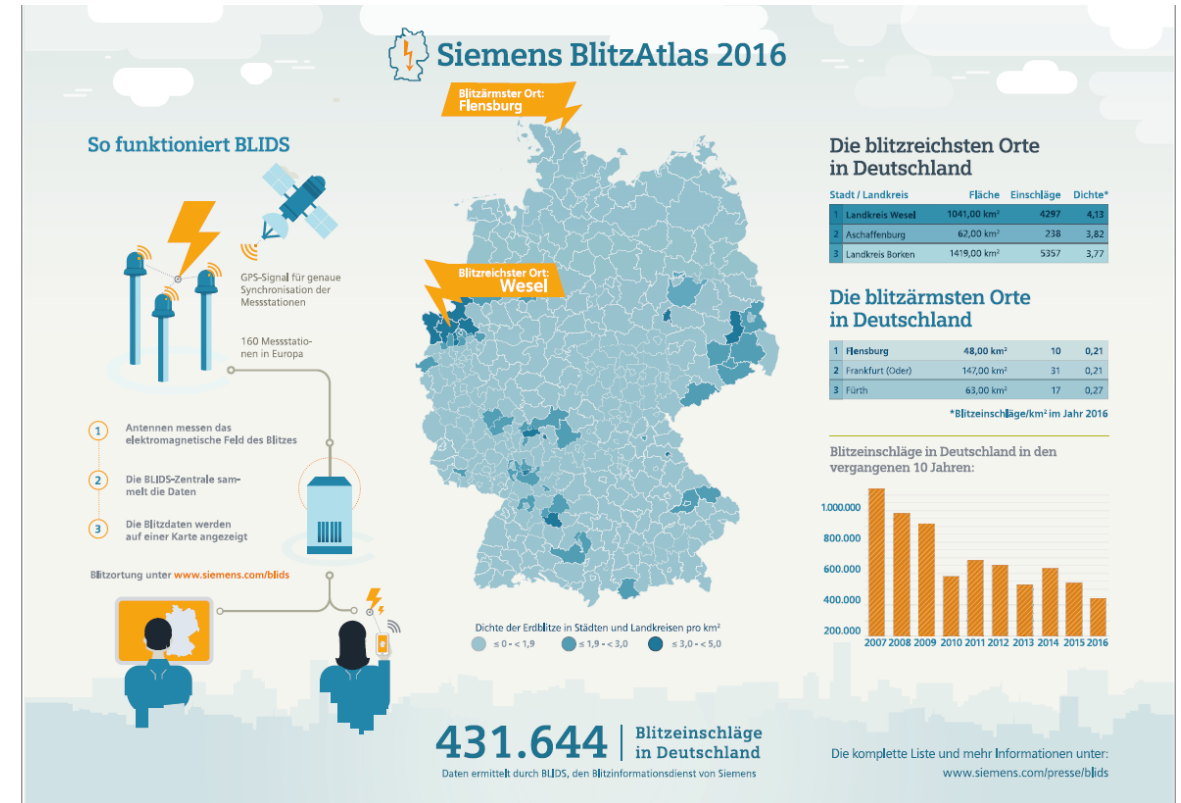


Figure 1: Source of surges to a facility

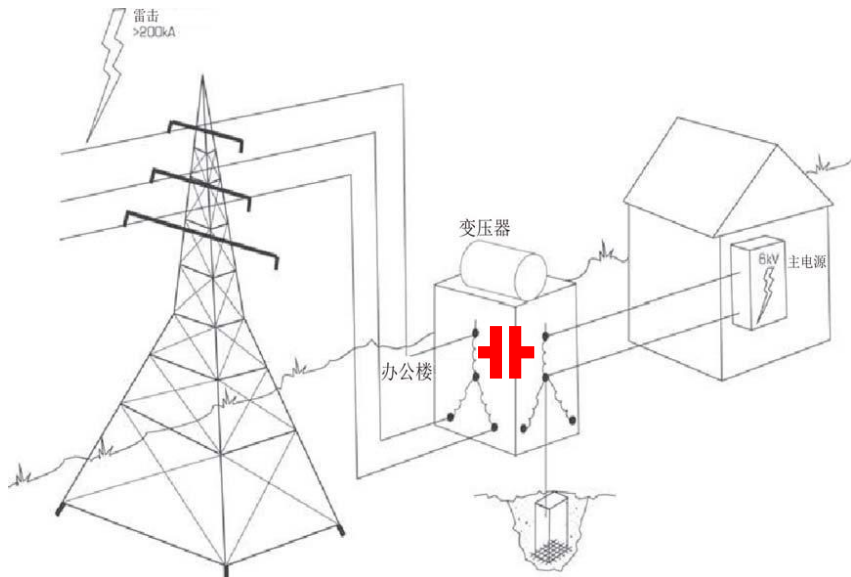
Why protection?

- You can build keen electronics but without protection it is vulnerable
- If you don't protect, then electronics will get damaged or broken.
- 2016: over 431,000 strikes in Germany
 - Netherlands *) approx. 3 strikes/km² per year
 - Germany- Wesel region, average of 4.13 strikes/km² per year **)

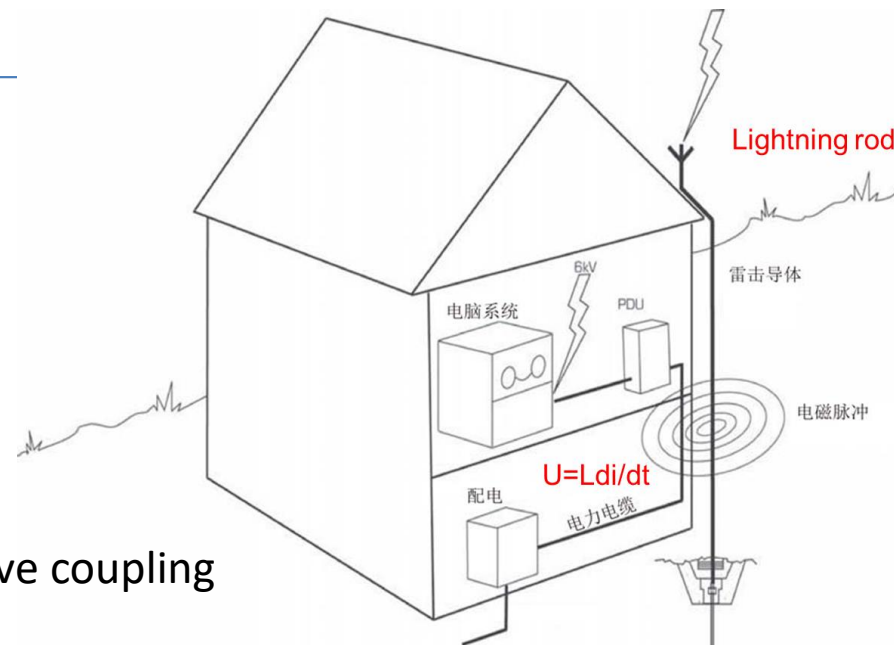


*) source: De Bliksemvraagbaak

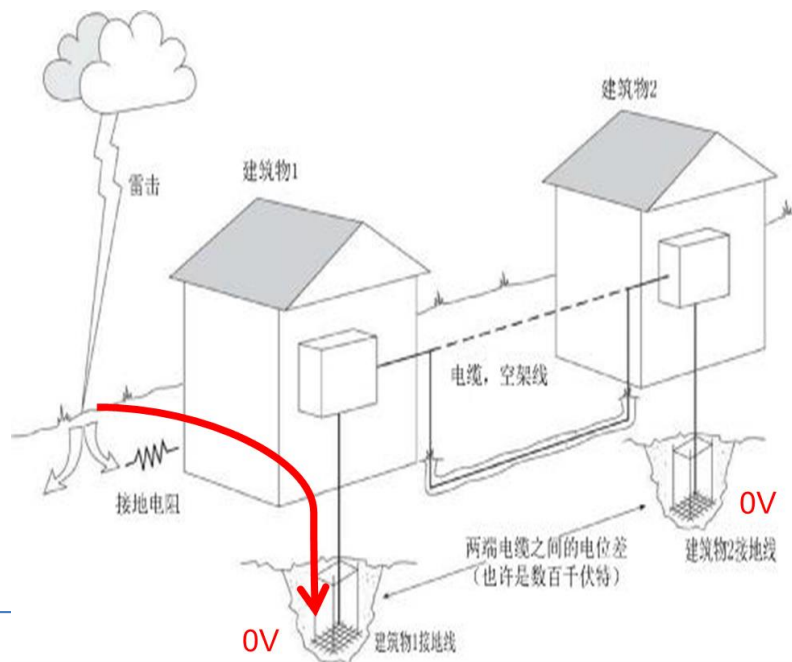
**) source: Siemens BlitzAtlas



Parasitic capacitance



Inductive coupling



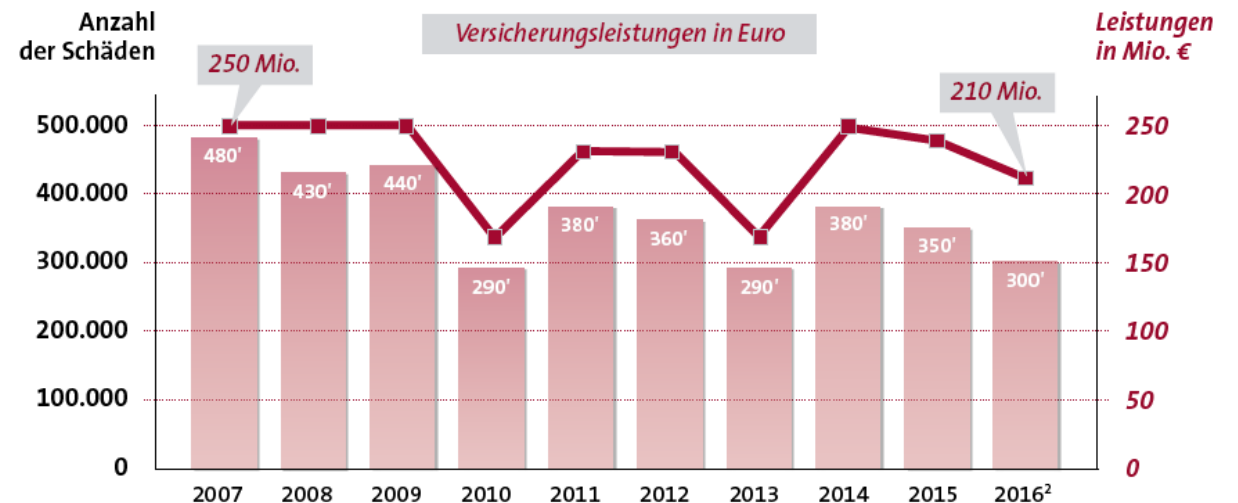
Impedance coupling

Cost of inaction

- 210m€ in 2016 in consumer electronics
- # of strikes seem to go down, but # of equipment rises.
- Industrial damage ??

Blitz-Bilanz 2016

Anzahl der Blitz- und Überspannungsschäden und die Leistungen in der Hausrat- und Wohngebäudeversicherung¹



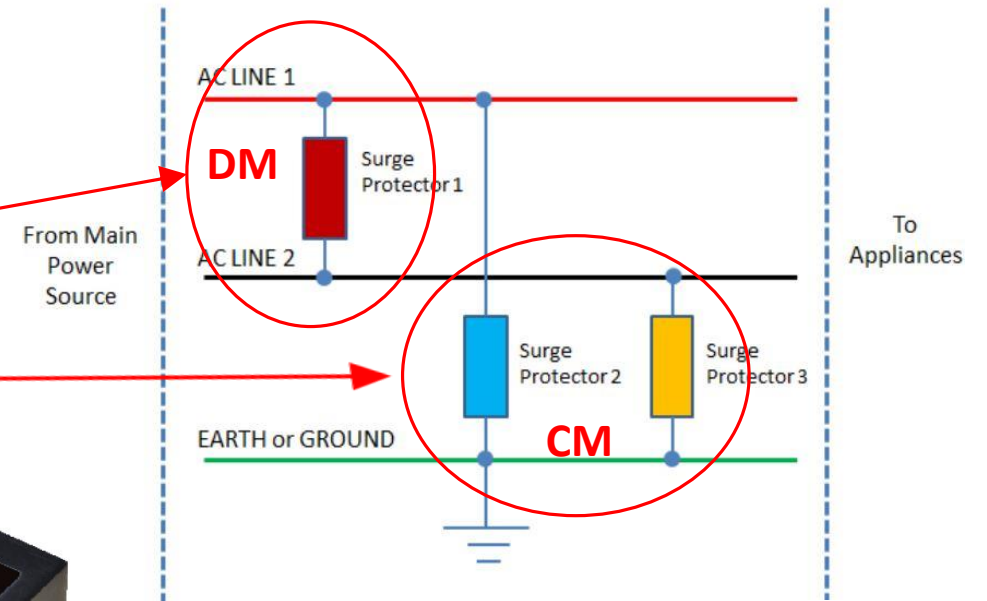
1) GDV-Hochrechnung

2) vorläufig

Quelle: www.gdv.de | Gesamtverband der Deutschen Versicherungswirtschaft (GDV)

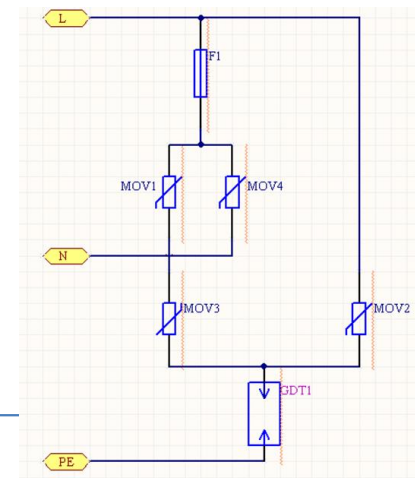
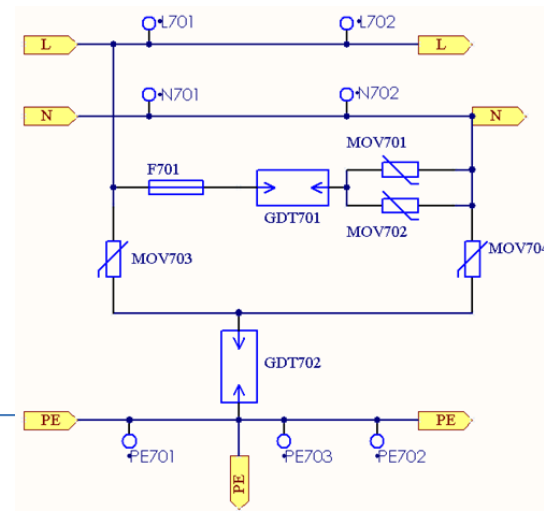
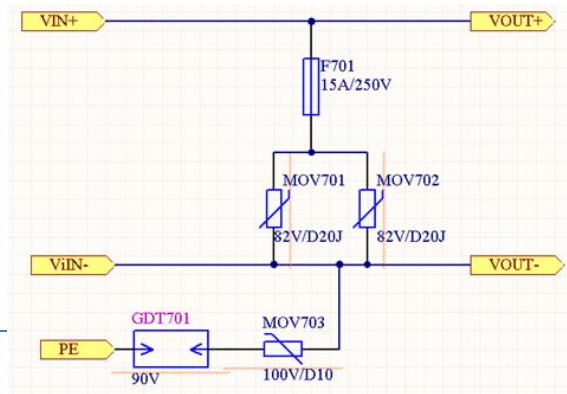
How to act

- DM: Differential mode
- CM: Common mode
- Build in solution
- External solution
 - Series topology
 - Parallel topology



How to protect

- Build in Surge protection device in Drivers
 - Common mode / Differential mode
 - Differential mode only (Class II often)
- External Surge protection device
 - Series or parallel topology



What to consider when choosing a driver or SPD?

- Application
 - Outdoor
 - Indoor
 - Horticulture
 - else...
- Class I or Class II luminaires
- Level of protection
 - levels, kA or kV

Control ready drivers



Industrial/Outdoor Lighting Applications – INVENTRONICS Smart LED Driver Solution

EBS/EUD/ESD Series

40W~600W

Features

- Input Voltage Range : 176-305Vac / 90-305Vac / 249-528Vac
- Constant power programmed
- Always-on Auxiliary Power : 12V/200mA
- All-in-one dimming control : 0-10V, PWM, DALI, Timer
- Dim-to-Off dimming function, enabling LED turn-on and turn-off
- Built-in DM 6kV (line-line) / CM 10kV (line-earth) super lightning protection function (4/6 KV for ESD-096/240/320)



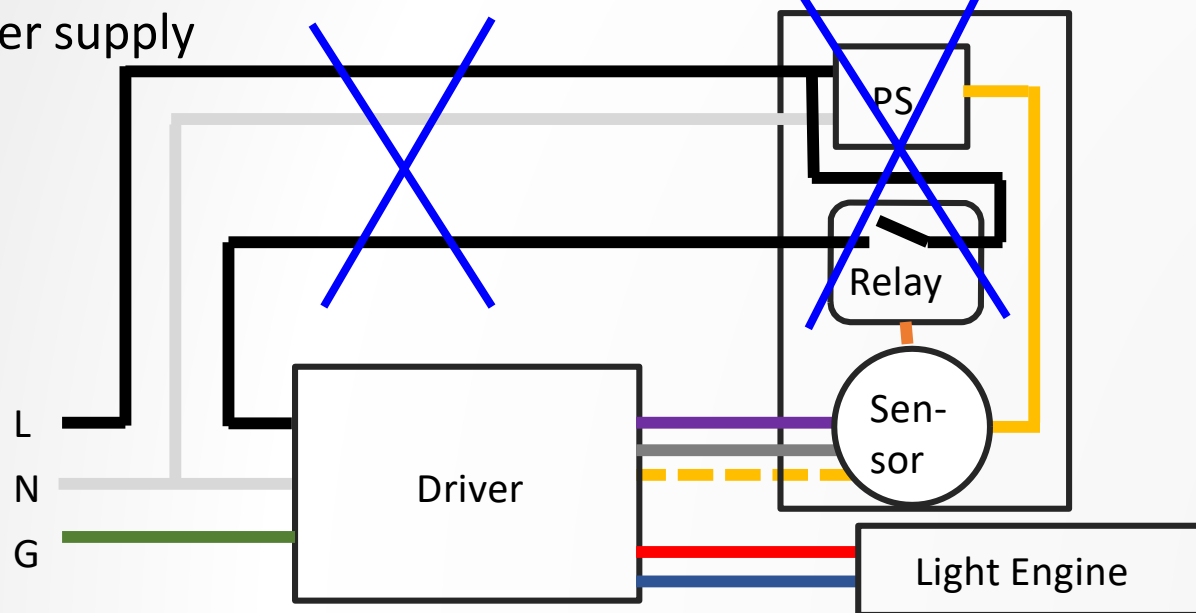
INVENTRONICS
英飞特电子



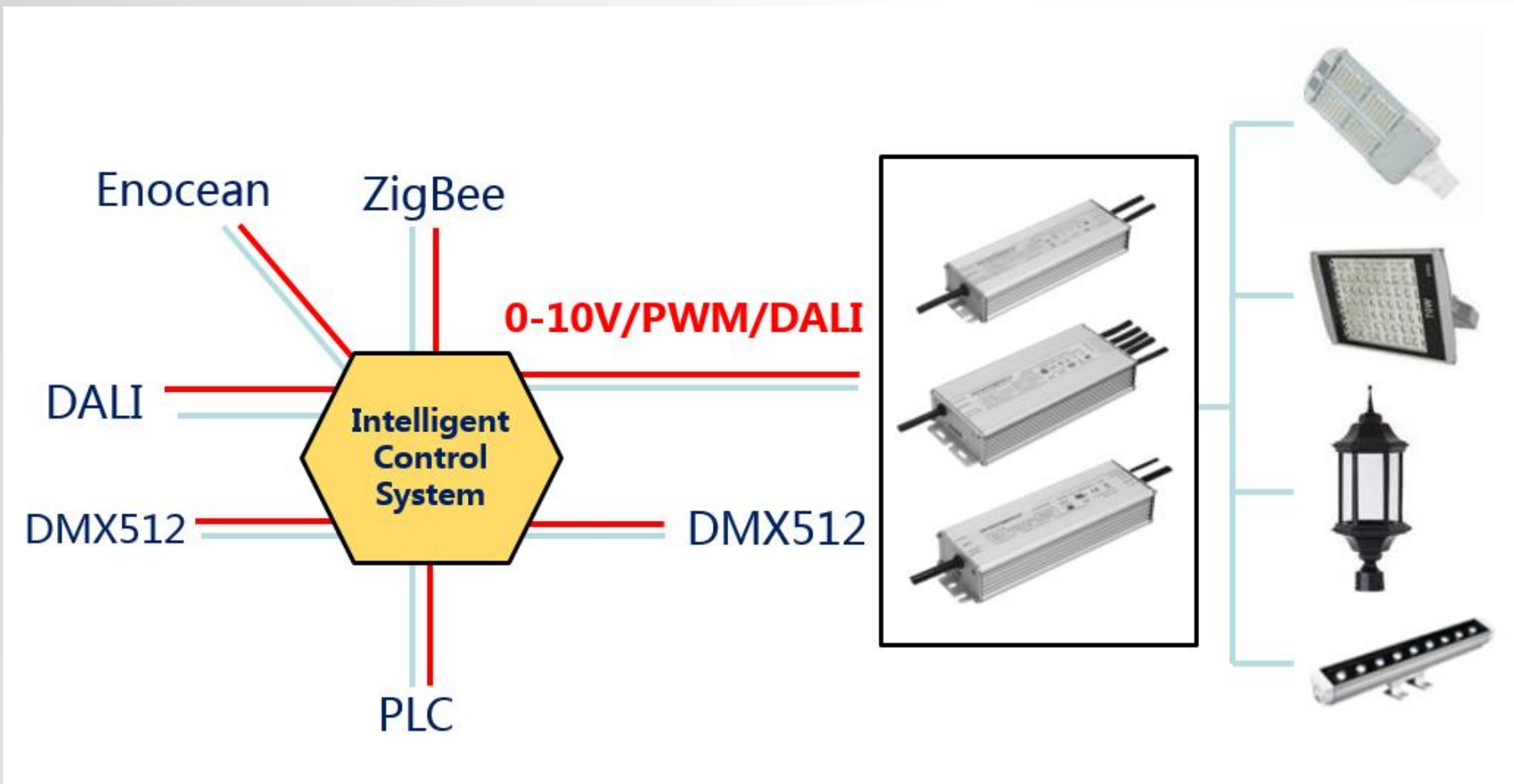
Industrial/Outdoor Lighting Applications – INVENTRONICS Smart LED Driver Solution

Enabled by Dim-to-Off + Always-On 12V

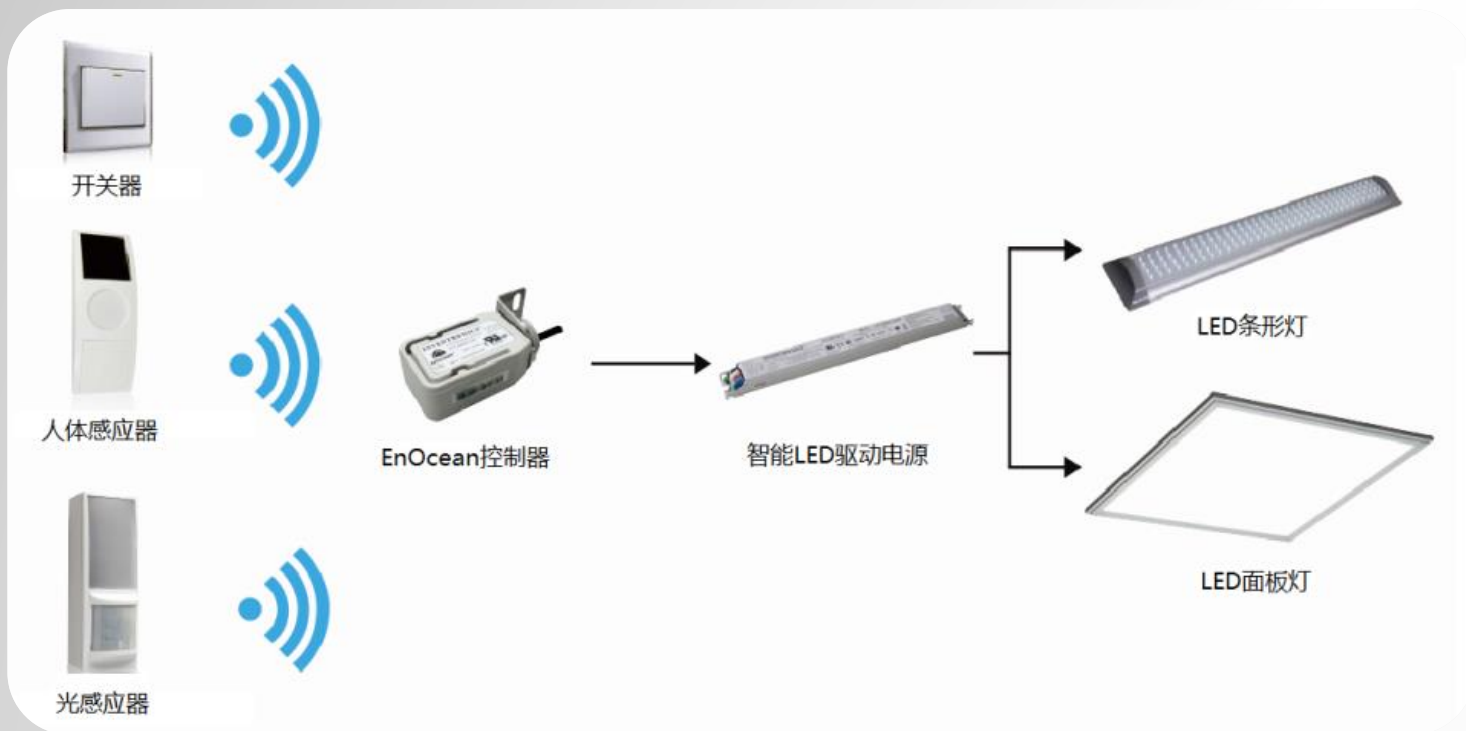
- Dimming signal can turn driver output OFF with low standby power $< 0.5\text{ W}$
- Auxiliary power supply stays ON to power local sensors/controllers
- Reduces system cost— eliminates sensor module components
 - NO off-line power supply
 - NO AC relay



Industrial/Outdoor Lighting Applications – INVENTRONICS Smart LED Driver Solution

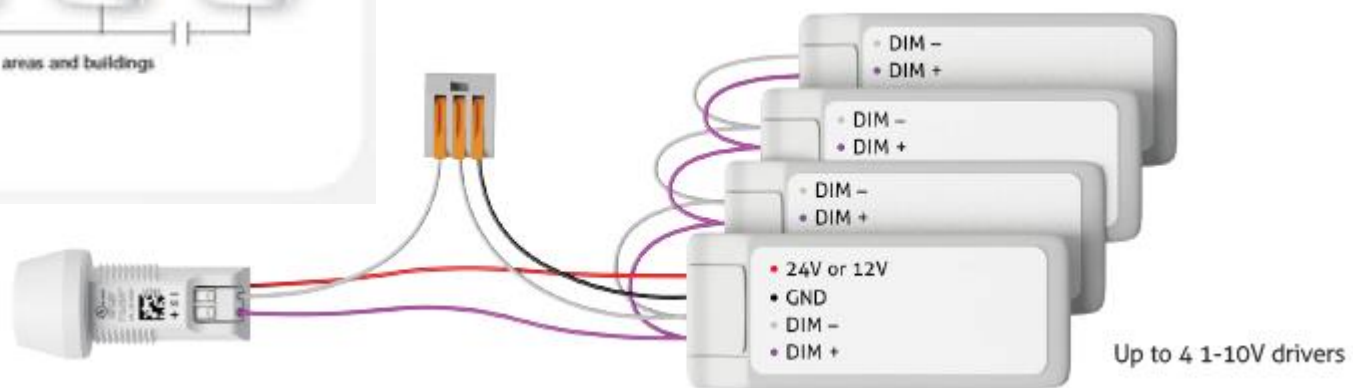


EnOcean controller 'CTL-ENOC-EU' (868 MHz)

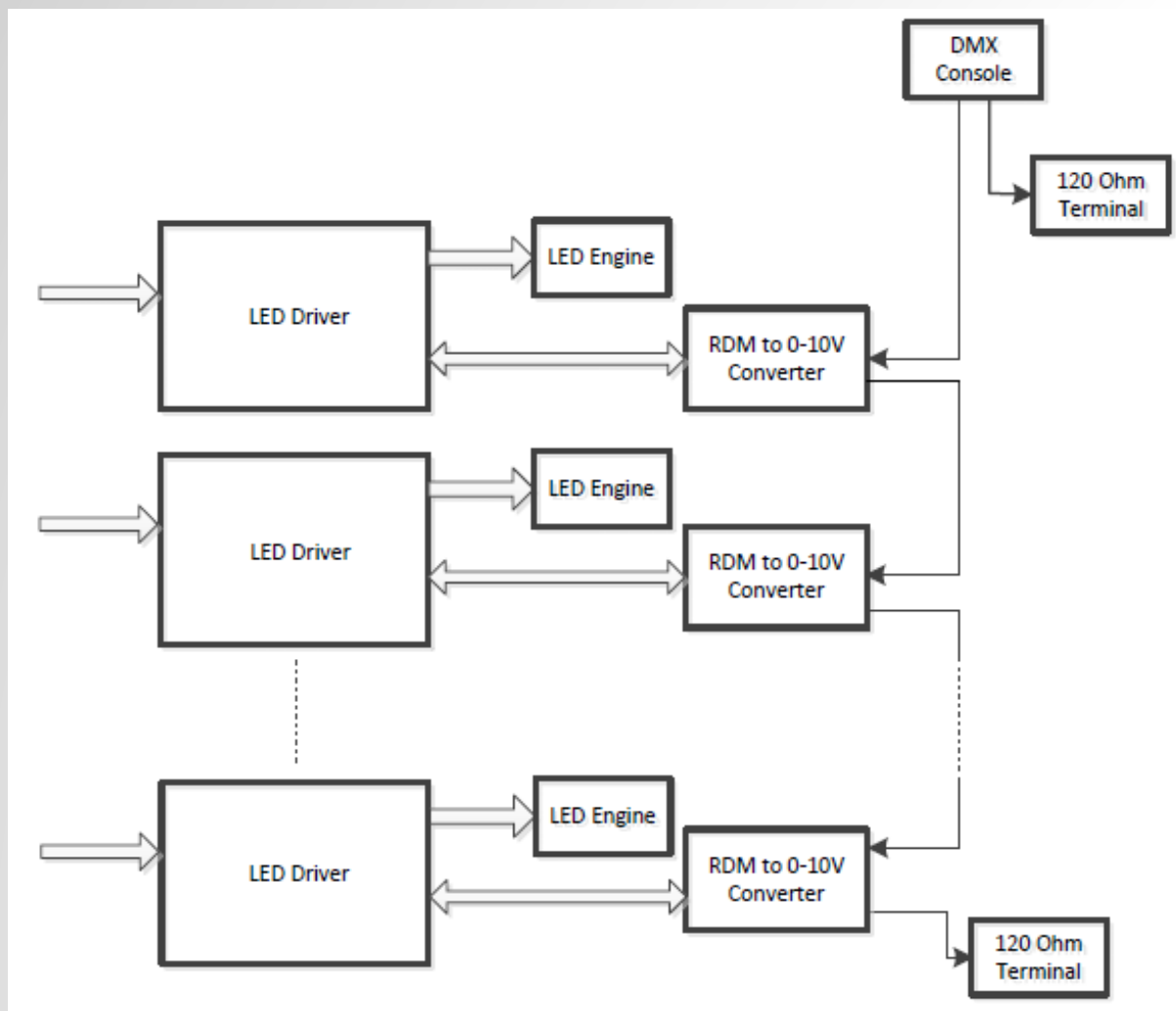


INVENTRONICS
英飞特电子

Nedap's IoT node







Inventronics' DMX (+ RDM) to 0-10V converter 'CNV-DMXR'

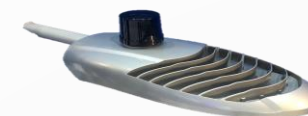
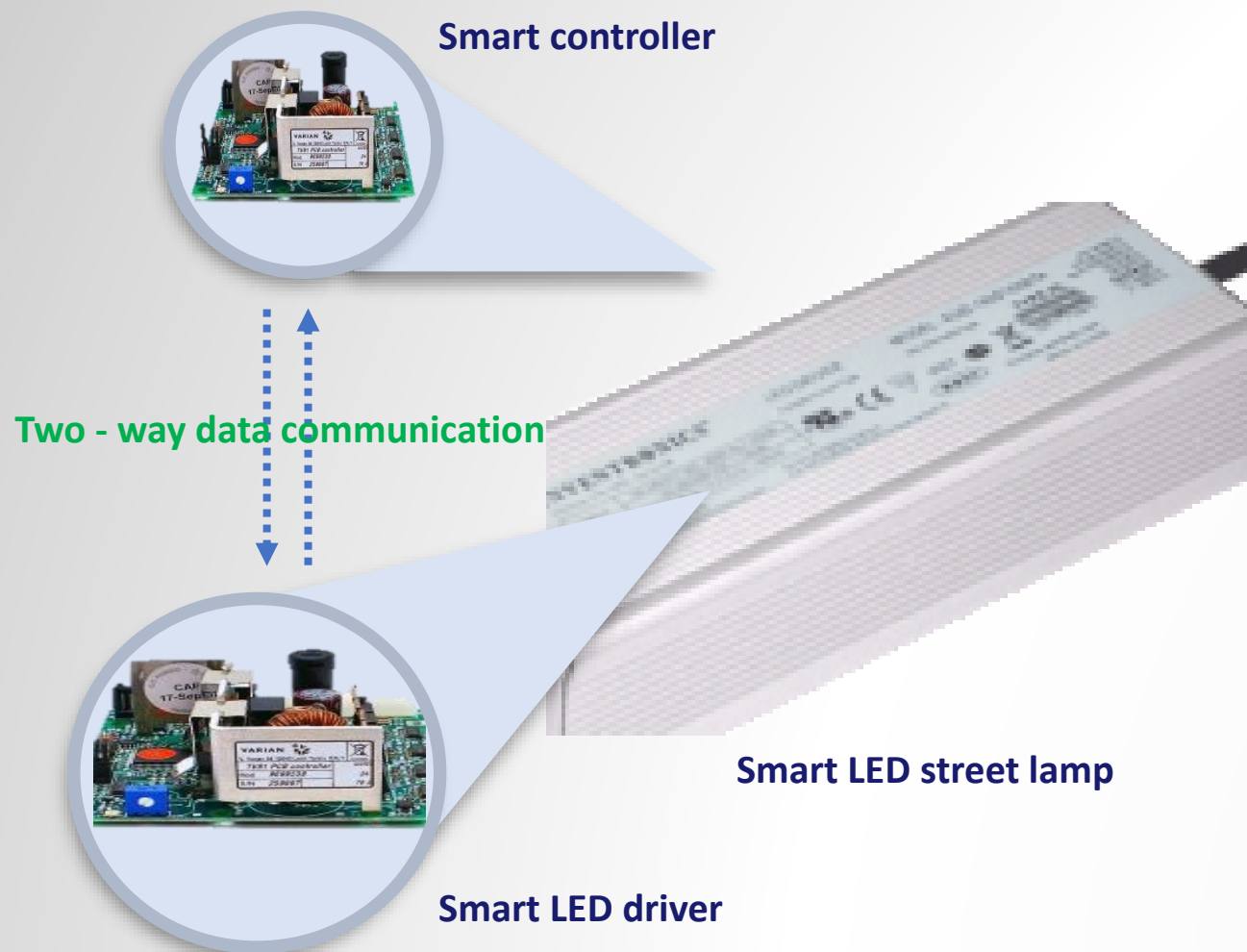




Outdoor Lighting Intelligent Control Solutions

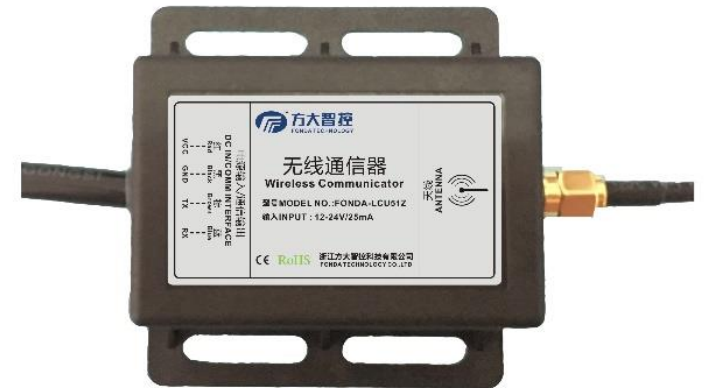
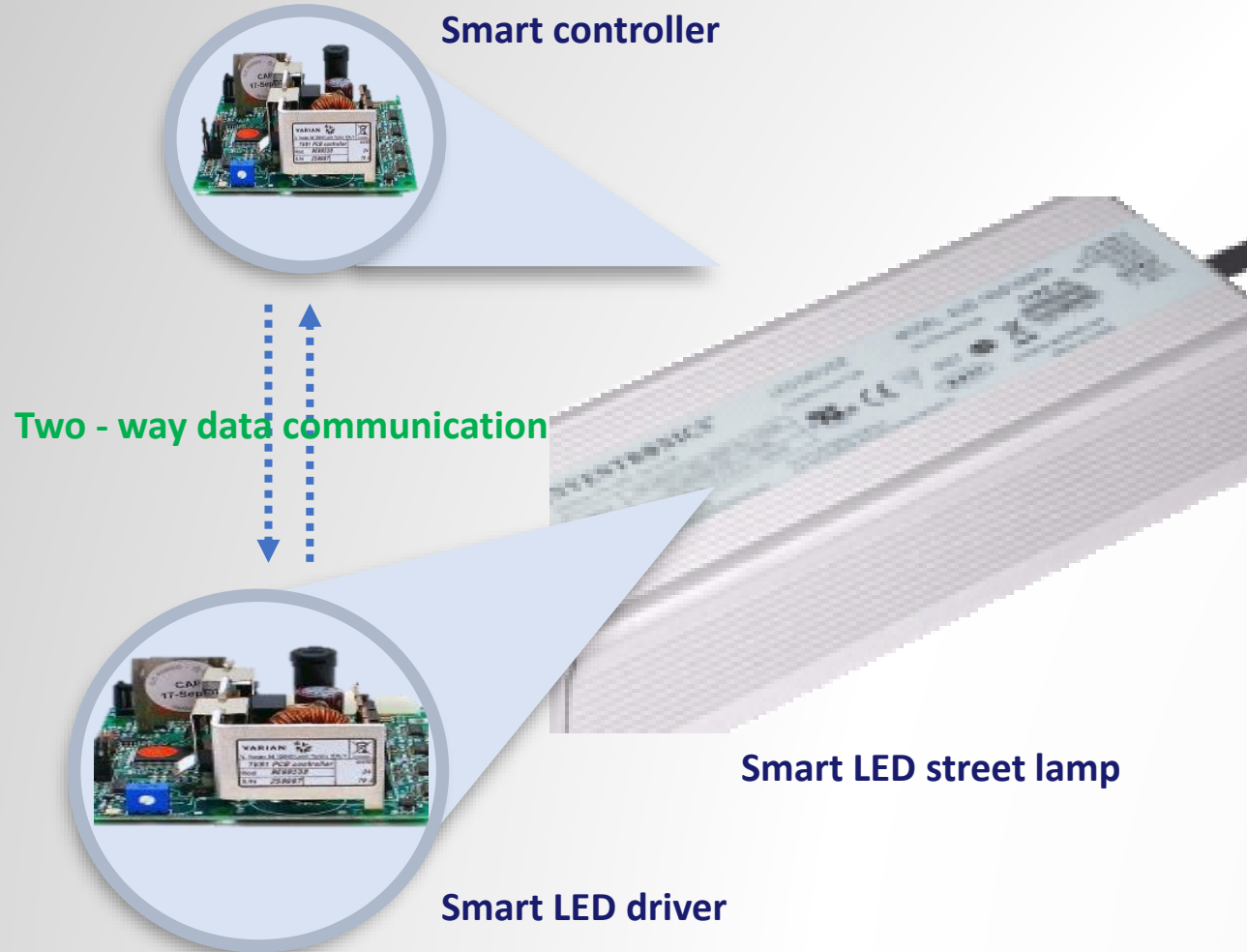
	PLC 	GPRS 	NB-IoT 	LoRa 
Frequency band	/	850/900/1800MHz	800/900/1800MHz	433/868/915MHz
Transmission distance	signal only can be transmitted within a range of distribution transformers	Unlimited	Unlimited	Unlimited
Transmission rate	5.5-20Kbps	115kbps	65kbps	0.2-37.5kbps
Advantage	High security, No need to set up a network, Data transfer convenient	High security, Anti-interference ability, Access time is short, High transmission rate, low power consumption, Low maintenance costs	High security, Anti-interference ability super, Strong links, high coverage, Wide area network, low power, Low maintenance costs	High security, Anti-interference ability, Wide area network, multi-node, Low power, low maintenance costs, free frequency band
Disadvantage	Anti-interference ability is weak, Transmission distance is limited, Maintenance costs are higher,	High power consumption, Data is easy to lose	Need pay the cost of the band	Low transmission rate

Esave' (www.esaveag.com) Street Lamp Controller 'SLC-DC'





Fonda's wireless communicator 'LCU51Z'



Contact Us

Inventronics (Hangzhou), Inc.

+86-571-56565800

sales@inventronics-co.com

India Office

+91-98-2154-2220

in-sales@inventronics-co.com

Inventronics Europe B.V.

+31-857-470-061

eu-sales@inventronics-intl.com

Japan Office

+81-3-5403-5974

jp-sales@inventronics-co.com

Inventronics USA

+1-405-600-7480

usa-sales@inventronics-co.com

Asia-Pacific Office

+65-9848-2413

sales@inventronics-co.com

