

# IoT DAYLIGHTING INTEGRATION BUILDING MANAGEMENT

## Disruptive Innovation

Standby zero with advanced interaction dimming for building managements system  
Tangible benefits for Reliability, Maintain free, Wire free, easy sensor's access by IoT

**Absolute standby zero with individual daylighting dimmer for  
succinct building lighting control system**

# SPECIAL CONSIDERATIONS

**Standby power**, also called **vampire power**, **vampire draw**, **phantom load**, or **leaking electricity** ("phantom load" and "**leaking electricity**" are defined technical terms with other meanings, adopted for this different purpose), refers to the **electric power** consumed by electronic and electrical appliances while they are switched off (but are designed to draw some power) or in a **standby mode**. This only occurs because some devices claimed to be "switched off" on the electronic interface, but are in a different state from switching off from the plug, or disconnecting from the plug, which can solve the problem of standby power completely. In fact, switching off at the plug is effective enough, there is no need to disconnect all devices from the plug. Some such devices offer **remote controls** and **digital clock** features to the user, while other devices, such as **power adapters** for disconnected electronic devices, consume power without offering any features (sometimes called **no-load power**). All of the above examples, such as the remote control, digital clock functions and, in the case of adapters, no-load power, are switched off just by switching off at the plug. However, for some devices with built-in internal battery, such as the phone, the standby functions can be stopped by removing the battery instead. In the past standby power was largely a non-issue for users, electricity providers, manufacturers, and government regulators. In the first decade of the twenty-first century awareness of the issue grew and it became an important consideration for all parties. Up to the middle of the decade, standby power was often several watts or even tens of watts per appliance. By 2010 regulations were in place in most developed countries restricting standby power of devices sold to one watt (and half that from 2013).

The **One Watt Initiative** was launched by the **IEA** in 1999 to ensure through international cooperation that by 2010 all new appliances sold in the world only use one watt in standby mode. This would reduce CO<sub>2</sub> emissions by 50 million tons in the OECD countries alone by 2010.

In July 2001 **U.S. President George W. Bush** signed an **Executive Order** directing federal agencies to "purchase products that use no more than one watt in their standby power consuming mode".<sup>[12]</sup>

In July 2007 California's 2005 appliance standards came into effect, limiting external power supply standby power to 0.5 watts.<sup>[13]</sup>

On 6 January 2010 the **European Commission** (EC) Regulation No 1275/2008 came into force. The regulations mandate that from 6 January 2010 "off mode" and standby power for electrical and electronic household and office equipment shall not exceed 1W, "standby plus" power (providing information or status display in addition to possible reactivation function) shall not exceed 2W. Equipment must where appropriate provide off mode and/or standby mode when the equipment is connected to the mains power source. These figures were halved on 6 January 2013.<sup>[14]</sup>

# MORE...

Now a day, realization of building management needs to daylight energy reduce and the some of sensing by low costs network system with substitution mechanical power switch for standby zero supports.

FIDES-Dimmer are only one of solution of efficiency by full of requirements building managements system. Such as mechanical switches substitution to epoch-making novel standby zero circuits theory with flicker free constant voltage drive dimming technology employed.

This technology can provide ideally makes very good cost effect an flicker free dimming with no data wire and AC switch for LED luminaire.

## **Operational Benefits**

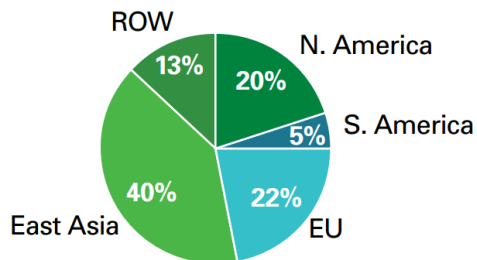
When a general lighting system try to dimming by ambient sensor. So, it could not provide dimming pleasant environment. This is approached in different ways. The daylight dimming can interactively reaction at any vicinity lighting environments to individually. Accurate execution on price quotes, and on-time, precise billing with avoid the blackout.

In addition to standby zero efficiency benefits are killed all data lines and switches to makes a saving install fees. With the just plugging AC line installations makes easy to old building transformation to energy efficiency Building Automation System building.

ARRA Section 1605 establishes requirements for federal government projects funded with stimulus monies: "None of the funds appropriated or otherwise made available by [the ARRA] may be used for a project for the construction, alteration, maintenance, or repair of a public building or public work unless all of the iron, steel, and manufactured goods used in the project are produced in the United States." Iron and steel used as components or subcomponents of other manufactured construction materials do not need to be produced in the United States. There is no requirement that components and subcomponents be U.S.-origin provided the manufactured construction material is "produced in the United States." (FAR 25.001(c)(4)) Section 1605 does not contain a domestic cost requirement. However, the government has not defined "produced" for purposes of the ARRA Buy American provision. Many commentators have adopted the "substantial transformation" test to determine whether a manufactured article is "produced" in the United States for purposes of Section 1605. Section 1605 contains a requirement that the Buy American provision be applied in a manner consistent with U.S. obligations under international agreements. As a result, national treatment is extended to products from countries with which the United States has entered a free trade agreement (e.g., Canada, Mexico, Bahrain, Chile, etc.) and to products from countries that have signed the WTO Government Procurement Agreement. National treatment is also extended to least developed countries (LDCs) (e.g., Bhutan, Mali, Zambia, etc.) but not to Caribbean basin countries (e.g., Belize, Haiti, Bahamas, etc.)

# Share of LED lighting market

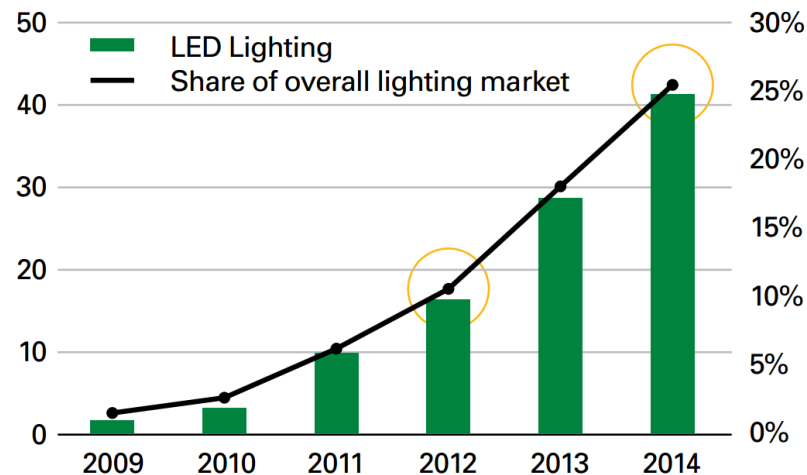
Market Share by Region, 2010



- Global LED Lighting market to reach \$16.5B in 2012, 11.3% share of total lighting
- 60% Comm, 25% Resdl, 15% Indl/Instl
- Key luminaire drivers: traffic lights, roadways, parking lots, and other outdoors

LED share of lighting market to exceed 25% by 2014

LED Lighting Market Value, 2009–2014 (US\$B)



The first LED lamps were introduced in the late 1990s. Since then, the unit costs have been steadily declining by double-digit percentages, making LED lighting technology viable for commercial, industrial and outdoor lighting applications. In addition, large strides have been made in improving the efficiency, lumen output and performance of LED lights. The global LED lighting market is estimated to be \$16B in 2012 and expected to reach nearly \$40B by 2014 (Figure 1). The US market CAGR for commercial and outdoor LED lighting alone is expected to grow 26-30% through 2016.



# FIDES BUILDING MANAGEMENT SYSTEM



Energy Administration



Building Equipment  
Integration



Zone Control



User Friendly Interface



Remote Control and  
Alarm, SMS



(BACnet, LonWorks, Modbus, OPC)  
Open Protocol Support

# Why Lighting is an Energy Issue

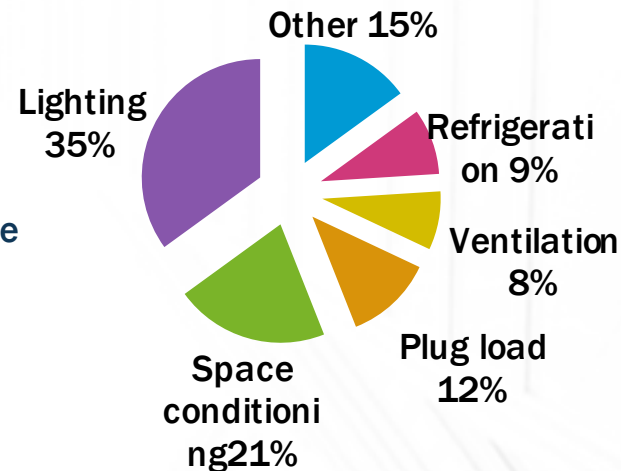
Lighting in all segments (residential, commercial, industrial, and outdoor) consumes almost 25% of the energy in the built environment, internationally. <sup>1</sup>

This energy is expended both in the electricity necessary to illuminate a given lightbulb, but also in cooling costs needed to counteract the heat produced by lighting fixtures. In fact, the heat produced by lighting alone contributes to 42% of the cooling load in U.S. buildings. <sup>2</sup>

The energy used by lighting amounts to 1.2 Terawatts (equivalent to 1,200 Gigawatts or 1,200,000 Megawatts), 112 full-sized power plants, and 1.9 billion tons of annual carbon emissions. <sup>3</sup>

If LEDs made up 45% of the world's lighting supply by 2020, we would forgo 5 trillion kWh of electricity, 559 full-sized power plants, and 8.4 billion tons of carbon emissions. <sup>4</sup>

U.S Commercial building electricity use



1 <http://www.undp.org.cn/projects/00062179.pdf>

2 U.S. Department of Energy Buildings Energy Data Book, Sept. 2008

3 Based on United States Energy Information Administration estimates.

4 Ibid.

# Power Consumption of BMS :

Only FIDES Standby zero, Daylight dimming attuned to demand in IEC62301 and green building.



**STANDBY POWER**  
**0.5MW/Years**

0.007%



**67% SAVE More...**

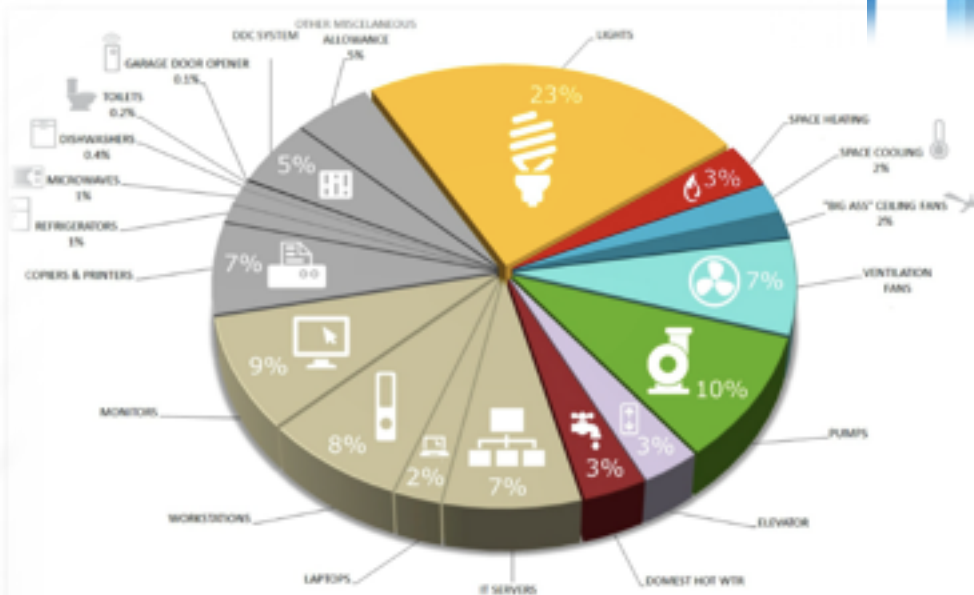


Figure 1: Bullitt Center - Energy Use



American Reconstruction and Reinvestment Act of 2009



# FIDES : STANDBY Energy Saving

## STANDBY POWER MEASUREMENT RESULTS

12W LOAD	120V	220V
STANDBY	0.027W	0.027W
ON(LOAD)	12W	12W

200W LOAD	120V	220V
STANDBY	0.027W	0.027W
ON(LOAD)	200W	200W

Any load power participate are same for stand by power keep in under the 0.027W, during the first initializing plugged to AC line for few seconds to a few watts to charging for super capacitor. After it's only allowed leakage currents in traic switching driver circuits.

Power Consumption\*1 - When the power is off: Any load equipment approximately 100V at 0.027 W \*1\*2\*3 / At 220V approx 0.03 W \*1\*2

\*1: Power consumption not varies. depending on the input voltage environment.

\*2: Measured according to IEC 62301 Edition 2.0.

\*3: Even when the machine is turned off, it will automatically turn itself on periodically for re charging maintenance, and then turn itself off.

Example of standby power consumption : 1W/h standby power SMPS X 1K pcs in building = 1KW/h  
(Standby at 14h/day for year  $\approx$  0.5MW/years

Same condition at Fides standby power consumption = 138W/years (0.5MW electric energy save!)

\* IEC 62301 in large appliances manufacturers target <50 mW or '0.0W consumption'

# FIDES DIMMER Vs ORDINARY DIMMER

	DALI	RF WIRELESS	FIDES
COSTS	✘	▲	😊
INSTALLATION	✘	✘	😊
STANDBY ZERO	✘	✘	😊
ADVANCED INTERACTION DIMMING	✘	▲	😊
CONNECTIVITY	✘	😊	😊
POWER CONSUMPTION	✘	✘	😊
AC POWER MEASUREMENT	✘	😊	😊
SMART GRID	✘	😊	😊
MULTI-SENSOR	✘	😊	😊
WEB CONTROL	▲	😊	😊



VERY GOOD



NOT GOOD



BAD

# FIDES MERIT IS REAL INTERNET OF THINGS

FIDES BMS; disruption to ordinary BMS technologies chain.

	<b>Ordinary BMS system</b>	<b>FIDES BMS system</b>
IEC62031 Standby Zero	Not supports	Patent Technology
Individual dimmer	High Price	Good Price(Patent Pending)
Wire	Complicate	Just Plug AC Line
Temp, Humidity, Ambient	Option	Integrated
AC Power Line measure	Option	Integrated
Luminaire connection Limit	Limit	Unlimited
Fire alarm, Occupy Sensor	Option	Option(Just Plug in AP)
Management Software	Option	Default

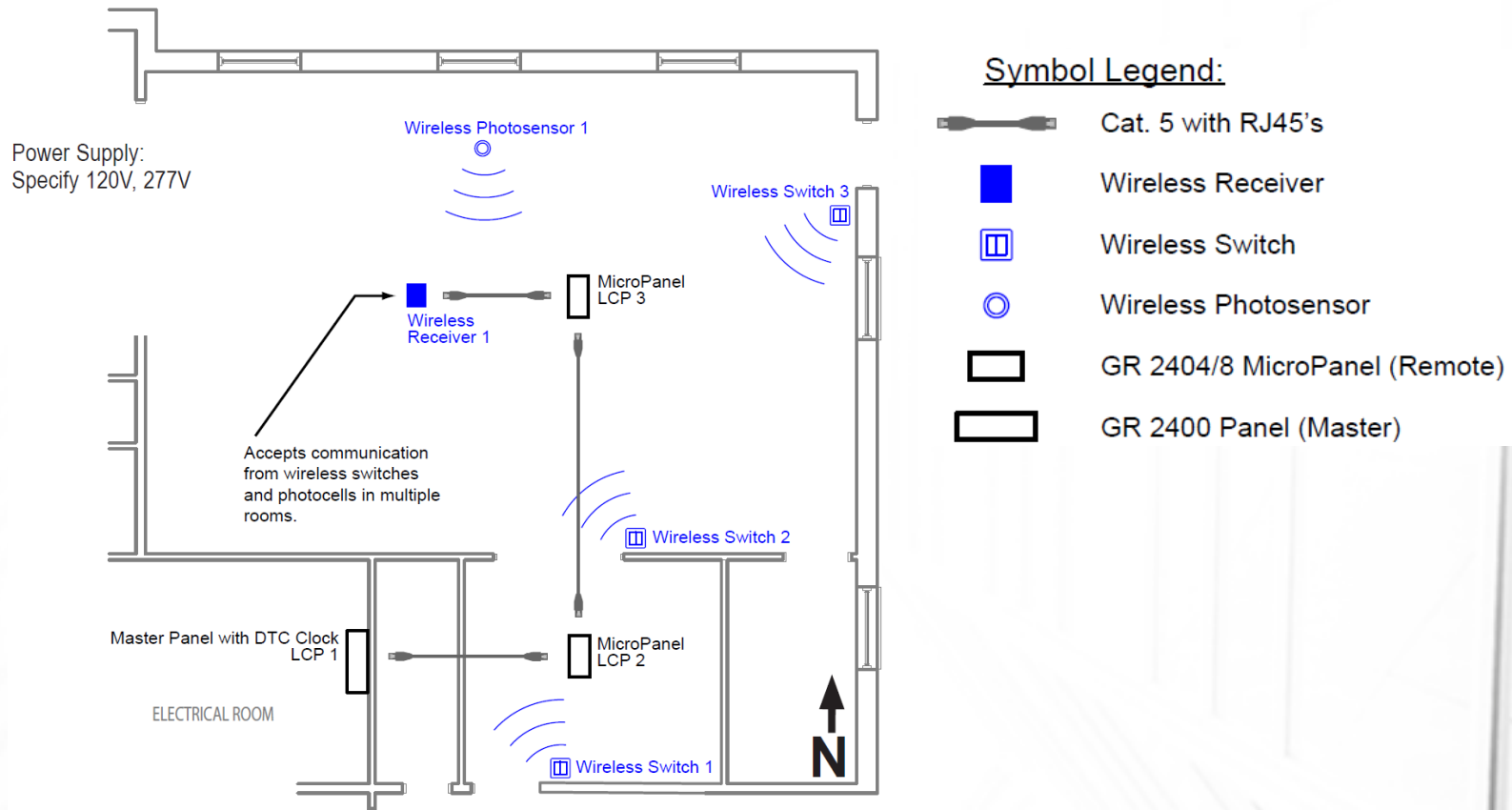
\* For more information refer to FIDES\_ADSZ data sheet manual.

# FIDES-BMS merit are just one day to green building transformation

Any old building can be energy efficiency sustainable green building to no reconstruction.  
**JUST SWAP TO FIDES LED LIGHTING FIXTURE!**

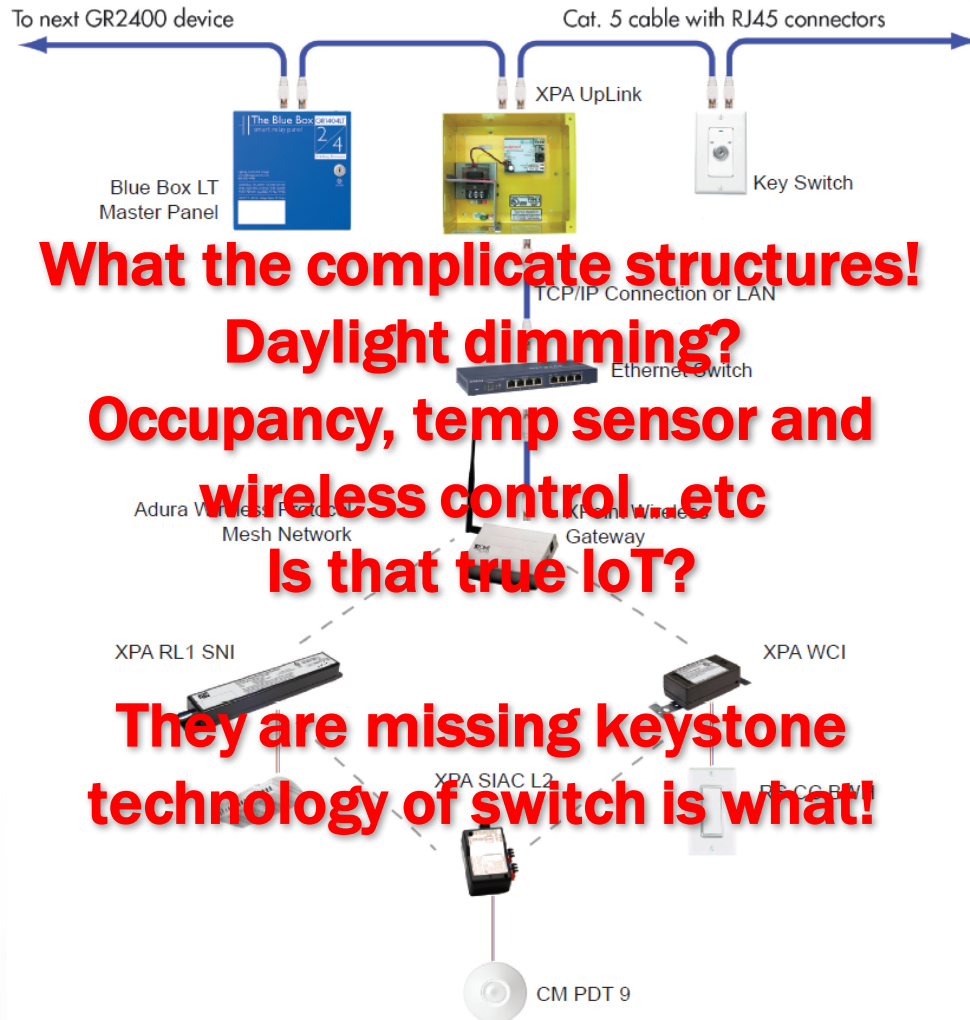


# REALLY IT'S MORDEN BMS TECHNOLOGY?



**Too many data line and each device power supply problems!**

# Beyond the BMS is IoT technology?

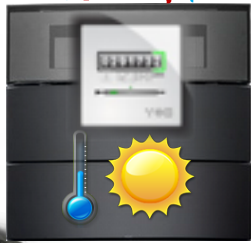


# FIDES-BMS ARCHITECTURE SUCCINCT GRID NETWORKS



AC100~230V

DJ03AB



Wireless Daisy chain



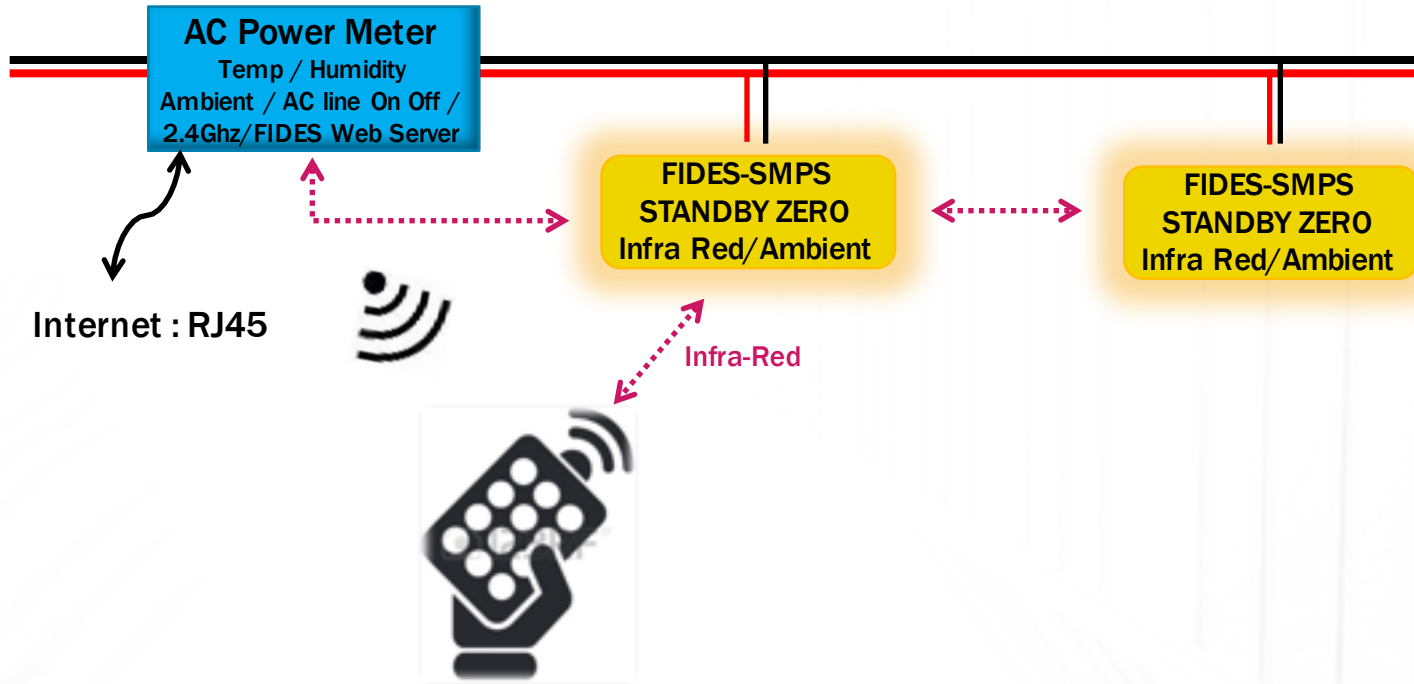
DJ04,5/DJ02



Sustainable buildings



# FIDES wiring and controls

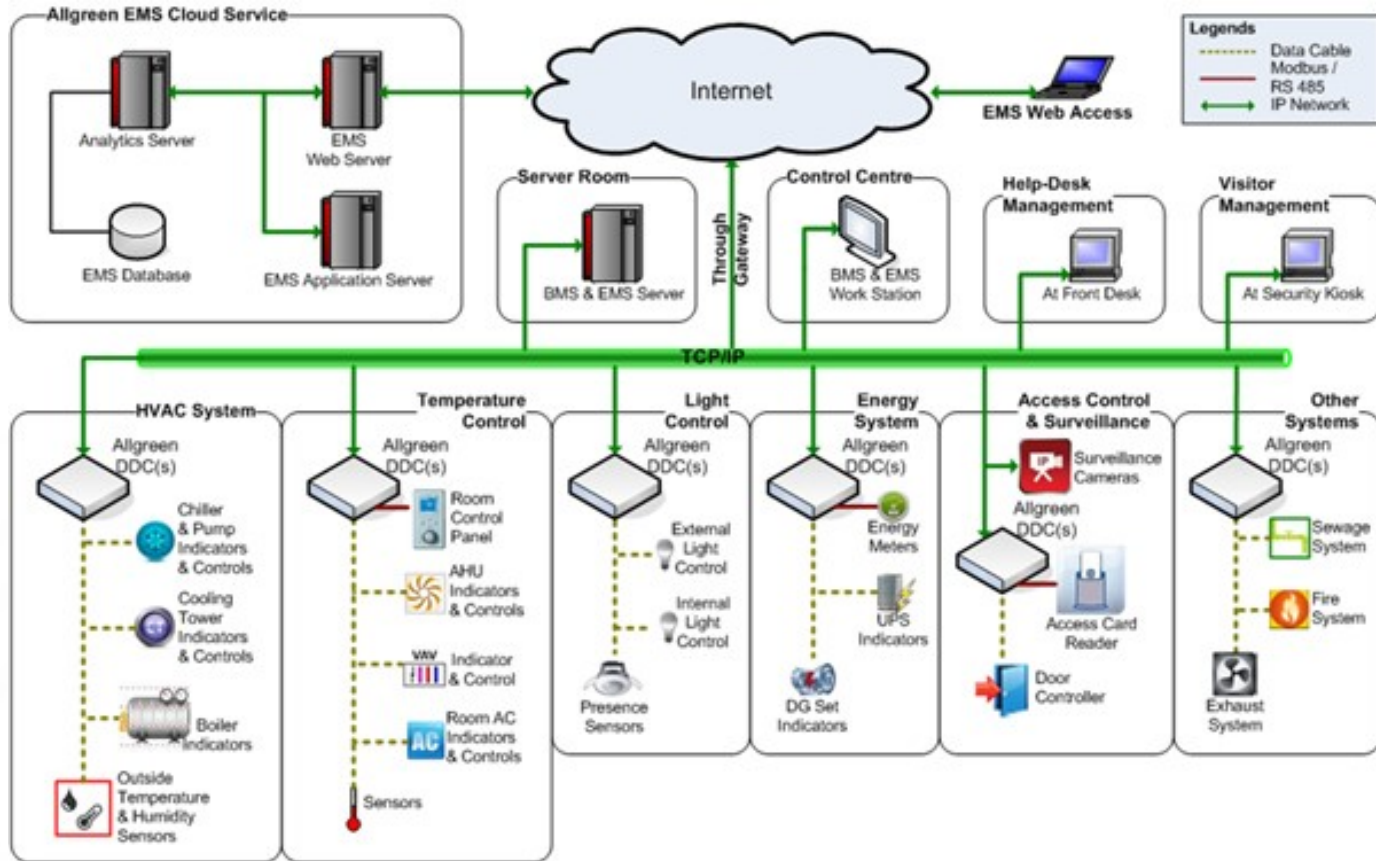


Fides are individual daylighting sensor with absolute standby zero(27mW) support.  
**Only one day works** to transformation of old building to modern energy efficiency green building





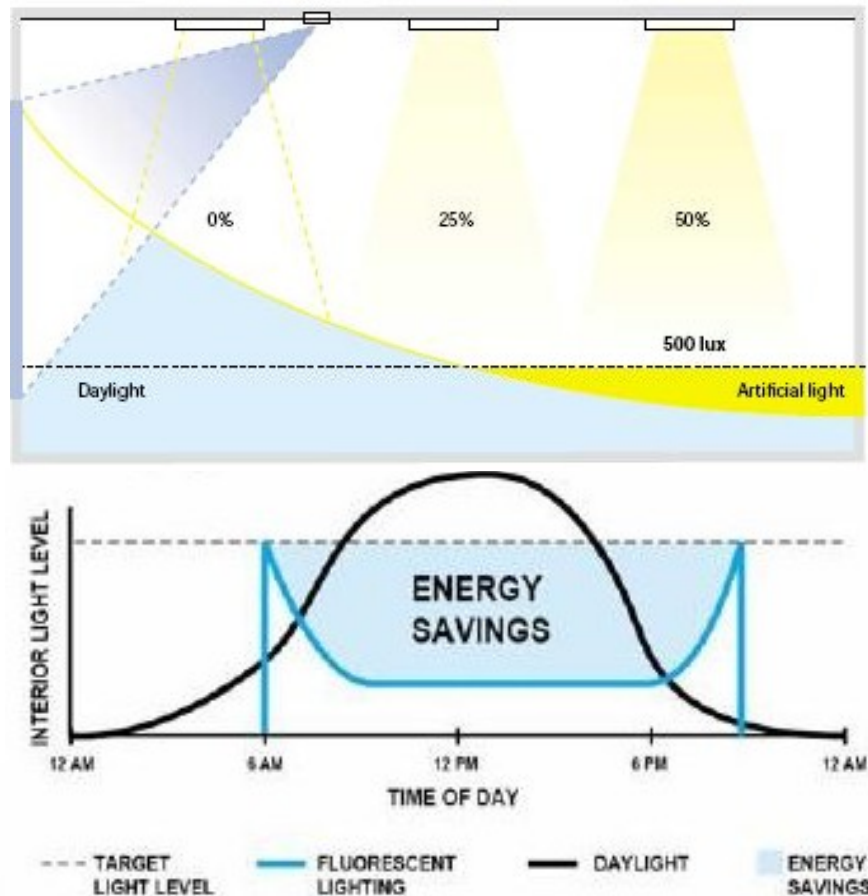
# TYPICAL BMS ARCHITECTURE



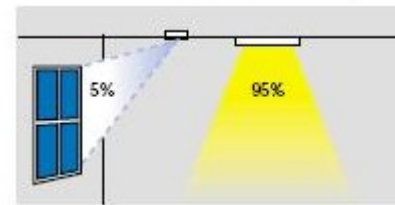
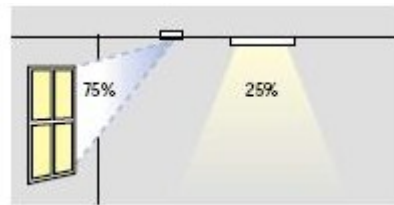
Too much complicate!

# FIDES : Energy Saving

## Daylight Individual Interaction Dimming

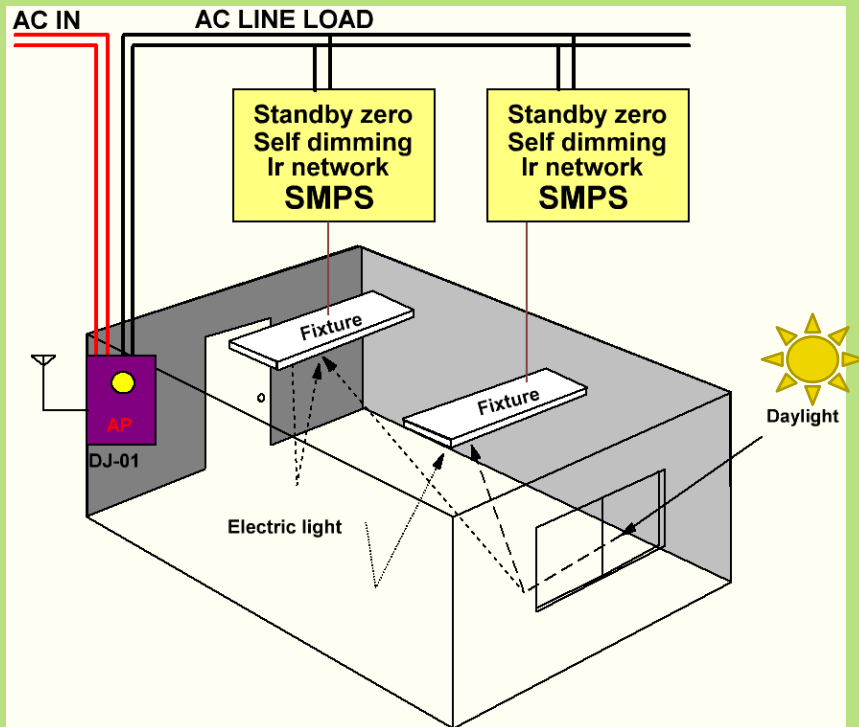


# Daylight dimming



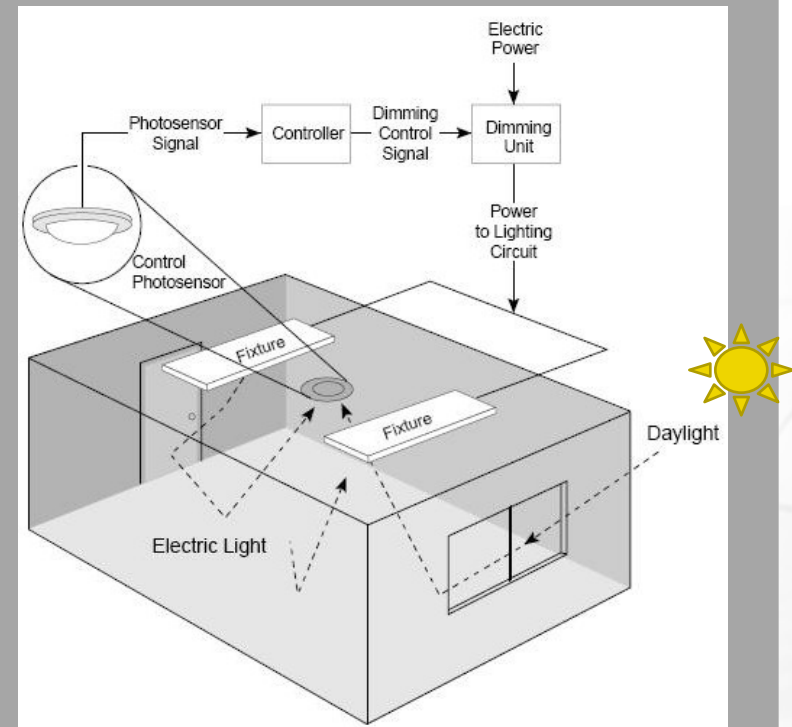
**A daylight harvesting system decreases electric light contribution as the daylight contribution increases. Courtesy of Leviton.**

# Building management winner!



## All in One Supports :

- IEC62301 Standby zero(Patent 0.03W/h)
- IEC62053-21 AC Power measurement
- Temp/Humidity/Ambient sense
- Full flicker free individual dimming
- Wire Free IrDA/2.4Ghz Smart Grid Network
- 10 years Limited Warranty

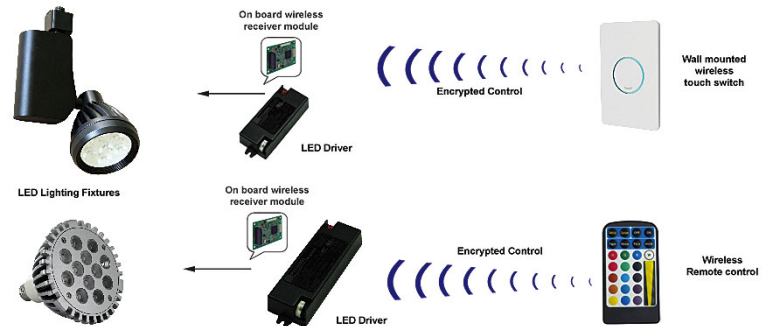
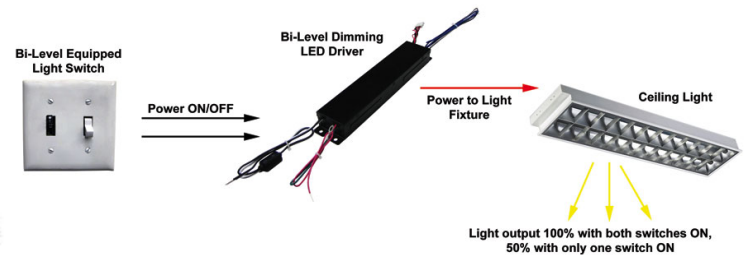
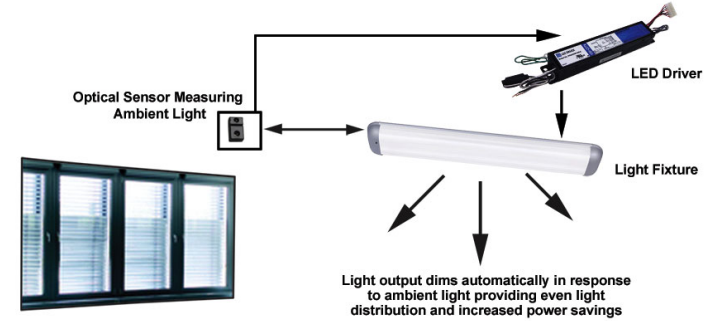
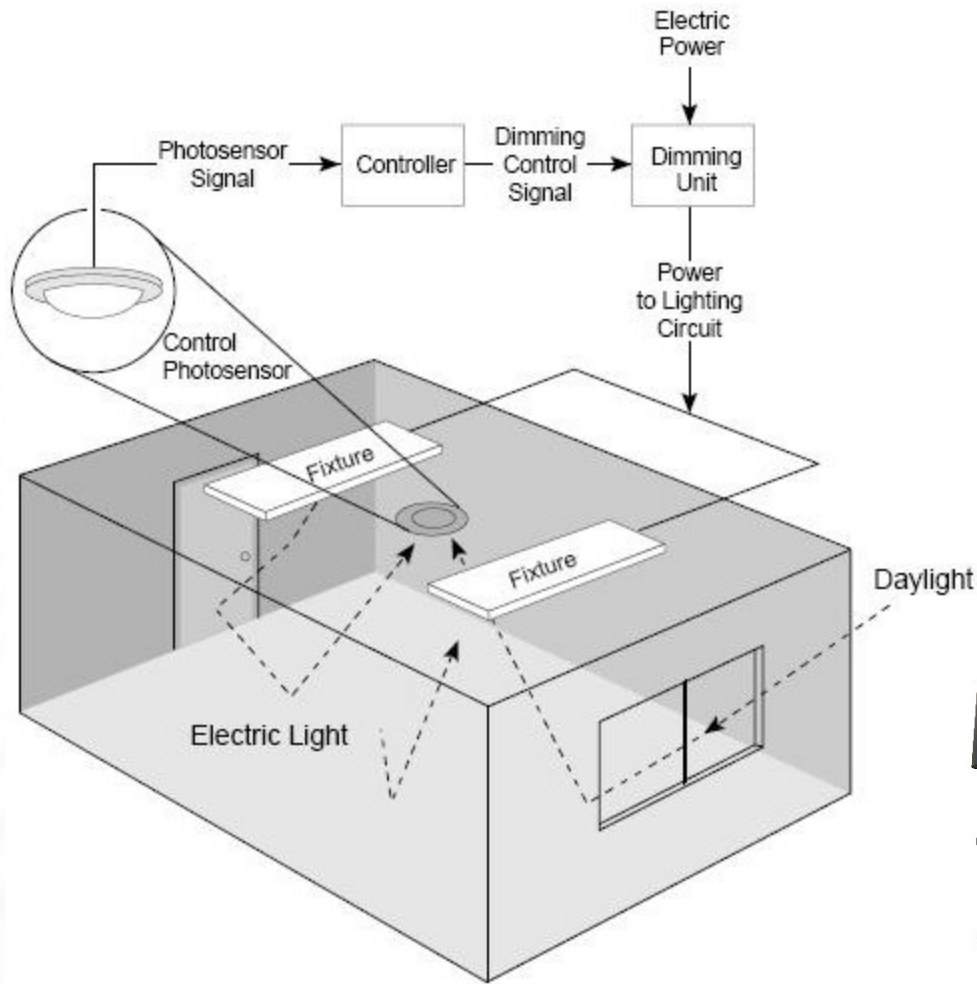


## Typical daylight system

### Not support :

- IEC62301 Standby zero not support
- IEC62053-21 AC Power measurement
- Temp/Humidity sense
- Full flicker free individual dimming
- No 10year warranty

# Typical daylight harvesting control system.



Courtesy of Lawrence Berkeley National Laboratory.

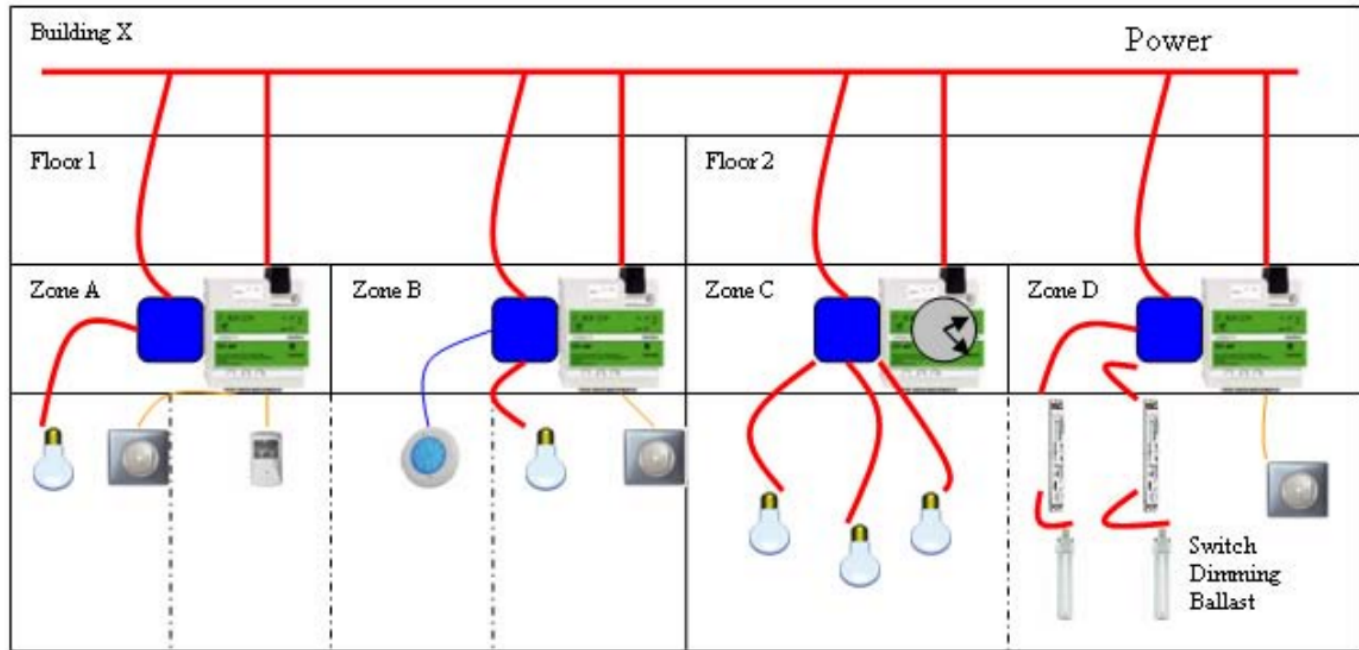
# Competitors typical daylight zone control system.

Lighting Service

Lighting Plant

Lighting Zone

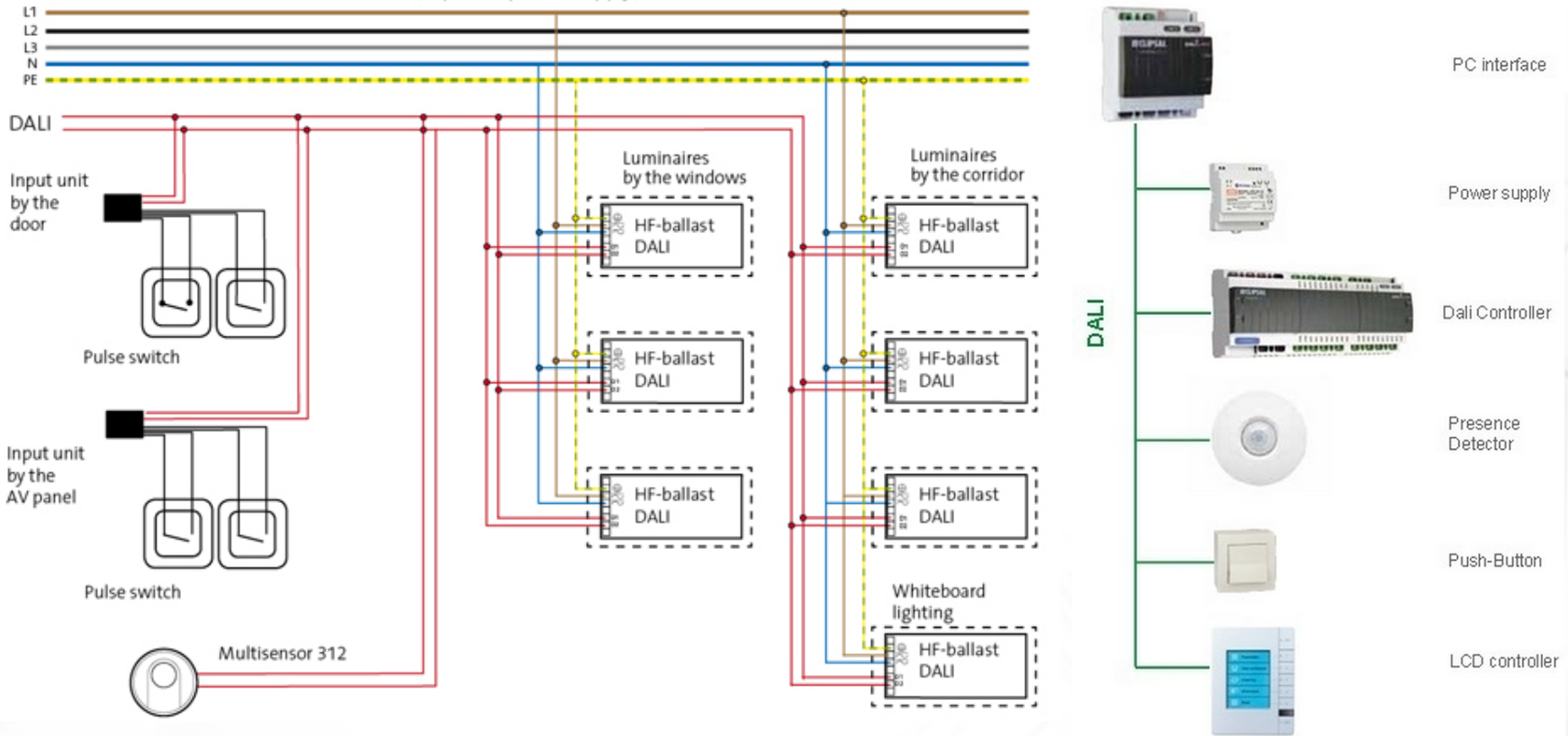
Lighting Device



Legend

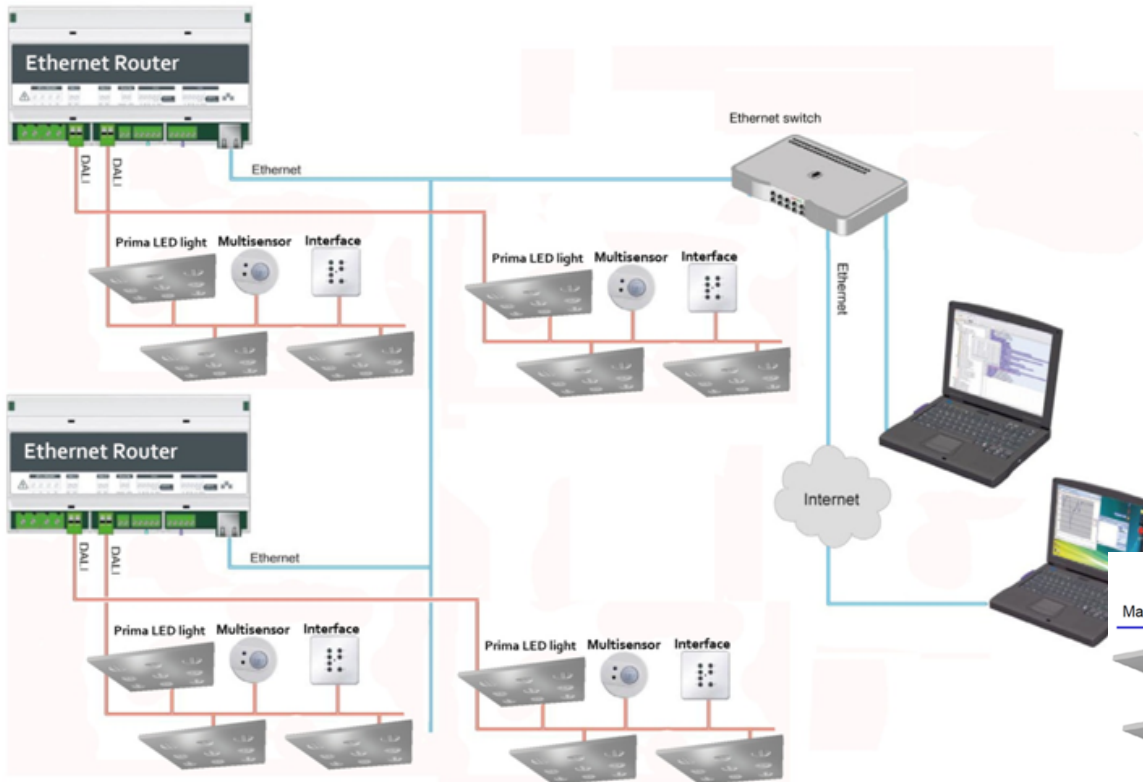


# DALI dimming wire connection



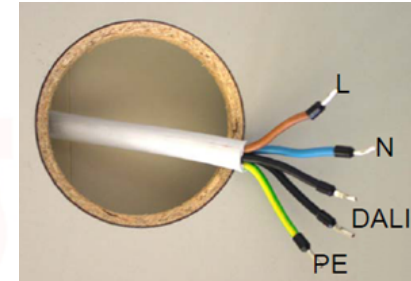


# DALI BUS WIRE



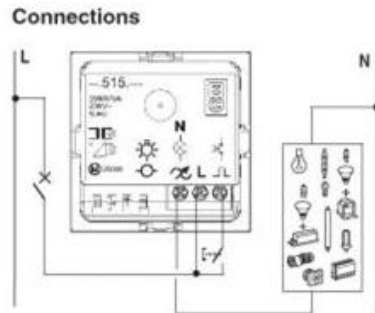
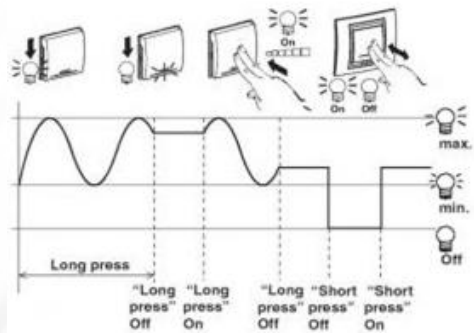
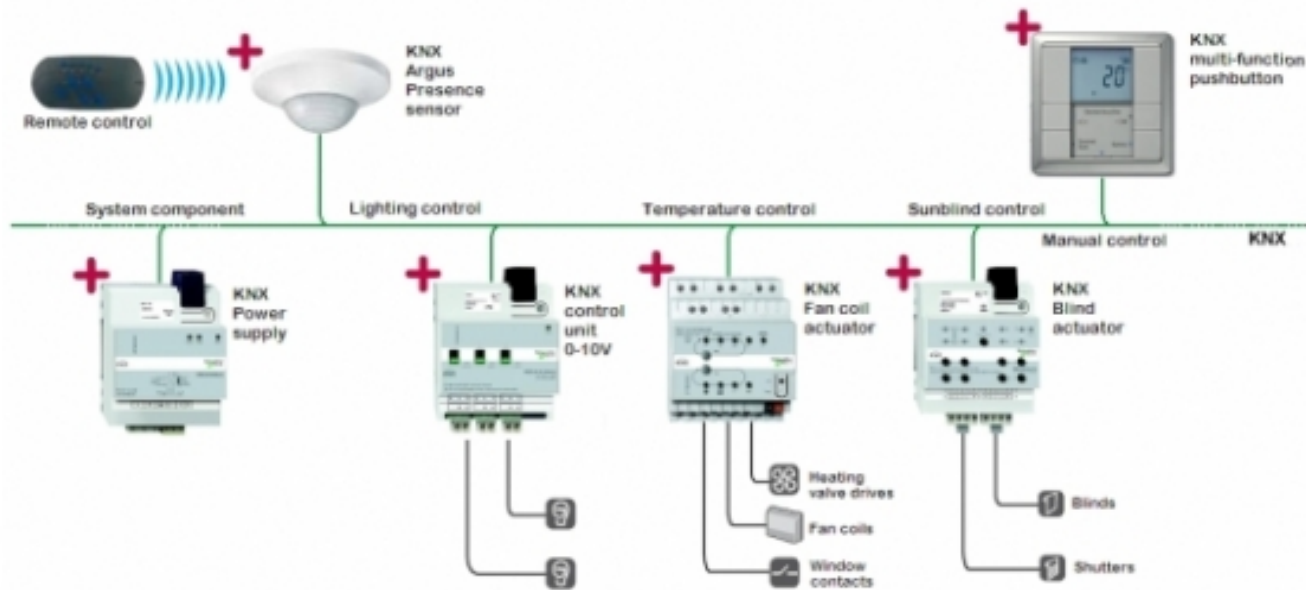
Picture 3: Large DALI system with DALI routers

Too much complicate and expensive with no efficiency energy saving architecture system



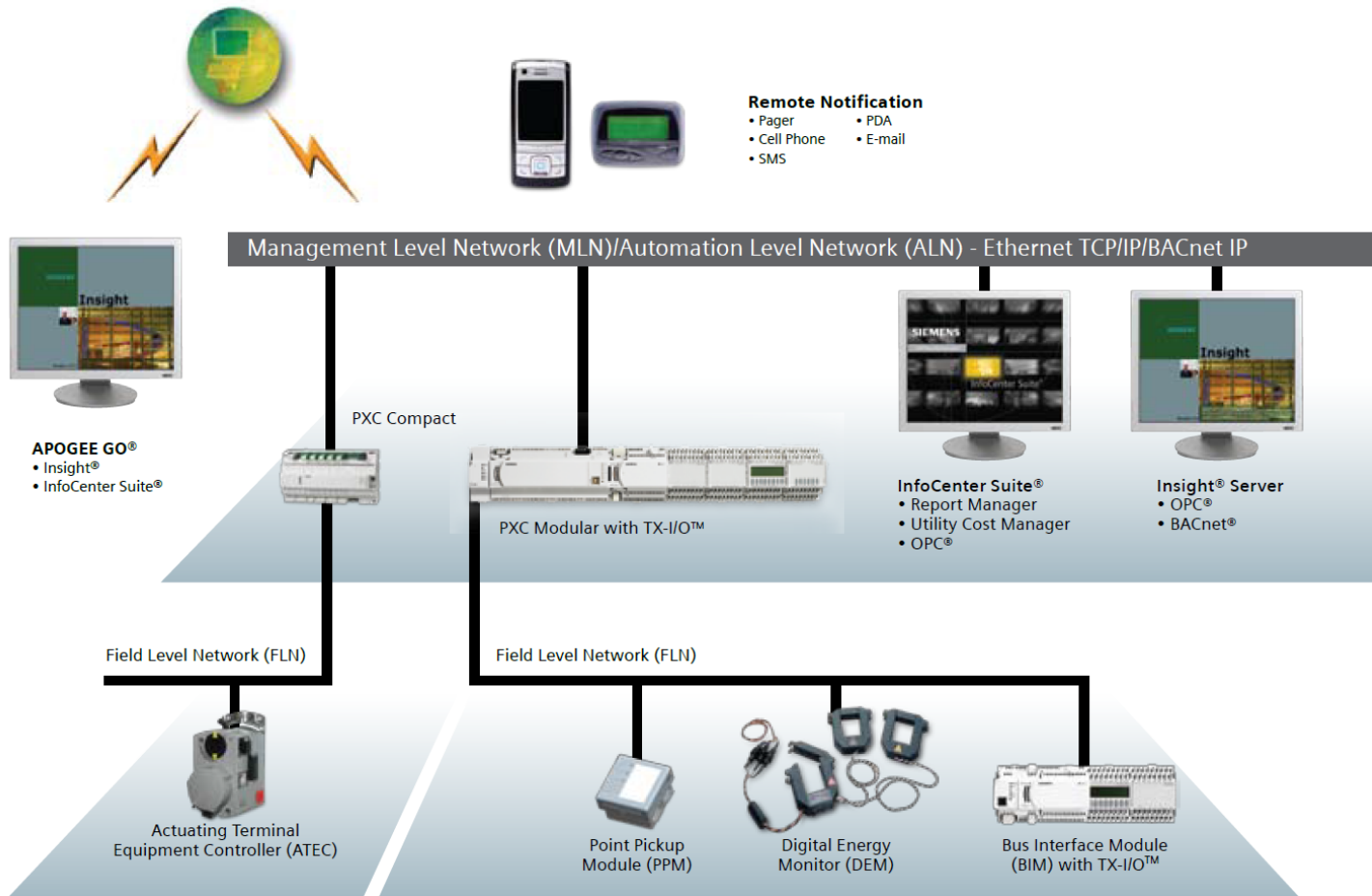
Picture 2: Standalone DALI system

# KNX BMS SOLUTION ARCHITECTURE

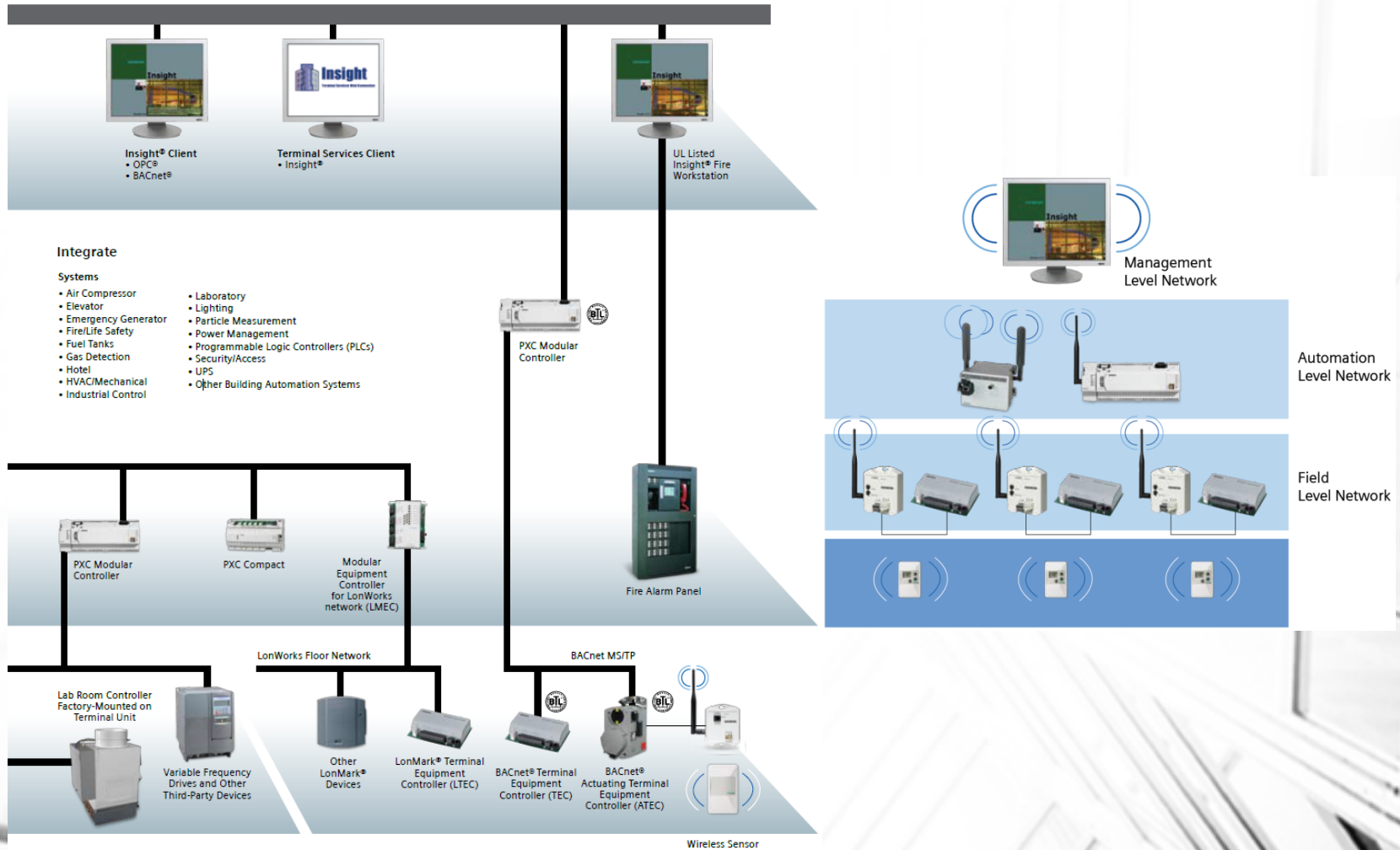


Wall box dimmers allow reduction of energy spent for lighting. Instead of having light only ON or OFF, light level can be adjusted to needed level. Dimming your light level just 25%, saves 20% in energy.

# SIMENS APOGEE BUILDING AUTOMATION



# SIEMENS APOGEE



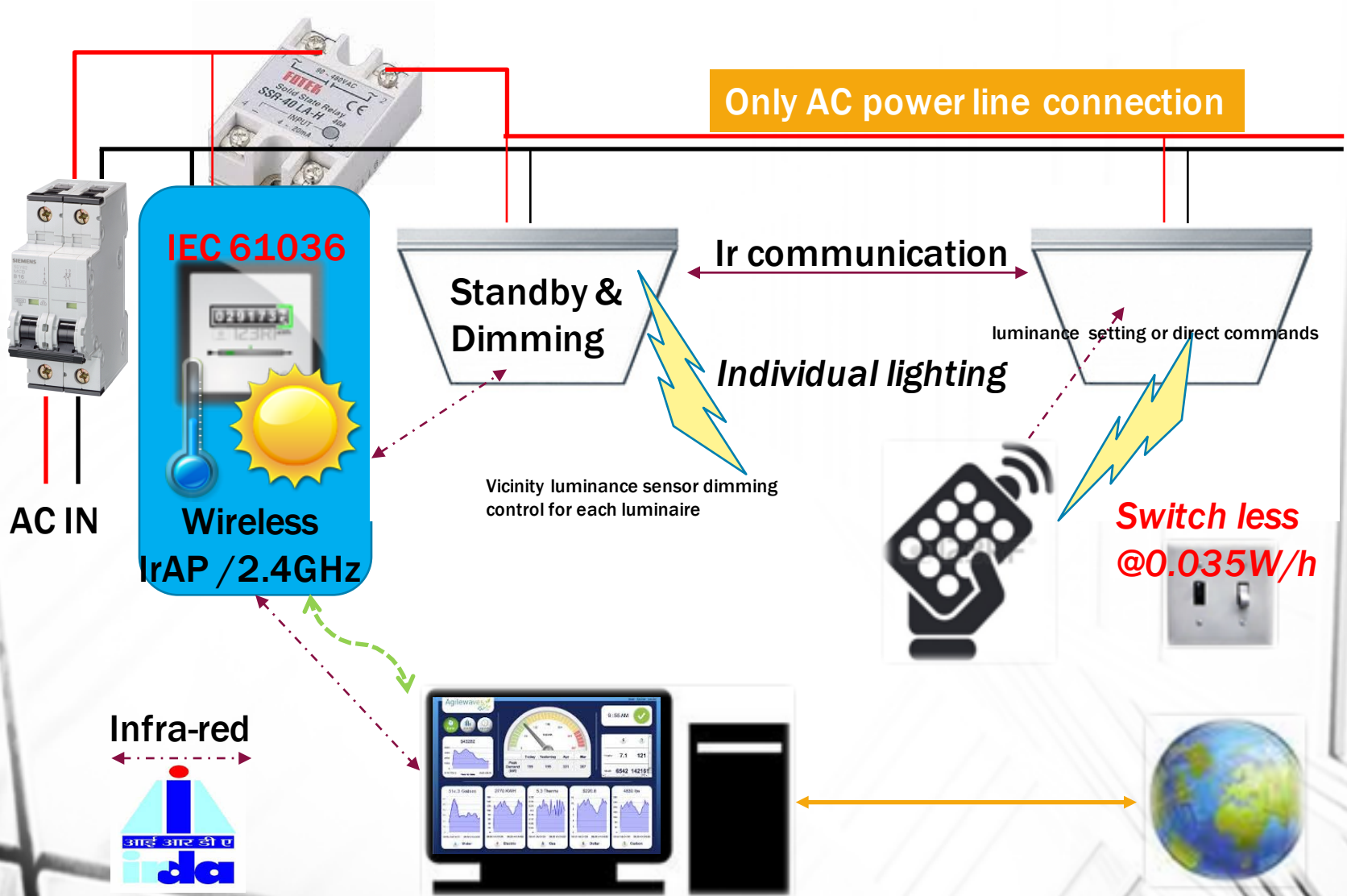
# SWOT ANALYSIS OF BMS ARCHITECTURE

(The SWOT analysis is a strategic planning method used to evaluate the Strengths, Weaknesses, Opportunities, and Threats of elements or strategies)

Architecture	Costs	Flexibility	Easy to install	Mixing with BMS	Visual performance and comfort	Sensor and measurement	Standby zero supports
Plant Control	Intermediate	Intermediate	Easy	Possible	Low	Option	No
Zone Control	Intermediate	Intermediate	Low	Easy easy	Intermediate	Option	No
Wiring Device Control	Low	Low	Easy	Difficult	Intermediate	Option	No
Embedded Fixture Control	High	High	No expert is needed	Easy	High	Option	NO
Fides-BMS	Very low	Very high	Quite easy	Quite easy	Very High	Integrated	Yes

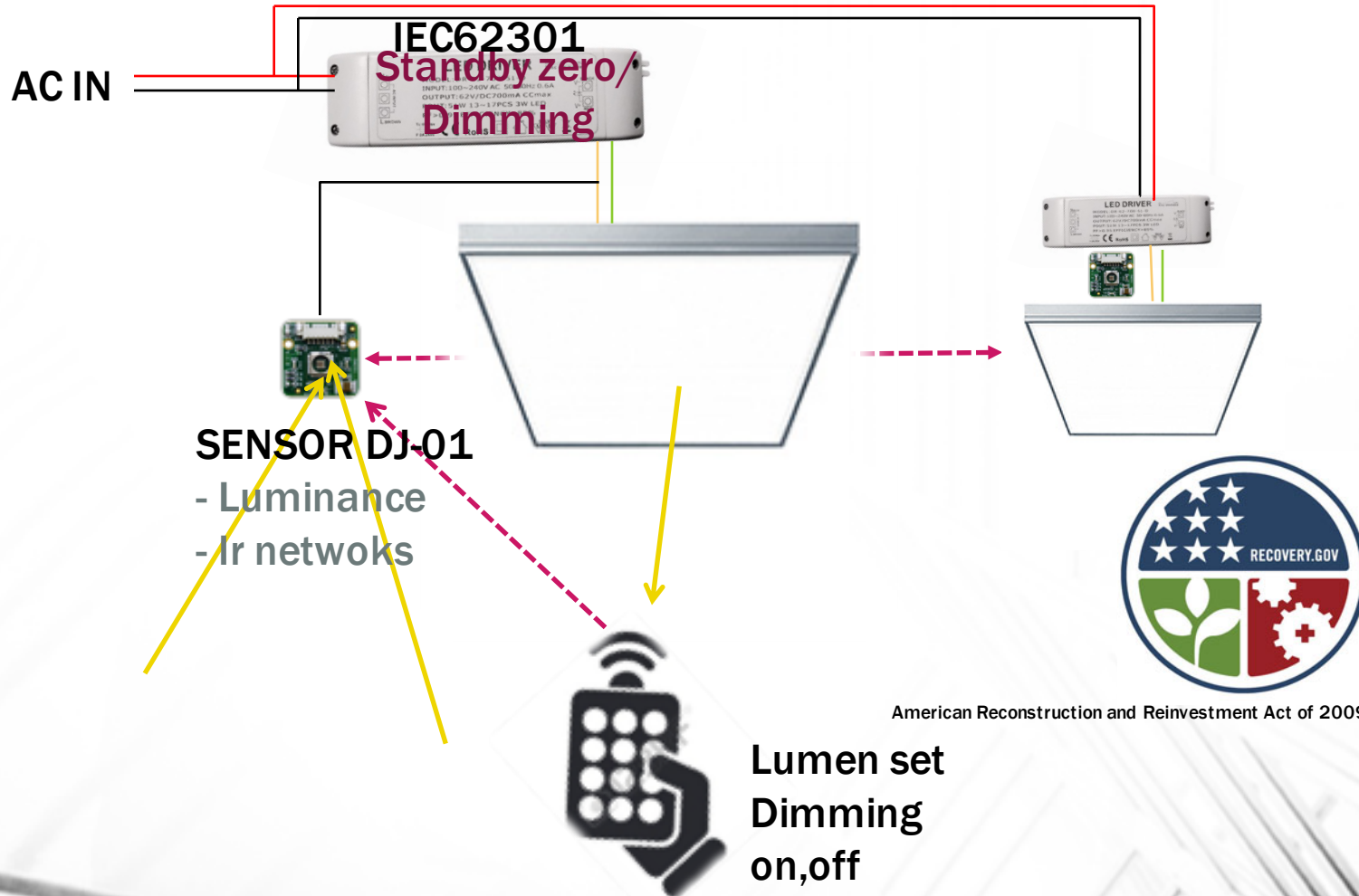
**FIDES-BMS system are No wire, No switch with absolute standby zero supports.**

# FIDES dimming wire connection

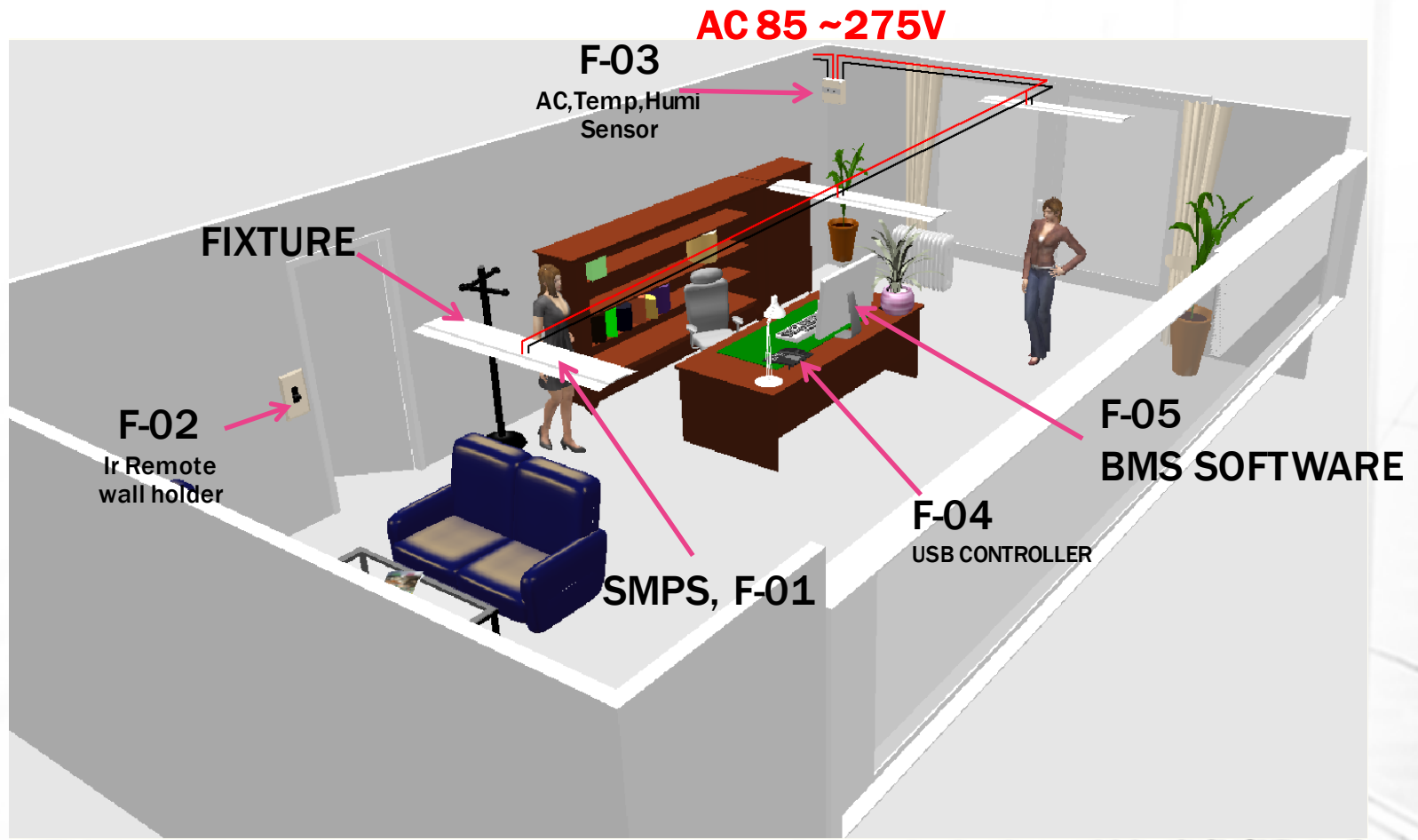


# FIDES LUMINAIRE

More information refer to FIDES-ADSZ datasheet



# FIDES-BMS WIRE SYSTEM ONLY ONE AC LINE





# FIDES LIGHTING BMS SYSTEM CONNECTS ALL JUST ONE AC WIRE



**No Switch!, No Sensor cable!, No Controller!, No Gateway!**

**ONLY AC LINE WIRING!!!**

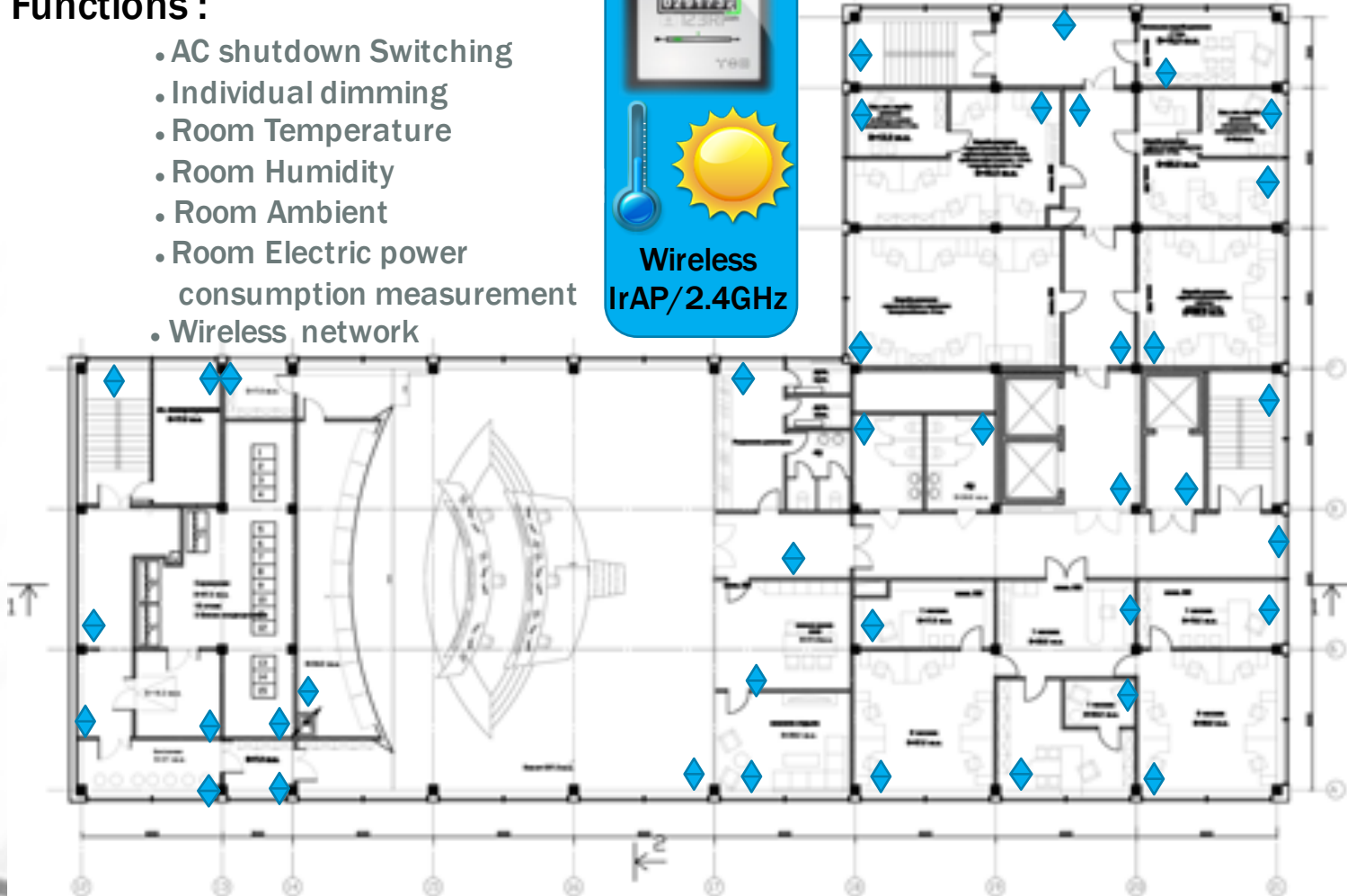
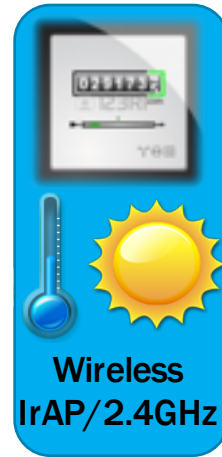
**As same for One Room to Whole Building**

# FIDES-AP BM PLACEMENTS

## ◆ DJ03A: place to each rooms

### Functions :

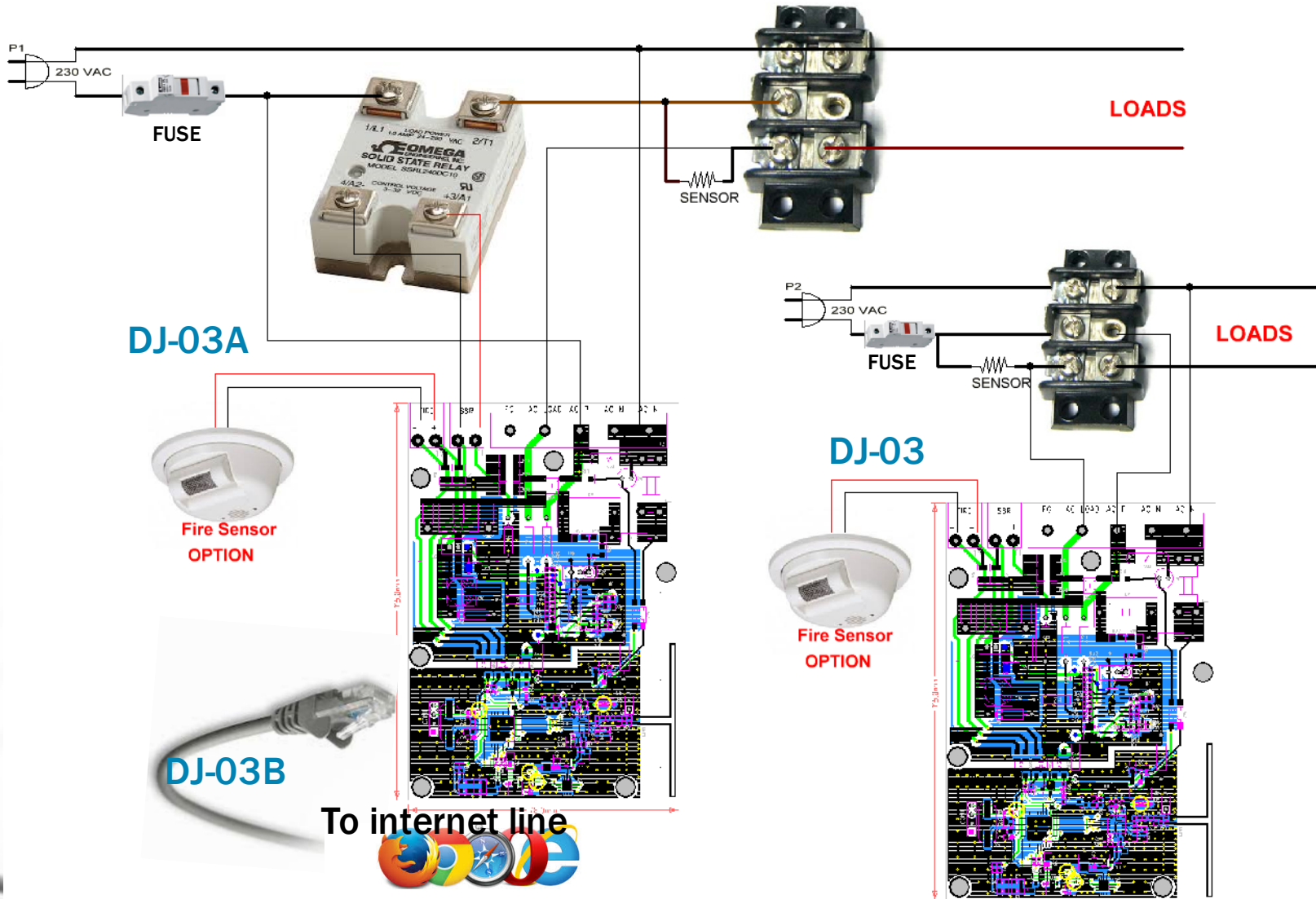
- AC shutdown Switching
- Individual dimming
- Room Temperature
- Room Humidity
- Room Ambient
- Room Electric power consumption measurement
- Wireless network



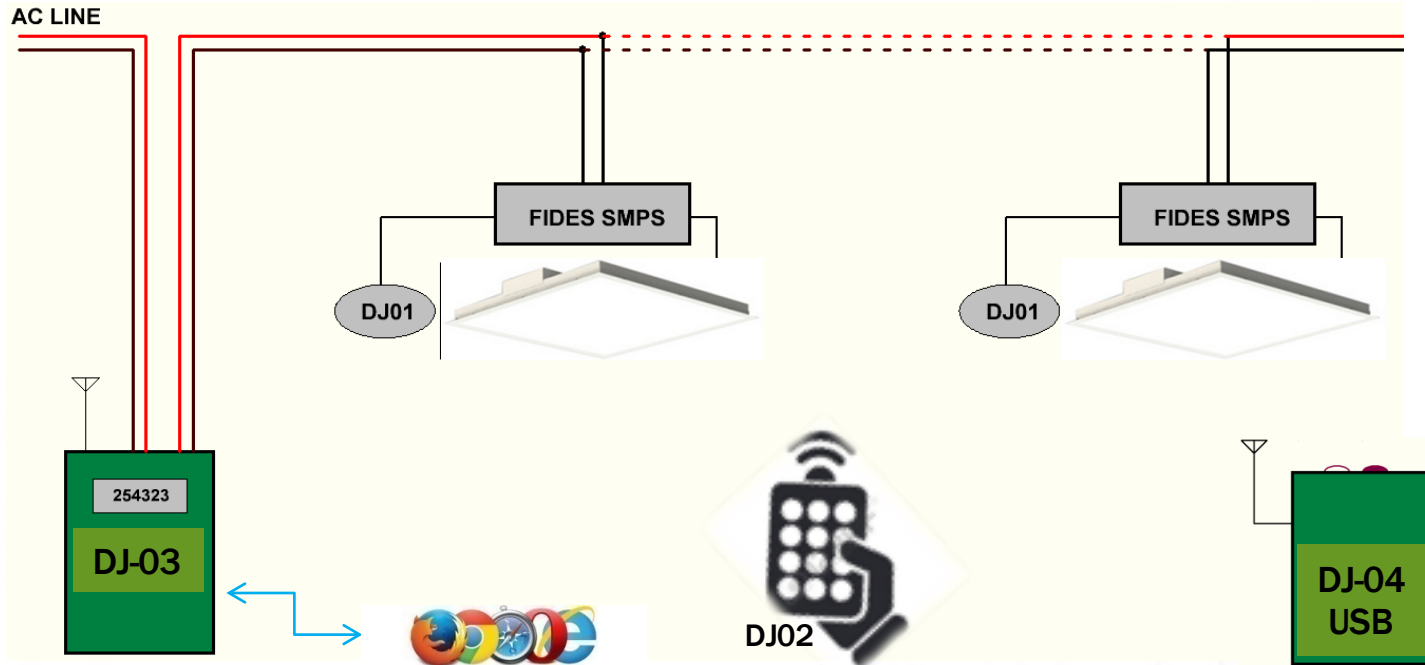
# Virtual Remote



# DJ-03A WIRING



# PRODUCTS



**FIDES SMPS : AC-DC SMPS for IEC62301 Standby Zero, Dimming**

**F-01 : IrDA, Luminance sensor (Pair with FIDES SMPS)**

**F-02 : Remote controller**

**F-03 : Access Point 2.4Ghz and IrDA with IEC62036 Class II AC Power smart meter, Temp, Humidity, ambient sensor (AC85~275V 50/60Hz), Remote Shutdown SW(F-03A) (*1BMS OPTION*), *Direct WEB Server(F-03B)***

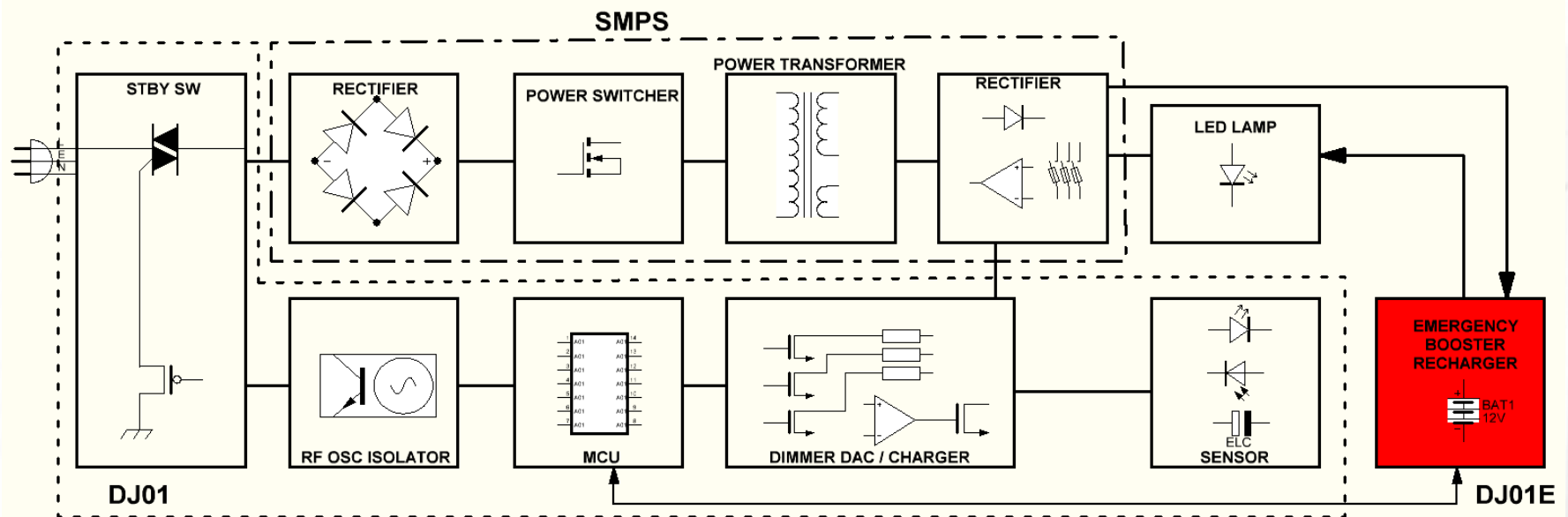
**F-04 : USB Access Point Main Controller (*BMS OPTION*)**

**F-05 : FIDES-BMS Software (*BMS OPTION*)**

*\* 1BMS are supports multi rooms and environments measure*

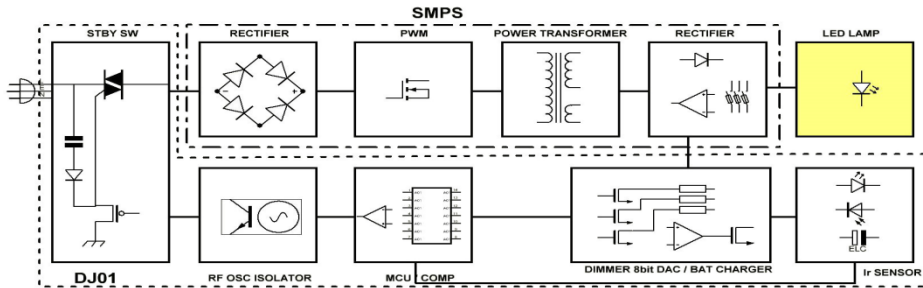
# PRODUCTS OPTION : DJ-01E

Emergency lighting option are full power lighting service 3h at blackout

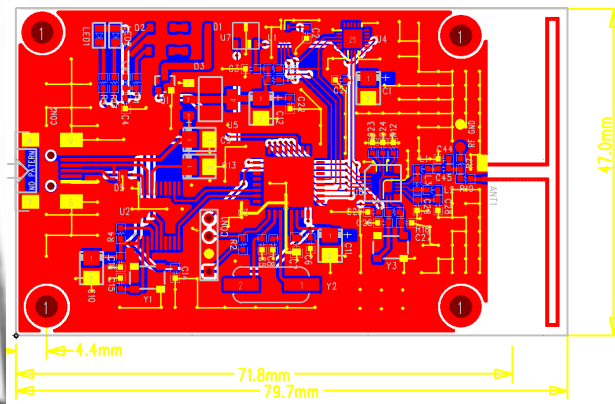
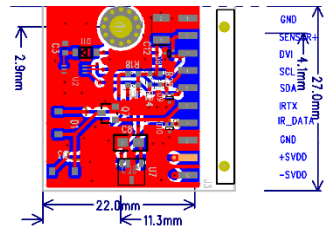
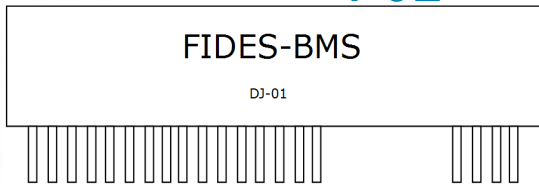


When a blackout, F01E are sustained 3h for full power lighting or half power for 6h more illuminate a luminaire by internal battery. It's very useful at stoped electric service and electric problems. The re-chargerble battery are automatically charged with status anounce and remote controled by F02, F05.

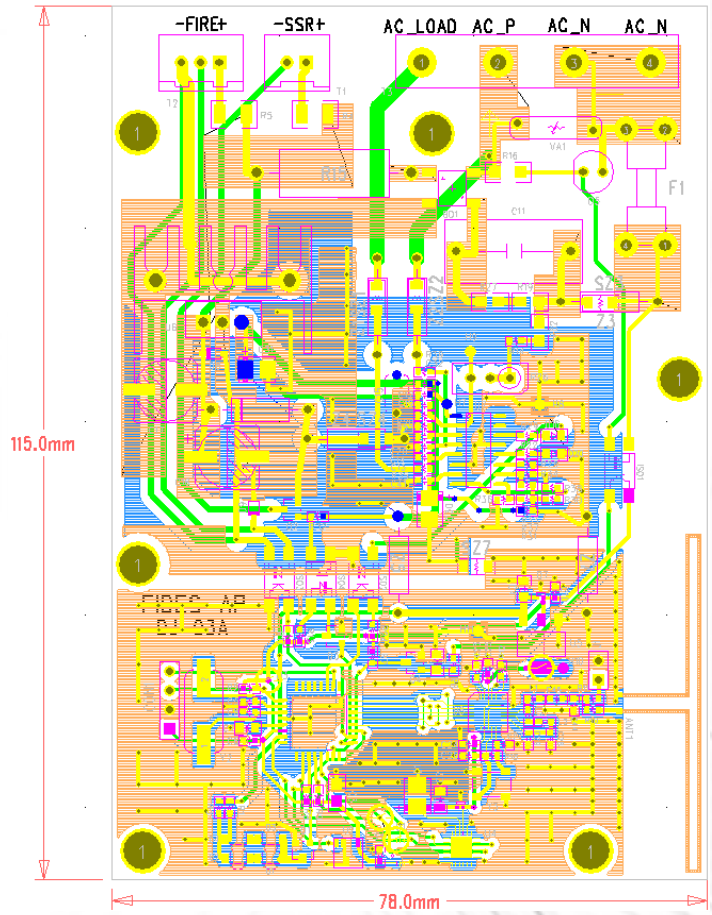
# FIDES- BMS PRODUCTS



F-01

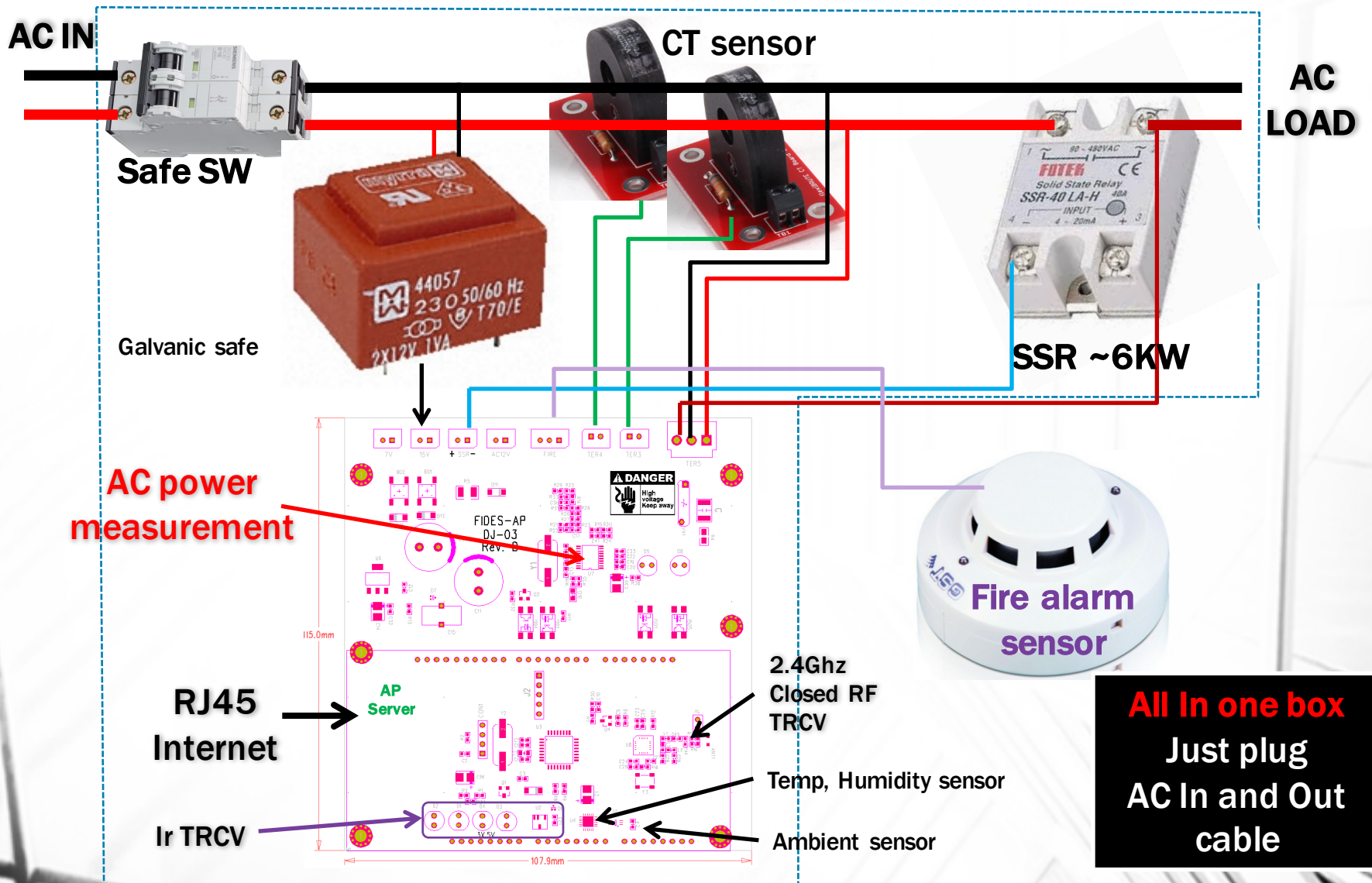


F-02



F-03A

# HOW IS WORKS OF FIDES AP



**All In one box**  
Just plug  
AC In and Out  
cable







# FIDES-BMS

F05 BMS SYSTEM  
MANAGEMENT SOFTWARE

# Login Page

**FIDES BMS LOGIN**

**ID : X X X X X X X X**

**PASSWORD : X X X X X X X X**

**Current Demo Manager LOGIN are fixed ID and Password.**

# MAIN CONTROL

## FIDES-BMS

AP 1

AP 1

AP 1

AP 1

AP 1

AP 1

AP 1

AP 1

AP 1

AP 1



BMS POWER SWITCH

# Selected fixture in AP

## APの履歴管理

AC Power

3045W/h

Ambient

650lx

Temperature

23 °C

Humidity

55%



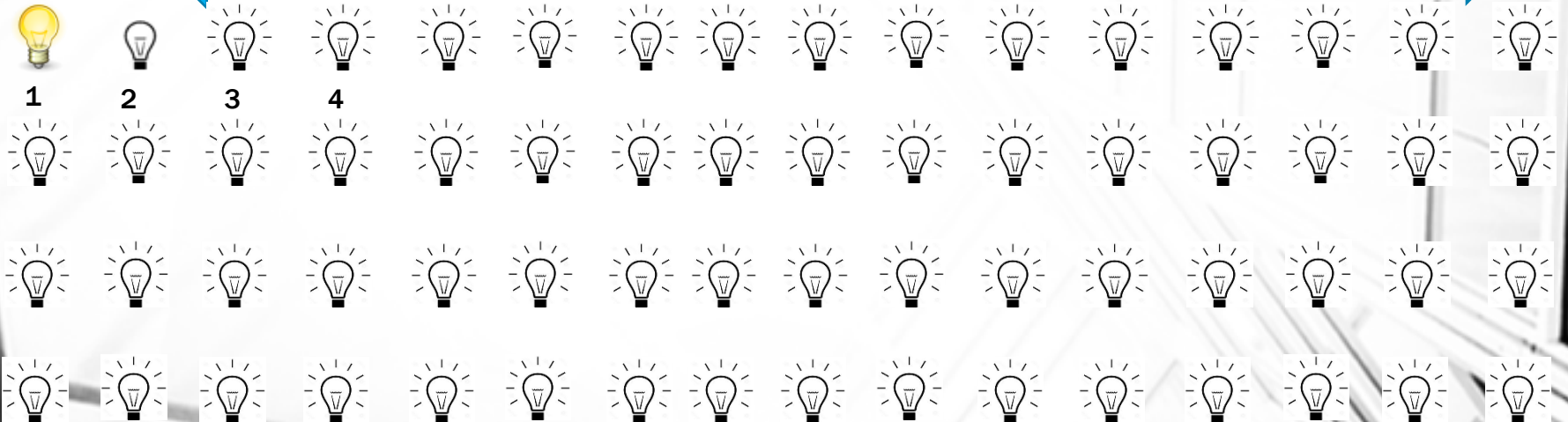
AC line live display



AP ON/OFF SW

Return

Next



# Selected AP page display

Each numbers are LED fixture.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



# LED fixture control



ON/OFF

SET

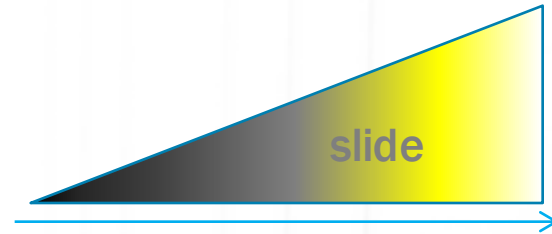
LUX 350lx



DIM HALT

SET

LUX 570lx



DIMMING ( X X %)

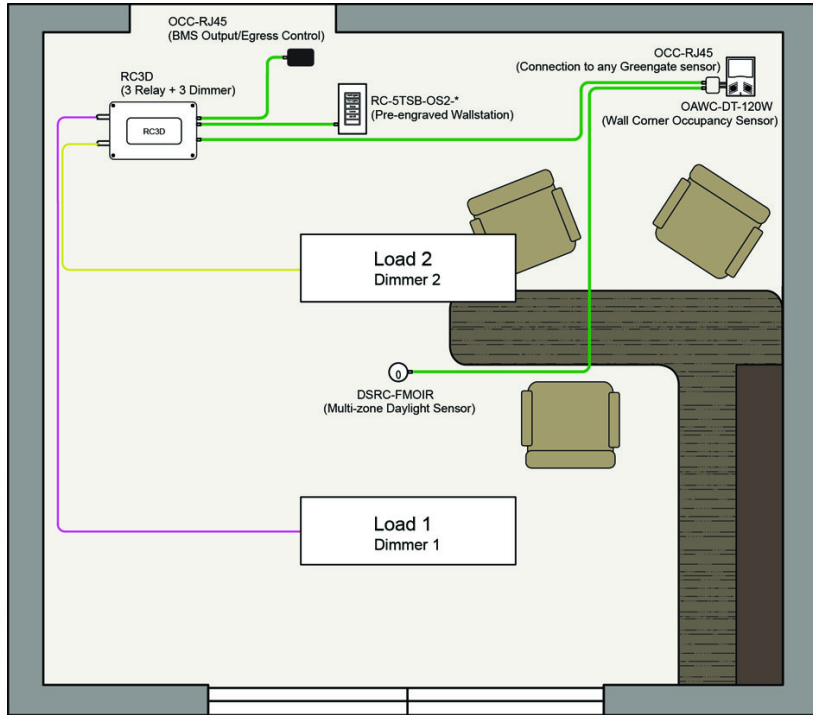
← Dimming set input





# COOPER LIGHTING

## Dimming w/ BMS



RCQK-OS3E-OS1-SS1-W1-D1-B-W



The Room Controller includes three relays and up to three 0-10 VDC dimming outputs to control compatible dimmable ballasts. The switching relays and 0-10 VDC outputs are controlled separately allowing flexibility in wiring and control. The Room Controller is shipped preconfigured to work out of the box when connected to RC devices allowing quick and easy daylighting controls, occupancy/vacancy sensing and manual switching.

Eliminate wiring errors and reduce installation time with Click & Go technology  
Benefit from advanced features like UL 924, BMS integration, Egress and Demand Response while meeting energy codes

Single package QuickKit makes the Room Controller simple to specify, install and use



Daylighting Controller

Daylight Sensor



Occupancy Sensors



Switchpack

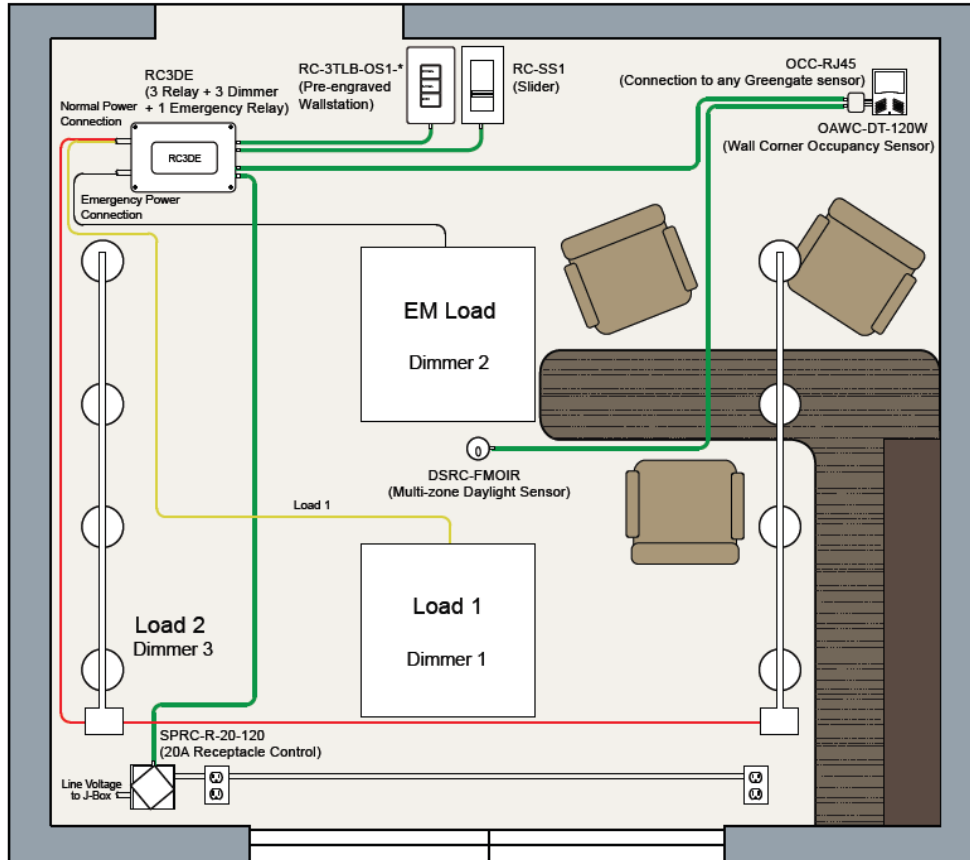


Wallstations











<http://cooperroomcontroller.sumoc.com/index.cfm?action=main.roomdetails&roomid=47c9b9c23e0e66c6013e1d91c11101f9&categoryid=6FA07EE6AF983C4384E7C6E064D5B716>

# COOPER LIGHTING

## Room Controller QuickKit RCQK-OS3E-OS1-SS1-W1-D1-P-W



### Product Legend

-  **QTY1: RC3DE**  
3 RELAY + 3 DIMMER + 1 EMERGENCY RELAY
-  **QTY1: RC-3TLB-OS1-W**  
HALF LIGHTS, FULL LIGHTS, ALL OFF
-  **QTY:1 RC-SS1-W**  
WHITE SLIDER
-  **QTY1: DSRC-FMOIR**  
DAYLIGHT SENSOR
-  **QTY1: OAWC-DT-120W**  
WALL CORNER VACANCY SENSOR
-  **QTY1: OCC-RJ45**  
OCCUPANCY SENSOR RJ45 CONNECTOR
-  **QTY1: SPRC-R-20-120**  
RECEPTACLE CONTROL
-  **QTY2: GGRJ45-10-G**  
QUICKCONNECT CABLE 10'
-  **QTY3: GGRJ45-25-G**  
QUICKCONNECT CABLE 25'
- SINGLE BOX PACKAGING WITH WIRING DETAIL AND INSTALLATION**
-  **RECESSED FIXTURE**
- FOR GUARANTEED COMPATIBILITY REFER TO PREFERRED COOPER LIGHTING FIXTURE INFORMATION BELOW.**

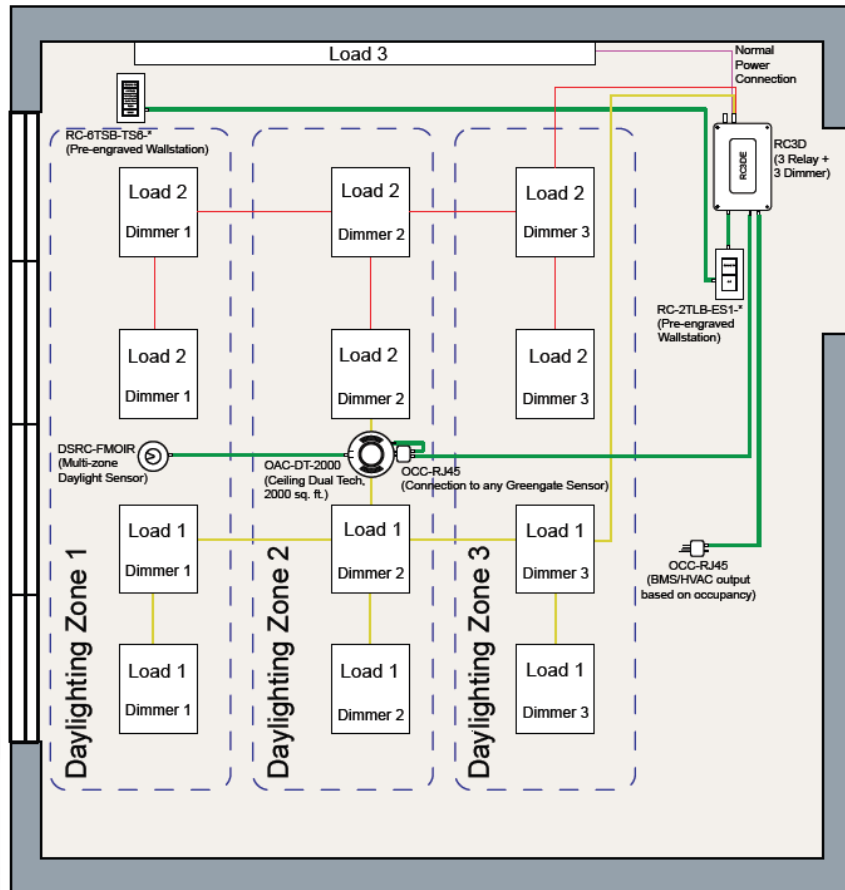
<http://cooperroomcontroller.sumoc.com/index.cfm?action=main.roomdetails&roomid=47c9b9c23f86a4bd01426d30addb2bc4&categoryid=6FA07EE6AF983C4384E7C6E064D5B716>

# COOPER LIGHTING

ROOM CONTROLLER SAMPLE ROOM LAYOUT (30' x 30')

## Room Controller QuickKit

RCQK-CR3-ES1-TS6-C1-DH-B-W



## Product Legend



**QTY1: RC3D**  
3 RELAY + 3 DIMMER



**QTY1: RC-2TLB-ES1-W**  
(ENTRY, ALL OFF)



**QTY1: RC-6TSB-TS6-W**  
(ENTRY, GENERAL, WHITEBOARD, RAISE, LOWER, ALL OFF)



**QTY1: DSRC-FMOIR**  
DAYLIGHT SENSOR



**QTY1: OAC-DT-2000**  
CEILING MOUNT VACANCY SENSOR 2000 SQ. FT.



**QTY2: OCC-RJ45**  
OCCUPANCY SENSOR RJ45 CONNECTOR  
BMS OUTPUT DEVICE



**QTY1: HHPRG-RC**  
HANDHELD DAYLIGHT PROGRAMMER



**QTY1: GGRJ45-10-G**  
QUICKCONNECT CABLE 10'



**QTY3: GGRJ45-25-G**  
QUICKCONNECT CABLE 25'



**QTY1: GGRJ45-50-G**  
QUICKCONNECT CABLE 50'

**SINGLE BOX PACKAGING WITH WIRING DETAIL  
AND INSTALLATION**



**RECESSED FIXTURE**

**FOR GUARANTEED COMPATIBILITY REFER TO PREFERRED COOPER  
LIGHTING FIXTURE INFORMATION BELOW.**

<http://cooperroomcontroller.sumoc.com/index.cfm?action=main.roomdetails&roomid=47c9b9c23e0e66c6013e1d9684>

050213&categoryid=6FA8BC59E543AC61294A08912A01F478  
Jeong.osc@gmail.com

# Target Vendor

- Lighting Type : LED
- Communication Type : IP-Wired, RF wireless, Ir wireless
- Deployments : 1 to unlimited
- Avg. Payback : 12~24Months
- Target market : Residential, Commercial, Industrial
- Partnerships : OEM, Channel

# Vendors by Stage & Market Segment



## Total Cost of Ownership or Lifetime Cost of Lighting (LCOL)

Lifetime cost =  $S1(\text{selling price}) + O\&M + R$  (Replacement costs)

Where:  $S1 = \text{ASP}$  - Average selling (or retail) price of a fixture

# FIDES Building lighting control system

Founded in 2014, offers companies the advantages of novel AC to DC conversion patented technology solutions, extensive business experience, global reach, and a commitment to SMPS client relationships

- BMS Lighting for Absolute Standby Zero with Individual Wireless Daylighting System
- Advanced IEC62301 Management
- BMS Desktop and Web Server Development
- BMS Management and Energy Saving Program
- Energy Performance Monitoring and Reporting
- Green Building Quality and Analytics
- Workforce Optimization
- Data Security and Compliance



**Jeong.osc@gmail.com**