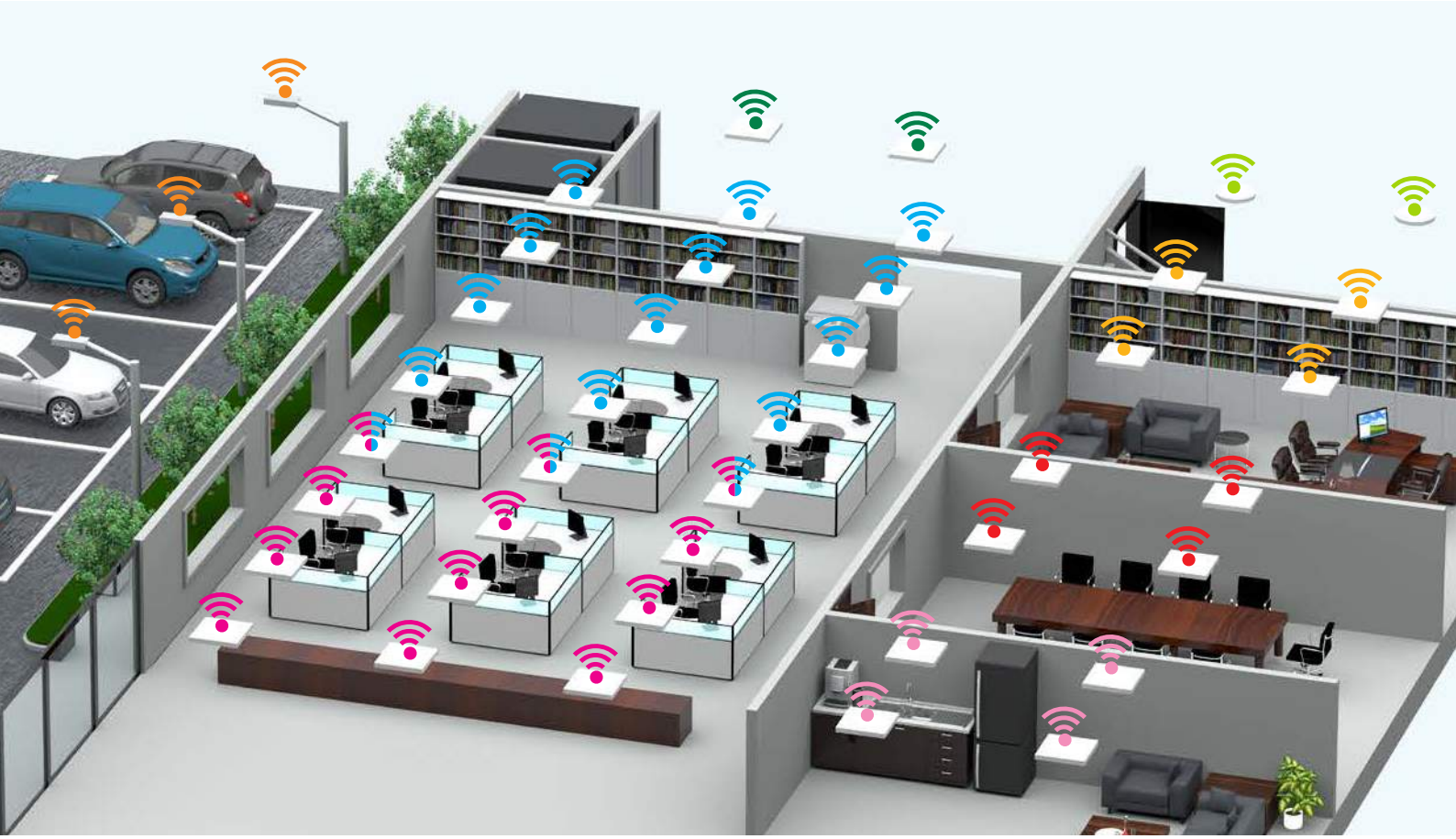
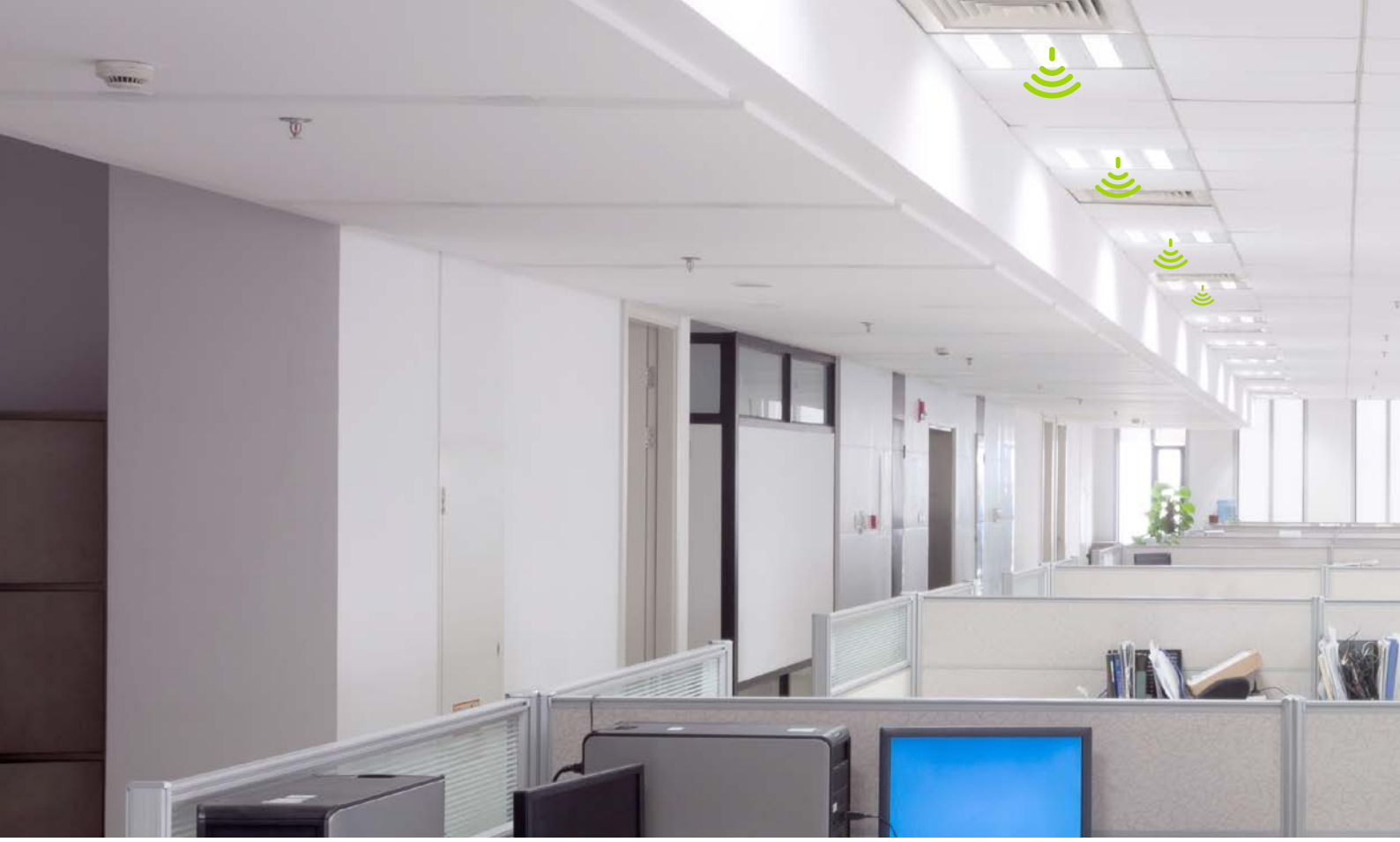
OSNET

A Simpler and Smarter Wireless Lighting Control Solution



Flexibility • Functionality • Simplicity

iR-TEC
Specializing in Building Sensors



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FOREWORD

Bringing sophisticated lighting controls to non-residential buildings typically meant extra set of control wire networking, labor intensive installation and complicated wiring connections among system devices, luminaires and central controls, device configurations and system commissioning through proprietary management software. All above works result in more time up and down the ladder, separate wiring schematic, high levels of complexity, and also higher ownership costs. These adverse factors are known as the major barriers that restrain the market development of smart lighting control.

With the availability of advanced wireless communication technologies, such as ZigBee, Bluetooth Low Energy (BLE) and WiFi, wireless technology undoubtedly becomes the most feasible solution for achieving smart lighting controls. Nevertheless, most existing wireless solutions are still quite complicated to implement in commercial and industrial applications, especially the existing buildings.

While the Internet of Things (IoT) becoming a hot topic for many industries, people should realize a hard fact that a wireless mesh network (WMN) would have to be broadly deployed in the environments to enable the IoT operation. The lighting infrastructure, both indoors and outdoors, is a perfect WMN platform for collecting and carrying information to improve productivity, enhance the quality of life, create new services, increase sustainability, and reduce operating costs.

The real challenge comes from finding a solution that not only can easily achieve even the most sophisticated lighting control, but also cost effectively deploy a wireless mesh network that can be applied for IoT or other smart controls in the future.

- **Transform general luminaires into smart lightings with ease**
- **Achieving sophisticated control with unparalleled simplicity**
- **Individual sensing control brings no SPOF robust operation**
- **Universal control platform available with different luminaires**
- **Effortlessly deploys an IoT-applicable ZigBee mesh network**
- **Independent control operation ensures total system security**
- **Suitable for commercial, industrial and institutional lightings**
- **Ideal for new building or existed lighting renovation projects**

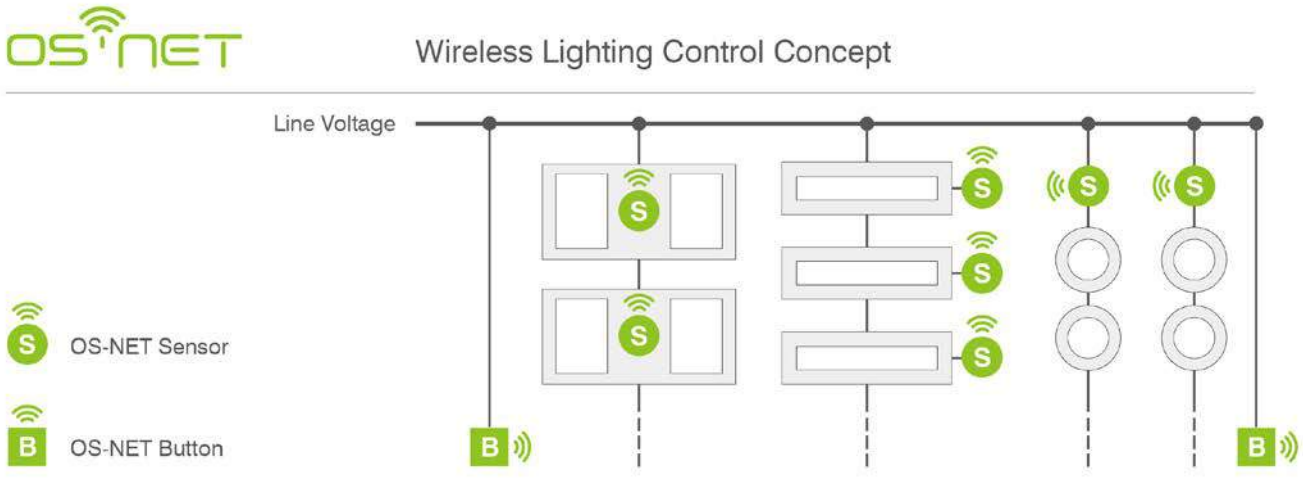
Achieving Smart Lighting Controls with Ease

Introducing the OS-NET from IR-TEC, a second-to-none wireless occupancy sensor network solution developed for lighting industry to enable smart lighting control with unsurpassed level of Flexibility, Functionality and Simplicity.

By simply installing the luminaires and lighting circuits integrated with OS-NET Sensors featuring smart sensing controls and networking capabilities, a ZigBee based wireless mesh network can be effortlessly deployed to execute different sensing control schemes, including occupancy or vacancy sensing with daylight harvesting, bi-level StepDIM or continuous SmartDIM control for commercial and industrial lighting systems through wireless communication.

With easy and intuitive settings via a handheld remote programmer, the OS-NET Sensors can be programmed in an individual or a group basis to execute specific control scheme to the connected lights under the concept of “individual sensing control, group activation”. If necessary, the installed OS-NET enabled lighting can be easily re-configured to provide different control schemes or re-assigned to a new group.

IR-TEC’s OS-NET is not only a simple solution for OEM manufacturers to enable their luminaires with embedded smart control and wireless connectivity, but also a perfect solution for renovating the legacy lighting with solid state lighting featuring maximum energy savings from human-centric smart controls.



Unsurpassed Flexibility, Functionality and Simplicity

All functionalities in one and one for all controls

Each OS-NET Sensor is packed with all sensing and control functionalities to meet all kinds of control requirements. Specific sensing control scheme can be easily set to execute even the most sophisticated control to the connected lights without requiring complicated devices and commissioning.

Deploy an IoT usable mesh network effortlessly

A ZigBee based wireless mesh network can be effortlessly and broadly deployed together with the lighting system of commercial and industrial environments. A wireless mesh network broadly established throughout the entire space will be a valuable infrastructure for Internet of Things (IoT).

Flexible integration allows the same installation

The OS-NET Sensor can be flexibly integrated with OEM luminaire or mounted on the ceiling for lighting circuit control. Unparalleled integration flexibility allows the installation of OS-NET enabled lighting system just like installing the conventional luminaires, occupancy sensors and wall switches.

Single device can be member of multiple groups

A single OS-NET device can be assigned as member of up to 4 groups. This allows multiple lighting groups to be activated simultaneously by the sensor located at the spot with multi-directional traffics. Advanced group control setting enables pre-lighting or directional guide lighting at public places.

Individual sensing control with group activation

When a specific OS-NET Sensor of the group detects the presence of occupant, the sensor not only controls the connected lighting as set according to the local condition, but also broadcasts the occupancy status for other devices of the group to activate the programmed controls respectively.

Hybrid Switching protects from inrush current

An advanced Hybrid Switching technology is employed to protect every OS-NET sensor from being damaged by exceptionally high inrush current while switching on the LED driver. With Hybrid Switching protection, the service lifetime of OS-NET load switching device is guaranteed much longer.

SmartDIM constant lighting control technology

SmartDIM control can be programmed in every OS-NET sensor to perform constant lighting control. This advanced dimming control technology will continuously adjust the lighting output to maintain the overall light level within a preset range based on the occupancy status and ambient light level.

Universal 2-way IR remote programming tool

Unlike many other network control solutions, OS-NET does not require any proprietary management software, operation app or expensive hardware to run the system. All you need is just a 2-way IR remote to set up the network, group the devices, set the control scheme, and all other configurations.

Enable Sophisticated Controls with Simple Devices

An OS-NET is built-up with numerous wirelessly linked OS-NET devices, which include OS-NET Sensors and OS-NET Buttons. Each OS-NET device not only provides its specific control functionality, but also acts as a node that can transmit, receive, and/or forward the communication commands within the wireless network.

OS-NET Sensors

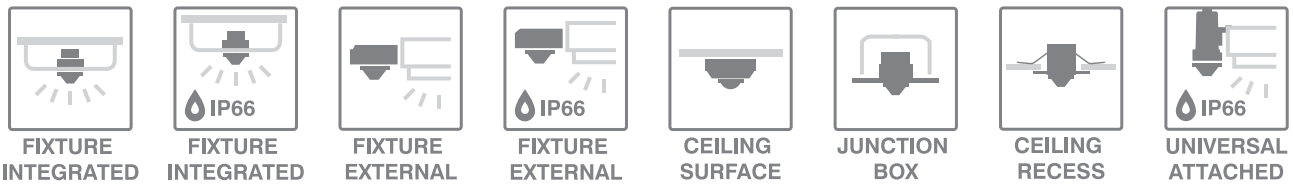
The OS-NET Sensors (ONS) are fundamental OS-NET devices. Each ONS is packed with multiple sensing control functionalities, including occupancy/vacancy sensing, ambient light sensing, 0-10V or DALI dimming, together with wireless mesh networking capabilities required for smart lighting control. The ONS are available in two different form factors, namely **Omni ONS** and **Mini ONS**.

with lens F

Omni ONS

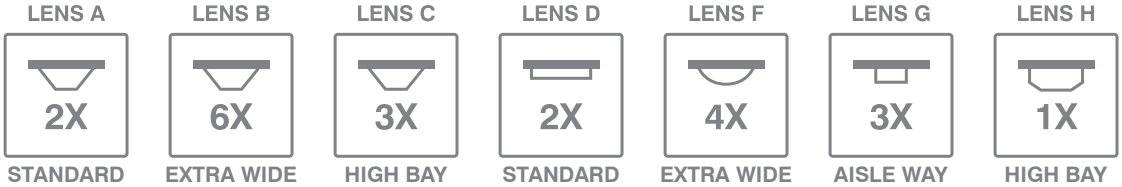
The Omni ONS can be flexibly integrated with an OEM luminaire or mounted on the ceiling in different options. Changeable lens options allow the Omni ONS to be used from typical office to high bay applications with different coverage. Detailed information of Mounting and Lens options are available on the Appendix page.

Mounting Options



FIXTURE INTEGRATED | FIXTURE INTEGRATED | FIXTURE EXTERNAL | FIXTURE EXTERNAL | CEILING SURFACE | JUNCTION BOX | CEILING RECESS | UNIVERSAL ATTACHED

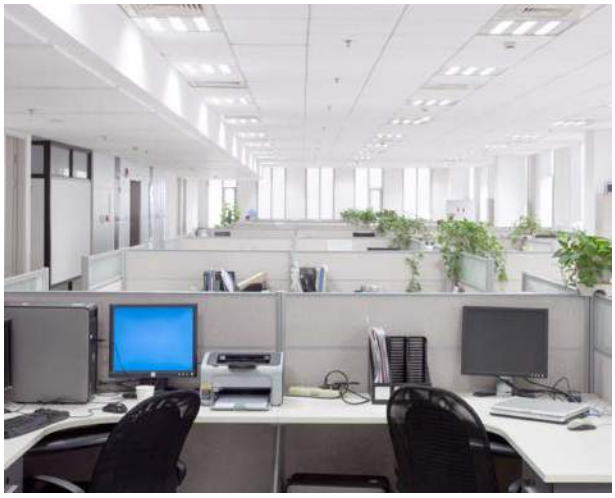
Lens Options



STANDARD | EXTRA WIDE | HIGH BAY | STANDARD | EXTRA WIDE | AISLE WAY | HIGH BAY

Mini ONS

The Mini ONS is a low profile OS-NET Sensor with a small flat lens specially designed for through-hole assembly with office luminaire such as Troffer or side-lit LED panel light.



OS-NET Buttons (ONB)

The OS-NET Button is an optional network device designed to replace the existing wall switch, and provide manual on-off and dimming control to the lighting of assigned group wirelessly. OS-NET Buttons are available in two different form factors; the ON-PBD-815 is for mounting into standard EURO type wall box, the ON-PBD-705 is for mounting into standard NEMA wall box.

ON-PBD-815

ON-PBD-705

OS-NET Remote

The OS-NET Remote is a universal programming tool to conduct the network setup, device grouping and control settings. 2-way IR communication with LCD instructions allows you to easily select the target network device to assign the group and set the sensing control scheme intuitively.

All Controls in One and One for All Controls

Each OS-NET Sensor can be set to control the connected lighting in a specific control scheme derived from occupancy/vacancy and daylight sensing control strategies associate with typical on-off switching, bi-level StepDIM or continuous SmartDIM control.

Scheme	Status	Day*	Night*	Description
ON/OFF	Vacant	OFF	OFF	Lighting will be inhibited when the ambient light level is higher than the set threshold, regardless of occupancy or vacancy. When the ambient light level is lower than the set threshold, the controlled light will be turned on automatically once the sensor detects the presence of occupant, and turned off after the delay time elapsed. **NOTE:** This is a typical **occupancy sensing control** scheme can be used with **dimmable** or **non-dimmable** lighting, but **not HID**.
	Occupied	ON/OFF	ON	
OSO	Vacant	Low Dim	Low Dim	When space is vacant, the lights will be maintained at Low Dim level. Whenever space is occupied, lighting output will be increased to High Dim level or continuously regulated to maintain within the pre-set range by SmartDIM control. **NOTE:** This is an **occupancy sensing control** scheme can be applied in areas that require 24-hour lighting. Do **NOT** use with **non-dimmable** lighting.
	Occupied	High Dim/ SmartDIM	High Dim/ SmartDIM	
OSLA	Vacant	OFF	Low Dim	Lighting will be inhibited if the ambient light level is higher than the set threshold, regardless of occupancy or vacancy. When the ambient light level is lower than the set threshold, the sensor will automatically control the light at Low Dim level. When sensor detects the presence of an occupant, lighting output will be increased to the High Dim level or continuously regulated within the pre-set range by SmartDIM control. After the delay time elapsed, lighting output will be reduced to Low Dim level or shut off if the ambient light is higher than the set threshold. **NOTE:** This is an **occupancy sensing control** scheme can be applied in spaces that require automatic lighting whenever ambient light level is lower than the set threshold. Do **NOT** use with **non-dimmable** lighting.
	Occupied	OFF	High Dim/ SmartDIM	
OSLATO	Vacant	OFF	Low Dim & OFF	Lighting will be inhibited if the ambient light level is higher than the set threshold, regardless of occupancy or vacancy. When the ambient light level is lower than the set threshold, and any sensor detects the presence of occupant, lighting output will be increased to High Dim level or continuously regulated to maintain overall lighting level within the pre-set range by SmartDIM control. After the delay time elapsed, lighting output will be reduced to Low Dim level for a period of TIME OFF delay before shut off. **NOTE:** This is an **occupancy sensing control** scheme can be applied in spaces that require maintaining Low Dim lighting for a period of time before shutting off. This scheme requires **dimmable** lighting to enable dimming control. If lighting is **non-dimmable**, the controlled lights will be shut off after the TIME OFF delay elapsed.
	Occupied	OFF	High Dim/ SmartDIM	

*Day/Night refers to the condition when ambient light level is higher/lower than the threshold set.

Scheme	Status	Day*	Night*	Description
DSVM	Vacant	OFF	High Dim/ SmartDIM & Low Dim	Lighting will be inhibited if the ambient light level is higher than the set threshold. When the ambient light level is lower than the set threshold, the sensor will turn the light to High Dim level or continuously regulate the output to maintain overall lighting level within the pre-set range by SmartDIM control. Lighting output will be reduced to Low Dim level from a certain time before virtual midnight to a certain time after. **NOTE:** This is a **daylight sensing control** scheme can be applied in spaces that require automatically dimming the light to a low level between a certain time before and after virtual midnight. This scheme requires **dimmable** lighting to enable dimming control. If lighting is **non-dimmable**, the controlled lighting will remain full on whenever the ambient light level is lower than the set threshold.
	Occupied	OFF	High Dim/ SmartDIM & Low Dim	
DSC	Vacant	OFF	High Dim/ SmartDIM	The sensor will automatically turn on the light to High Dim level or continuously regulate the output to maintain overall lighting level within the pre-set range by SmartDIM control when the ambient light level is lower than the set threshold, and automatically turn off the light when the ambient light level is higher than the set threshold. **NOTE:** This is a **daylight sensing control** scheme can be applied in spaces that require automatic lighting whenever the ambient light is lower than the set threshold. This scheme requires **dimmable** lighting to enable dimming control. If lighting is **non-dimmable**, all lights will remain full on whenever ambient light level is lower than the threshold.
	Occupied	OFF	High Dim/ SmartDIM	
VSC	Vacant	OFF	OFF	The occupant would have to press the OS-NET Button to turn on the lighting group assigned. The sensor will control the lights at High Dim level or continuously regulate the output to maintain overall lighting level within the pre-set range by SmartDIM control. The sensor will control the connected lighting as per OSLATO. **NOTE:** This is a **vacancy sensing control** scheme can be applied in spaces that require users to manually turn on the light, and have the sensor turn off automatically. This scheme requires **dimmable** lighting to enable dimming control. If lighting is **non-dimmable**, the controlled lighting will be shut off after the TIME OFF delay elapsed.
	Occupied	Manual ON	Manual ON	
OSB	Vacant	OFF	OFF/ Low Dim	Lighting will be inhibited if the ambient light level is higher than the set threshold, regardless of occupancy or vacancy. When the ambient light level is lower than the set threshold and the first occupant is detected by a grouped sensor, the output of sensor connected light will be increased to High Dim level or continuously regulated within the pre-set range by SmartDIM control during occupancy, and the unoccupied areas of entire lighting group will brighten up to Low Dim level as background light. The entire lighting group turns off after the last person leaves and delay time elapsed. **NOTE:** This is an advanced **occupancy sensing control** scheme can be applied in open offices to provide background light level before the area of entire lighting group is vacant. Do **NOT** use this scheme to control **non-dimmable** lighting.
	Occupied	OFF	High Dim/ SmartDIM	
OFF	Vacant	OFF	OFF	Once this scheme is set, all OS-NET controlled lighting will remain off until another scheme is selected. **NOTE:** This is a **manual control** scheme can be used when you need the light to be off for a certain period of time.
	Occupied	OFF	OFF	

A Simple Solution **Benefits All Parties**

The OS-NET is capable of providing top-notch energy efficient, code-compliant, sophisticated multi-scheme controls without requiring extra sets of control wire networking to each luminaire and circuit. These controls include occupancy, vacancy, and daylight sensing based for on-off switching, bi-level StepDIM and continuous SmartDIM to the connected lighting in an individual or a group basis. With above capabilities, it can help lighting industry achieve smart controls with unsurpassed level of Flexibility, Functionality, and Simplicity.

OEM Lighting Manufacturer

With the OS-NET solution, an OEM lighting manufacturer can easily deliver OS-NET enabled luminaires via integrating the OS-NET sensors.
All OS-NET enabled luminaires can be easily grouped and intuitively set to execute smart sensing control through wireless mesh network via a handheld remote.

Lighting Designer/Specifier

With the OS-NET solution, designing a smart lighting system with code-compliant controls will be same as selecting general luminaires and ceiling sensors. No more complicated devices and control wires required, just allocating the OS-NET enabled luminaires and OS-NET sensors at proper positions.

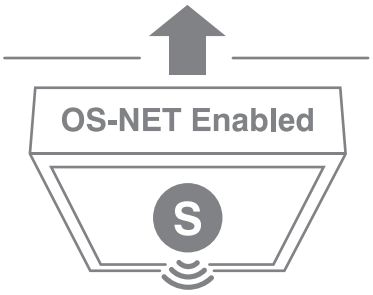
Electrical Contractor/Installer

With the OS-NET solution, installing an advanced lighting system featuring smart controls will be same as installing the conventional lighting and ceiling sensors. The intelligence is built in each OS-NET enabled luminaire and lighting circuit. All you need is grouping the devices and setting controls.

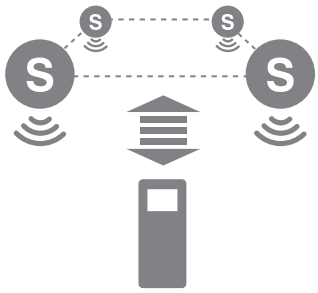
Deliver Smart Lighting Control in **3 Easy Steps**

Bringing smart controls to commercial or industrial lighting typically require complicated control wires networking, labor intensive installation, wiring connection, and configuration among complex system devices, luminaires and central controls through proprietary system commissioning or operation software. These works result in more time up the ladder, separate wiring diagrams, high levels of complexity, higher ownership cost, and professional engineer required the system operation. With OS-NET, a commercial or industrial lighting system featuring top-notch intelligent control can be done in 3 easy steps.

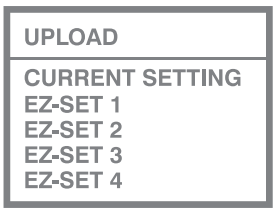
1 **Install the OS-NET enabled luminaires and devices**



2 **Group all OS-NET devices to form the network**



3 **Set the desired sensing control scheme via remote**



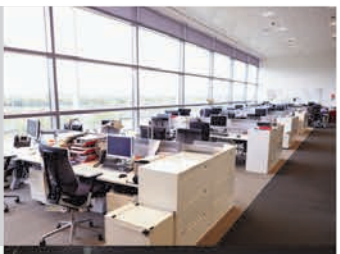
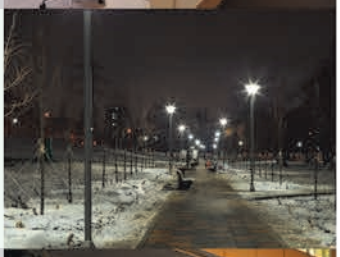
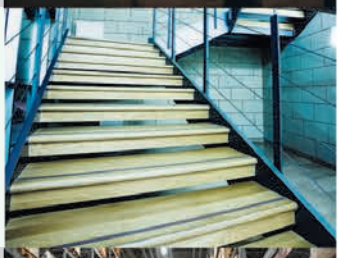
An Optimized Solution with Clearly Better Edges

OS-NET is an optimized solution with clearly better competitive edges in all aspects that no other single solution in the market can match.

Terms	OS-NET	Other Solutions
Device Complexity	Requires only ONS for all sensing controls and networking. ONB is just an optional device.	Most require complex devices, incl. Sensor, Controller, Switch, Dimmer and/or Gateway.
Integration Flexibility	Omni ONS can be flexibly integrated with OEM luminaires and lighting circuits.	Many require extra wiring connection among sensors, controllers and luminaires.
Ease of Installation	Same as installing general luminaires, sensors and wall switches.	Installing complex devices result in more works, time, and higher labor cost.
Operation Software	Proprietary management software is not needed for system operation.	Many require proprietary PC management software to run the system.
System Security	Individual sensing control within an isolated system ensures the highest operation security.	PC-based operation is more vulnerable to hostile threats or cyber attacks.
Control Functionality	Each ONS can be programmed to provide specific sensing control scheme.	Control functionalities are determined by different devices or central controls.
Ease of Commissioning	Use handheld remote to configure network, group, and device control scheme settings.	Most require complicated procedures via PC or special hardware or software tool.
Ease of Maintenance	Maintenance is exactly same as conventional lighting and sensor.	Most require professional engineer for the routine maintenance.
Application Range	Available for most indoor/outdoor applications of commercial and industrial lightings.	Many are available for indoor lighting with limited applications and ceiling heights.
Freedom of Supply	Not binding with specific manufacturer. Available for controlling luminaires from different manufacturers.	Some may require luminaires with specific devices from certain certified manufacturers.
Future Scalability	Just require an easy remote operation to add new OS-NET enabled lighting to the system.	Many require professional engineer to add new lighting to the network.
Ownership Cost	Lower project and ownership costs effectively shorten the ROI.	Higher project and ownership costs prolong the ROI.

Scalable Intelligent Lighting for All Applications

The OS-NET solution can be used indoors or outdoors in most applications of commercial, industrial, and institutional lighting environments to maximize energy efficiency through a wirelessly interconnected, versatile, simple to use, intelligent lighting control network.

Classroom		Office	
Cold storage		Outdoor	
Corridor/hallway		Parking garage	
Emergency exit		Retail	
Hazardous/ chemical area		Public restroom	
Lecture hall		Stairwell	
Manufacturing		Warehouse	

Appendix

Ordering Information

OS-NET Sensor - Omni

Model No.	x - Mounting	y - Lens	Power Input	Control Output
ON-LRD-509Sxy	**F/W/E/P/S/C/L**	**A/B/C/D/F/G/H**	120-277VAC	Switched AC, 0-10V
ON-LRD-609Sxy	**A**	**A/B/C/D/F/G/H**	120-277VAC	Switched AC, 0-10V
ON-MRD-510Sxy	**F/W/E/P/S/C/L**	**A/B/C/D/F/G/H**	230VAC, DALI	DALI broadcast
ON-MRD-600Sxy	**A**	**A/B/C/D/F/G/H**	230VAC, DALI	DALI broadcast

NOTE: While ordering the Omni ONS, please specify the Model No. with Mounting and Lens codes.

OS-NET Sensor - Mini

Model No.	Power Input	Control Output
ON-LRD-209S	120-277VAC	Switched AC,0-10V
ON-MRD-210S	230VAC, DALI	DALI broadcast

OS-NET Button

Model No.	Power Input	Mounting	Control Output
ON-PBD-705W	120-277VAC	NEMA	On, Off, Dim
ON-PBD-815W	230VAC	EURO	On, Off, Dim

Mounting Options

For Luminaire Integration

Mount	Fixture Integrated	IP-66 Fixture Integrated	Fixture External	IP-66 Fixture External	IP-66 Universal Attached
Code	**F**	**W**	**E**	**P**	**A**
Exterior					

For Ceiling Mount

Mount	Ceiling Surface	Junction Box	Ceiling Recess
Code	**S**	**C**	**L**
Exterior			

Lens Options

Lens	Standard	Extra Wide	High Bay	Standard	Wide Angle	Aisle Way	High Bay
Code	**A**	**B**	**C**	**D**	**F**	**G**	**H**
M. Height (X)	2.4~4.5 m	2.4~3.0 m	4.5~9.0 m	2.4~6.0 m	2.4~6.0 m	2.4~12.0 m	9.0~15.0m
Coverage	2X	6X	3X	2X	4X	3X	1X
Exterior							

Lens C/G may be mounted up to 12/15m or higher at the area providing with motions of large objects, such as forklift trucks. Before installing all sensors, please ensure that the sensor can have optimal detection at expected height.

About IR-TEC

Premier Sensor and Control Solutions Specialist

Found in 1982, as a pioneer of infrared motion sensing technology, IR-TEC has established a solid reputation as a truly Innovative, Reliable, Technological, Efficient, and Cooperative business partner. All IR-TEC products are designed, manufactured, and tested by a professional team under a well-maintained ISO-9001 quality management system in a state-of-the-art ISO-14001 certified manufacturing facility in Taiwan.

With continuous research and development, IR-TEC has created a wide range of occupancy/vacancy sensors, daylight sensors, power packs and controllers for commercial and industrial buildings to achieve the highest level of energy savings with occupancy/vacancy sensing based smart lighting and HVAC controls, while still maintain high level of occupant's comfort.

OSNET

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