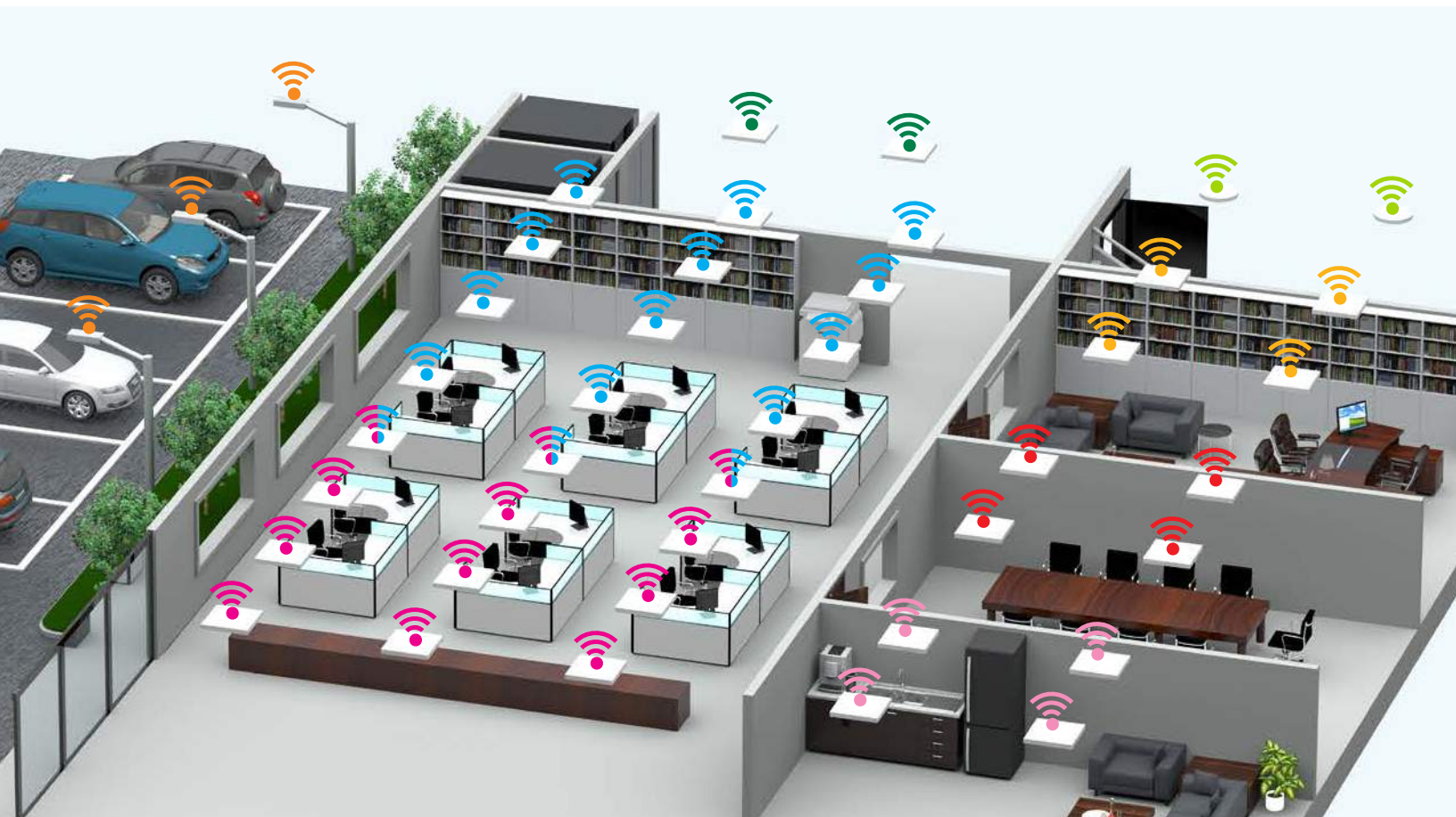




A Simpler and Smarter Wireless Lighting Control Solution



Flexibility • Functionality • Simplicity



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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 buildings
- Ideal for new building or existed lighting renovation projects
- Fully compliant with the latest ASHRAE 90.1 and CA Title 24

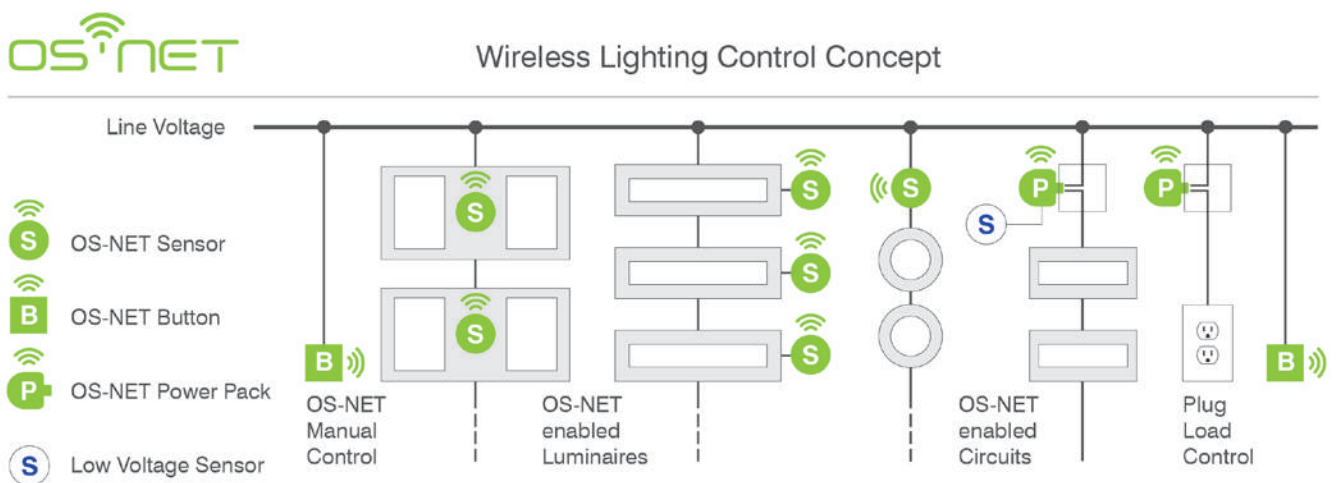
Achieving Smart Lighting Controls with Ease

Introducing the OS-NET, a simpler and smarter wireless lighting control solution developed for lighting industry to enable smart control with unsurpassed level of Flexibility, Functionality and Simplicity.

By simply installing the OS-NET enabled luminaires, lighting circuits, and plug loads at all applicable areas, a Zigbee based wireless mesh network can be effortlessly deployed and easily configured to execute a variety of smart lighting controls, including numerous occupancy or vacancy sensing controls with multi-level StepDIM or continuous SmartDIM for commercial and industrial lighting systems.

The OS-NET system is formed by some simple devices; mainly include OS-NET Sensors (ONS), OS-NET Buttons (ONB), and OS-NET Power Packs (ONP). With some easy and intuitive settings via a handheld remote programmer, all installed OS-NET devices can be wirelessly grouped and linked as a network to execute the programmed control to the connected lights based on the concept of “individual sensing control, group activation”. If necessary, an installed OS-NET enabled lighting can be easily re-configured to provide different control or re-assigned to a different group.

IR-TEC's OS-NET is not only a simple solution for OEM lighting 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

Deploy an IoT wireless mesh network effortlessly

A Zigbee based wireless mesh network can be effortlessly deployed while installing lighting and control devices for commercial and industrial environments. A wireless mesh network broadly established throughout the entire space will be a valuable infrastructure of Internet of Things (IoT).

Flexible device integration allows easy installation

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

All functionalities in one and one for all controls

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

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.

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 areas.

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 Sensor is guaranteed much longer than others.

SmartDIM constant lighting control technology

SmartDIM control can be programmed in each 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 make the system run. 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.

Latest ASHRAE 90.1 & CA Title 24 compliant

Versatile functionalities of OS-NET devices are developed and built to comply with the latest building energy codes and standards for non-residential buildings. With simple OS-NET devices installed, you can easily meet most lighting control requirements via some simple remote setting operations.

Enable Sophisticated Controls with Simple Devices

An OS-NET system is built-up by numerous wirelessly linked OS-NET devices; mainly include OS-NET Sensors, Buttons, and Power Packs. 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 Sensor

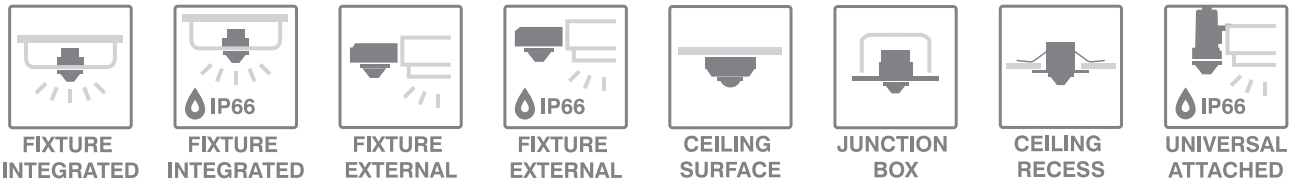
The OS-NET Sensors (ONS) are fundamental devices of OS-NET solutions. Each ONS is packed with multiple sensing control functionalities, including occupancy/vacancy sensing, ambient light sensing, 0-10V or DALI dimming, together with wireless mesh networking capabilities required for smart lighting control.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



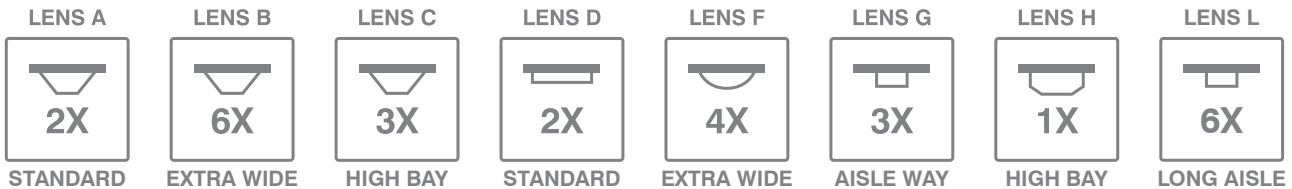
Omni ONS

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



Lens Options



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 Button (ONB)

The OS-NET Button is an optional wireless network device designed to replace the existing wall switch to provide manual ON/OFF and dimming control to the assigned lighting group. The button can be set to control 1-4 lighting groups.



OS-NET Power Pack & Load Controller (ONP)

The OS-NET Power Pack is an optional OS-NET enabled controller that can easily enable wireless smart lighting control with IR-TEC's low voltage occupancy sensors. Subject to the wiring connection and control setting, it can be easily configured to execute occupancy or vacancy sensing control to the connected light, or plug load control for codes compliance.



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

The 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		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 dimnable or non-dimnable lighting, but not HID .
	Occupied	OFF	ON	
OSO	Vacant	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-dimnable lighting.
	Occupied	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-dimnable lighting.
		Occupied	OFF	
	Occupied	SmartDIM		
		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 dimnable lighting to enable dimming control. If lighting is non-dimnable , the controlled lights will be shut off after the TIME OFF delay elapsed.
		Occupied	OFF	
	Occupied	SmartDIM		
		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.
	Occupied	OFF	High Dim/ SmartDIM & Low Dim	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 dimnable lighting to enable dimming control. If lighting is non-dimnable , the controlled lighting will remain full on whenever the ambient light level is lower than the set threshold.
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.
	Occupied	OFF	High Dim/ SmartDIM	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 dimnable lighting to enable dimming control. If lighting is non-dimnable , all lights will remain full on whenever ambient light level is lower than the threshold.
VSC	Vacant	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.
	Occupied	Manual ON		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 dimnable lighting to enable dimming control. If lighting is non-dimnable , the controlled lighting will be shut off after the TIME OFF delay elapsed.
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.
	Occupied	OFF	High Dim	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-dimnable lighting.
		SmartDIM		
OFF	Vacant	OFF		Once this scheme is set, all OS-NET controlled lighting will remain off until another scheme is selected.
	Occupied	OFF		NOTE: This is a manual control scheme can be used when you need the light to be off for a certain period of time.

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

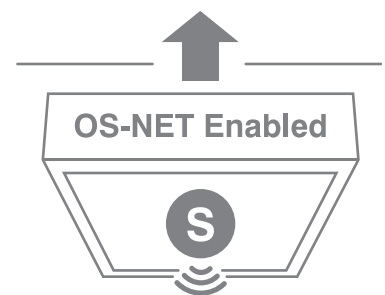
With the OS-NET solution, installing an advanced lighting system featuring smart controls will be same as installing the conventional lighting and ceiling sensors. The intelligence is built in each OS-NET enabled luminaire and lighting circuit. All you need is grouping the devices and setting controls.



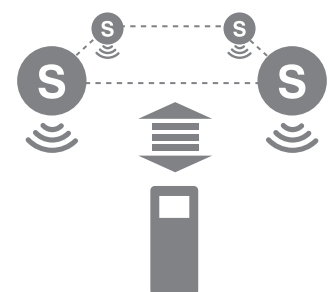
Deliver Smart Lighting Control in 3 Easy Steps

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

UPLOAD
CURRENT SETTING
EZ-SET 1
EZ-SET 2
EZ-SET 3
EZ-SET 4

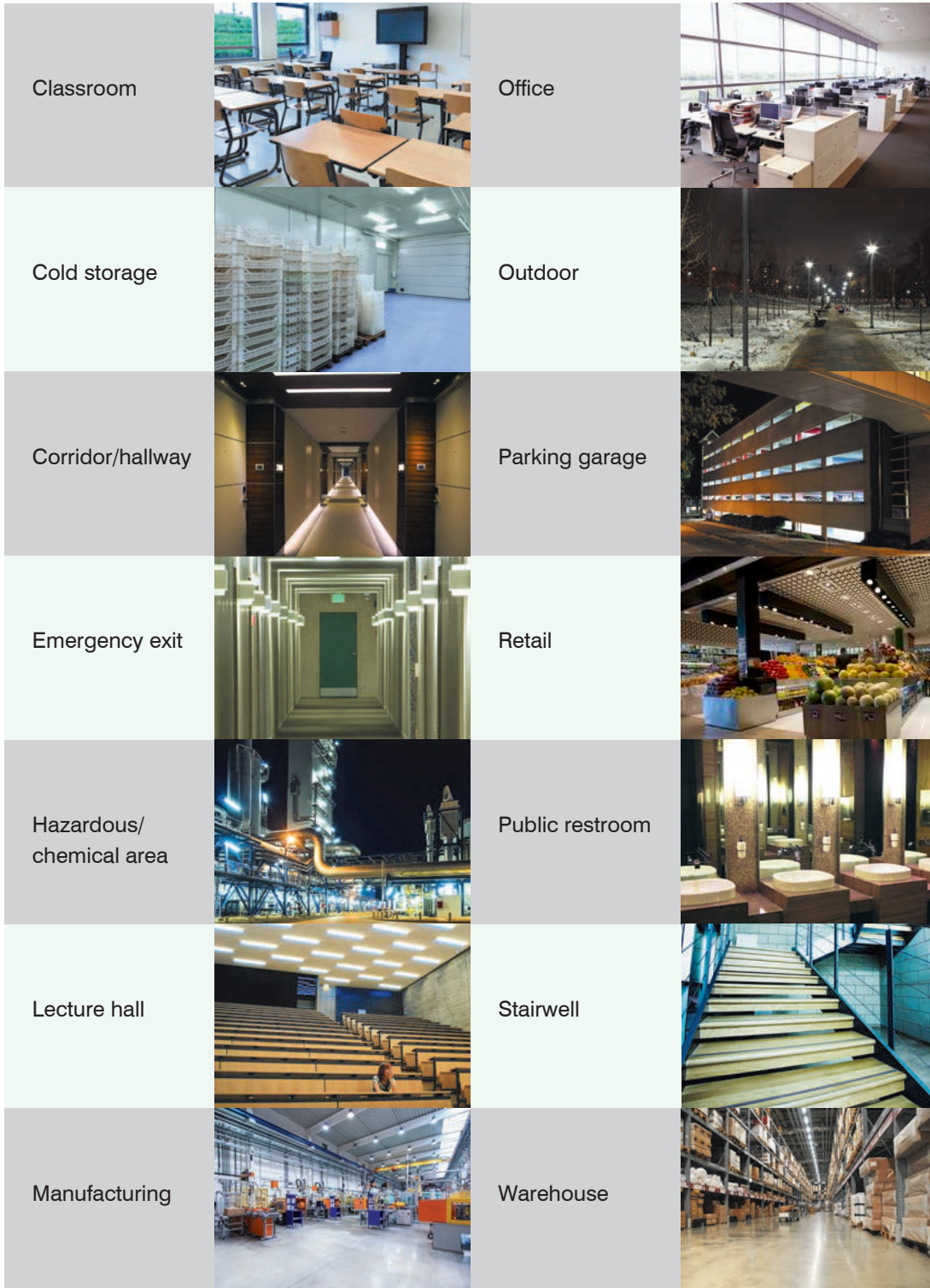
An Optimized Solution with Clearly Better Edges

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 to achieve sensing controls and networking.	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.



Appendix

OS-NET SENSOR OMNI-ONS

Model No.	x - Mounting	y - Lens	Power Input	Control Output
ON-LRD-509Sxy	F/W/E/P/S/C	A/B/C/D/F/G/H/L	120/277VAC	Switched AC, 0-10V
ON-LRD-609Sxy	A	A/B/C/D/F/G/H/L	120/277VAC	Switched AC, 0-10V
ON-MRD-510Sxy	F/W/E/P/S/C	A/B/C/D/F/G/H/L	230VAC, DALI	DALI broadcast
ON-MRD-600Sxy	A	A/B/C/D/F/G/H/L	230VAC, DALI	DALI broadcast
ON-BRD-500Sxy	F/W/E/P/S/C	A/B/C/D/F/G/H/L	12-24VDC	0-10V

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

x - Mounting Options

F Fixture Integrated	E Fixture External	A IP-66 Universal Attached	S Ceiling Surface	C Junction Box
W IP-66 Fixture Integrated	P IP-66 Fixture External			
				

y - Lens Options

A 2X Standard	D 2X Standard	F 4X Wide Angle	G 3X Aisle Way	H 1X High Bay
B 6X Extra Wide			L 6X Long Aisle	
C 3X High Bay				
				


Code	A	B	C	D	F	G	H	L
M. Height (X)	8~15 ft	8~10 ft	15~30 ft	8~20 ft	8~20 ft	8~40 ft	30~15 ft	8~10 ft
Coverage	2X	6X	3X	2X	4X	3X	1X	6X

Lens C/G may be mounted up to 40/50 ft 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.


MINI-ONS

Model No.	Power Input	Control Output	Mounting
ON-LRD-209S	120/277VAC	Switched AC,0-10V	Fixture integrated
ON-MRD-210S	230VAC, DALI	DALI broadcast	
ON-LRD-209SP	120/277VAC	Switched AC,0-10V	IP-65 fixture attached
ON-MRD-200SP	230VAC, DALI	DALI broadcast	

OS-NET BUTTON

Model No.	Power Input	Control Output	Channel	Mounting	
ON-PBD-705W	120/277VAC	On, Off, Dim	1	NEMA Wall box	

OS-NET POWER PACK

Model No.	Power Input	Power Output	Control Scheme	Max. Load	
ON-PPU-301	120/277VAC	24VDC, 100mA	ON/OFF, VSC, PLC	20 Amp.	

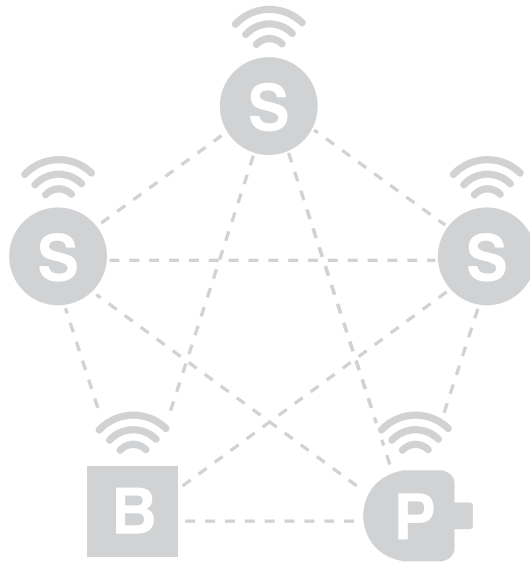
About IR-TEC



Premier Sensor and Control Solutions Specialist

Found in 1982, as a pioneer of infrared motion sensing specialist, IR-TEC has established a solid reputation as a truly Innovative, Reliable, Technological, Efficient, and Cooperative business partner of its global customers. 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 decades of continuous research and development, IR-TEC has created a wide range of product portfolio, including 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 maintaining high level of occupant's comfort.



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