OS NET

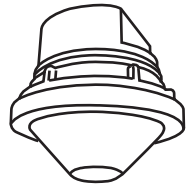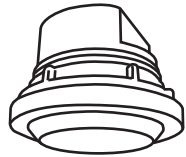## ON-MRD-514 series
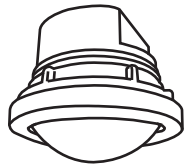SmartDALI OS-NET Sensor

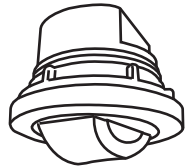## INSTALLATION INSTRUCTIONS

w/Lens A/B/C   w/Lens D

w/Lens F   w/Lens G

*More lens options are available for this sensor.
  Please refer to the Lens Datasheet for more details.

OVERVIEW

The ON-MRD-514 series is a DALI bus powered OS-NET Sensor (ONS) packed with numerous control functionalities including occupancy/vacancy sensing, daylight harvesting, bi-level StepDIM or continuous SmartDIM, and state-of-the-art wireless mesh networking capability for top-notch intelligent lighting control.

The sensor not only controls the associated luminaire in the programmed scheme individually by sensing the presence of an occupant/vehicle and the ambient light level, but also acts as a network node to broadcast exclusive commands for group lighting control wirelessly. All network setup, grouping and control settings; including sensing control scheme, delay time, ambient light level threshold, ramp up/fade down speed, sensitivity, burn-in duration…etc. can be easily and intuitively configured via a 2-way handheld remote programmer from the floor.

Being a member of Omni ONS family, this sensor can be flexibly integrated with an OEM luminaire or mounted on the ceiling in a variety of options. Changeable lens options allow the sensor to be mounted at various heights and providing different detection patterns for all applications. By connecting the ON-MRD-514 to a DALI driver with integrated bus power, an energy efficient IoT-based lighting control can be easily achieved through a wireless sensor mesh network effortlessly deployed while installing the OS-NET enabled lighting.
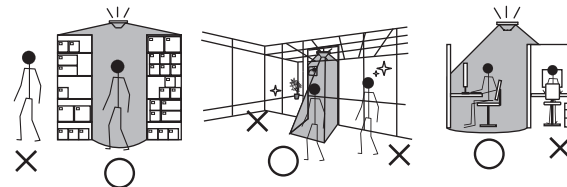
SPECIFICATIONS

Power supply	DALI bus, non-polarity
Infrared sensor	Digital quad-element pyroelectric sensor
Power Consumption	50mA(Max.)
Control protocol	DALI Broadcast
Wireless protocol	Modified Zigbee Light Link (ZLL)
Radio frequency	2405~2475MHz
Number of Channel	16ch
Radio range	15/90 m @indoor/outdoor, open space
Radio Power Output	6.96dBm
Detectable speed	0.15 ~ 3 m/sec. (0.5~10 ft./sec.)
Mounting height	Subject to lens applied*
Detection range	As per lens applied and mounting height
Remote range	Up to 8 m (26 ft), indoor with no backlight
Op. humidity	Max. 95% RH
Op. temperature	-40°C~70°C (-40°F~158°F)
Dimensions	Ø60 x H37mm (Ø2.36"x H1.45")

*Not recommended for 10 m plus mounting height.

⚠ WARNING & CAUTION

● Do NOT touch the square window of infrared sensor under the lens assembly.

● Use AWG 16-20 solid conductor wires Strip length 8-9 mm / 0.31-0.35 in.

APPLICATION NOTES

1. The sensor is more sensitive to the movements "crossing" the detection zones than "toward" or "away" the sensor unit. To obtain better sensitivity, avoid placing the sensor in line with occupant path.

2. The closer the movement is to the sensor, the more sensitive the sensor is. The higher the sensor is installed, the larger movement is required to be detected.

3. Ensure to place the sensor at least at 1.5m (5 ft.) away from air supply ducts as rapid air flow may cause false activations.

4. The sensor cannot "see" the movements behind obstacles, such as tall furniture, shelf, glass or partitions. Avoid placing the sensor where obstructions may block the sensor's line of sight.

5. The partition of workstation could block the sensor view to occupant movements, it is best to place the sensor over the intersection of workstation. For large open office, place multiple sensors so that there is overlap coverage with each adjacent sensor.

6. To obtain optimal wireless communication range, avoid enveloping the sensor with a metallic enclosure.
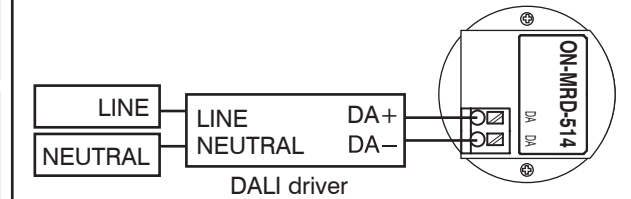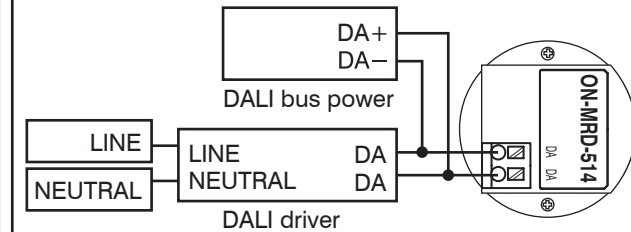
MOUNTING

This device can be integrated with a luminaire or mounted on the ceiling in various formats via specific mounting bracket. Please refer to the mounting instruction sheet separately attached for more details about mounting options available.

WIRING DIAGRAM

1. DALI driver with integrated bus power

LINE	LINE	DA+
NEUTRAL	NEUTRAL	DA−

DALI driver

ON-MRD-514

2. General DALI driver

DA+
DA−

DALI bus power

LINE	LINE	DA
NEUTRAL	NEUTRAL	DA

DALI driver

ON-MRD-514

OPERATION

The ON-MRD-514 employs a digital PIR sensor together with an ALS to detect occupancy status and ambient light level. The sensor not only controls the connected lighting as programmed when it detects the presence of an occupant/vehicle, but also broadcasts an OCC signal to other devices of the group to activate the respective controls. Each sensor can be assigned to be member of maximum 4 groups for coordinated control.

CE ✓ RoHS COMPLIANT

IR-TEC

SETTING

All sensor settings can be configured, in individual or group basis, by an OS-NET Remote Programmer SRP-281. Following table highlights the setting items and options available with ON-MRD-514. For detailed setting operation, please refer to the OS-NET Programming Guide available for download from www.irtec.com.

Programming Guide

Settings	Description	Options	Default
INDIV-SET	To setup an individual device		
GROUP-SET	To setup all devices of the group with same settings		
CONTROL	Control schemes available for OS-NET sensor.	ON/OFF, OSO, OSLA, OSLATO, DSVM, DSC, VSC, OSB, OFF	OSLATO
AMBIENT LUX	Thresholds of ambient light level for OS-NET sensor to execute the control.	10/20/40/60/80/200/400/600/1000/2000 LUX DISABLED/CURRENT	DISABLED
DELAY	Delay time that sensor will turn off or fade down the light.	30 sec./1/3/5/10/15/20/30/60 min.	10 min.
TIME OFF	Delay time that sensor will keep the light at low dim level after the OFF delay time elapsed.	10/30 sec./3/5/10/15/20/30/45/60 min.	10 min.
HIGH DIM	High dim is the output level set to control the light during occupancy, or when ambient light is lower than the threshold if daylight sensing scheme is selected.	50/55/60/65/70/80/90/100%/SmartDIM	100%
LOW DIM/ SmartDIM	Low dim is the output level set to dim the light when space is vacant for bi-level control. Low dim setting will become SmartDIM bar if SmartDIM control is selected.	0/5/10/15/20/25/30/40%	30%
RAMP UP	Speed of lighting output increase.	INSTANT/SOFT/SLOW	INSTANT
FADE DOWN	Speed of lighting output decrease.	INSTANT/SOFT/SLOW	SOFT
LED INDICATOR	Enable or disable the LED indicator of the sensor.	ENABLED/DISABLED	ENABLED
VM-TB	Time duration BEFORE Virtual Midnight. Only available if DSVM is selected.	0.5/1/1.5/2/2.5/3/3.5/4/4.5/5/5.5/6 hour	2.5 hours
VM-TA	Time duration AFTER Virtual Midnight. Only available if DSVM is selected.	0.5/1/1.5/2/2.5/3/3.5/4/4.5/5/5.5/6 hour	4 hours
SENSITIVITY	Sensitivity of occupancy sensor. To disable the occupancy sensing capability, select OFF.	HIGH/NORMAL/LOW/OFF	HIGH

SETTING ACKNOWLEDGEMENT

The sensor will acknowledge setting success or failure with different indications by device LED or connected lighting.

INDICATION	ACKNOWLEDGEMENT	REMARKS
Device LED fast blinking in GREEN and BLUE.	The device is scanning and linking to the network.	The fast blinking (on-off per 0.2 second) only appears during network linking.
Device LED blinks twice every 2-second in GREEN or BLUE.	The sensor detects occupant's motion.	GREEN means the device is network linked. BLUE means the device is unlinked.
Device LED blinks twice every 2-second for 5 minutes, and then 15-second after power applied.	The device is set with daylight sensing control. (DSVM or DSC)	GREEN means the device is network linked. BLUE means the device is unlinked.
Device short beeps twice.	Receiving a single setting or control command.	
Device beeps one long and two short. The connected lights flash twice.	1. Multiple setting data UPLOAD successful. 2. GROUP LINK successful.	
The connected lights flash twice.	1. Factory default setting resumed. 2. SmartDIM setting completed.	

CONTROL MODE

The ON-MRD-514 series can be programmed to control the connected lighting in one of the modes as below.

Scheme	Description
ON/OFF	This is a typical **occupancy sensing control** scheme. 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 automatically turned on once the sensor detects the presence of occupant, and turned off after the delay time elapsed. **NOTE:** This scheme can be used with **dimmable** or **non-dimmable** lighting, but not for HID lighting.
OSO	This is an **occupancy sensing control** scheme can be applied in areas that require 24-hour lighting. 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:** Do **NOT** use this scheme to control **non-dimmable** lighting.
OSLA	This is an **occupancy sensing control** scheme can be applied in spaces that require automatic lighting when the ambient light level is lower than the set threshold. 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:** Do **NOT** use this scheme to control **non-dimmable** lighting.
OSLATO	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. 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 scheme requires **dimmable** lighting to enable dimming control. If lighting is **non-dimmable**, there will be no dim control and the delay time will be extended with the TIME OFF (TO) delay.
DSVM	This is a **daylight sensing control** scheme can be applied in spaces that require automatically dimming the lighting output to a low level between a certain time before and after virtual midnight. 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 scheme requires **dimmable** lighting to enable dimming control. If lighting is **non-dimmable**, all lights will remain on whenever ambient light level is lower than the set threshold.
DSC	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. 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 scheme requires **dimmable** lighting to enable dimming control. If lighting is **non-dimmable**, all lights will remain on whenever ambient light level is lower than the threshold.
VSC	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 the light automatically. 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 scheme. **NOTE:** This scheme requires **dimmable** lighting to enable dimming control. If lighting is **non-dimmable**, there will be no dim control and the delay time will be extended with the TIME OFF (TO) delay.
OSB	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. 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:** Do **NOT** use this scheme to control **non-dimmable** lighting.
OFF	This is a **manual control** scheme can be used when you need the light to be off for a certain period of time. Once this scheme is set, all OS-NET controlled lighting will remain off until another scheme is selected.