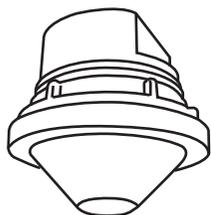# TRANS

MRB-510 series

Modbus Occupancy & Daylight Sensor
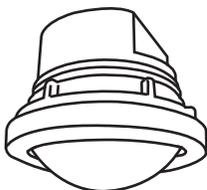
INSTALLATION INSTRUCTIONS
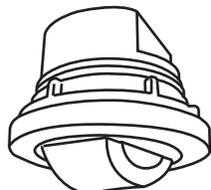
w/Lens A/B/C

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.

INTRODUCTION

The MRB-510 series member of the TRANS family is an occupancy and daylight sensor designed for Modbus control network. This slave sensor is able to provide occupied/vacant status and ambient light level outputs in Modbus communication protocol for area lighting or HVAC control of building management systems.

This Modbus multi-sensor employs a cutting edge quad element passive infrared (PIR) sensor to provide omni-directional occupancy sensing capability, and an advanced digital ambient light level sensor to provide dynamic ambient light level sensing performance for energy efficient building control. All sensor operation and communication settings, including ON/OFF delay times, ambient light level sensing ranges, transmission rate, and serial port, can be remotely programmed via Modbus network.
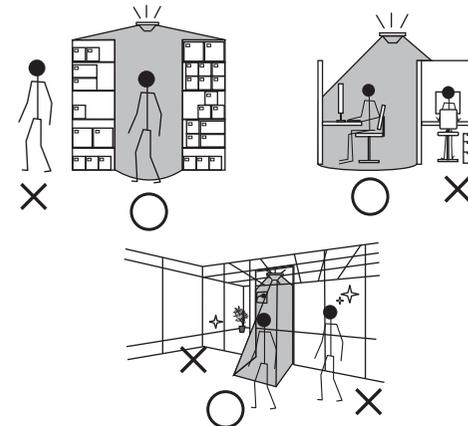
The innovative interchangeable lens design allows the sensor to provide different occupancy detection coverage without changing or relocating the sensor. Like all sensors in the TRANS family, the MRB-510 series is also available with various mounting options, including ceiling recess, ceiling surface, and junction box mounted. These design innovations offer second to none flexibility for all applications of commercial building control.
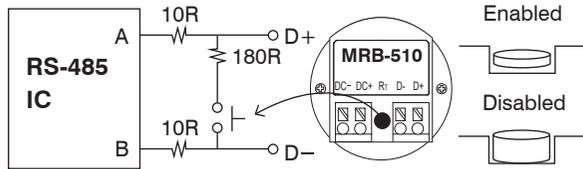
INSTALLATION NOTES

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, if possible.

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 furniture, shelf, glass or partition. As a general rule, each occupant should be able to clearly view the sensor unit.

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

⚠ WARNING & CAUTION

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

- **Do Not Install To and/or Cover a Junction Box Having Class 1, 3 or Power and Lighting Circuits.**

- **Class 2 Device Wiring Only – Do Not Reclassify and Install as Class 1, 3 or Power and Lighting Wiring.**

⚠ AVERTISSEMENT & PRUDENCE

- **Ne PAS toucher la fenêtre carrée de capteur infrarouge sous l'ensemble de l'objectif.**

- **Ne pas installer ou couvrir une boîte de jonction ayant les classes 1 et 3 ou circuits de puissance et d'éclairage.**

- **Classe 2 Câblage de périphériques Seulement - Ne PAS reclasser et installer Classe 1, 3 ou alimentation et circuits d'éclairage.**

CE   RoHS COMPLIANT

IR-TEC

TERMINATION RESISTOR

| Enabled |
| Disabled |

WIRING DIAGRAM
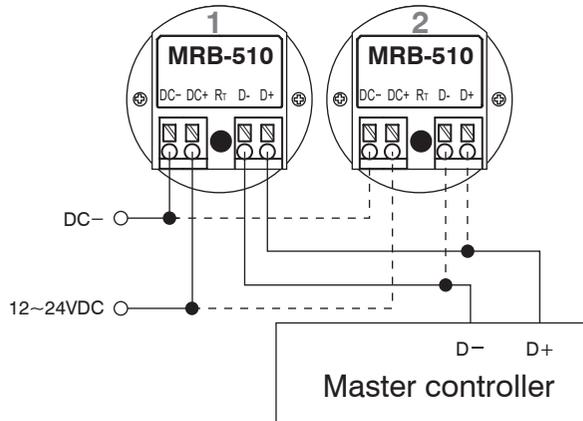
SPECIFICATIONS

| Power supply	12~24 VDC±10%
Current drain	Less than 12/14 mA @ 24 VDC, standby/active
	Less than 18/20 mA @ 12 VDC, standby/active
Output protocol	Modbus, RS-485
Infrared sensor	Omni-directional quad element pyroelectric
Detectable speed	0.3~3 m/sec (1~10 ft./sec.)
Mounting height	Subject to the lens type applied
Detection range	Subject to the lens applied and mounting height
Baud rate	1200/2400/4800/9600/19200/38400/57600/115200
ALS sampling rate	2~60 sec. network programmable
ALS ranges	1~2,000 lux
ON delay setting	0~5 min. network programmable
OFF delay setting	5 sec.~30 min. network programmable
Op. temperature	-10°C~50°C (-14°F~122°F)
Op. humidity	Max. 95% RH
Dimensions	Ø60 x H37mm (Ø2.36" x H1.45")

SUPPORTED FUNCTION CODES

Item	Function Code	Name	Usage
1	01	Read Coil Status	Read bits
2	03	Read Holding Registers	Read words
3	15	Force Multiple Coils	Write bits
4	16	Force Multiple Registers	Write words

MODBUS COMMUNICATION SETTING

1. Press the configuration button on the sensor front for 5 seconds to enter "Setting Mode" and the LED indicator will turn on. Sensor will operate in below value under "Setting Mode".
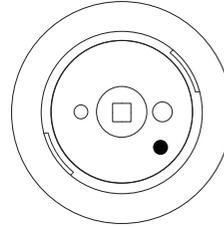
Register	Parameter	Description
4 MSB/4LSB	RS-485 address	Address = 0x01
5 LSB	baud rate	9600bps
5 MSB	serial port settings	No parity, one stop bit

2. To set different address or serial port, you need to write "MSB/LSB = 0x0001" to the "Register 7_System Setting", the LED indicator will start blinking. Change the Address and Serial Port Setting while LED indicator blinking.

3. When setting completed, write "MSB/LSB = 0x0002" to the "Register 7_System Setting" to exit "Setting Mode" or wait 10 minutes for auto-exit.

MODBUS REGISTER MAP (16bits)

*Non-volatile memory, write endurance > 100,000

Reg.	Parameter	R/W	Description			Default
1	Product ID	R	0x3310			
2	Firmware Version	R	0x0001 ~ 0xFFFF			
3	Hardware Version	R	0x0001 ~ 0xFFFF			
4*	RS-485 Address	R/W	0x0001 ~ 0x00FA			0x0001
5*	Serial Port Setting	R/W	LSB	0x01	1200 bps	
	Reset all of data to Factory Default via System Setting before changing baud rate.			0x02	2400 bps	
				0x03	4800 bps	0x04
				0x04	9600 bps	
				0x05	19200 bps	
				0x06	38400 bps	
				0x07	57600 bps	
				0x08	115200 bps	
			MSB	0b00000XYY		
				YY = 0b00	No parity	
				YY = 0b01	Even	
				YY = 0b10	Odd	0x00
				YY = 0b11	Ignore	
				X = 0	One stop bit	
				X = 1	If YY != 0b00, Ignore / If YY = 0b00, Two stop bits	
6	Status	R/W	N/A			
7	System Setting	W	LSB	0b000000XY		
	Read 0x0000			Y = 1	Reset all of data to Factory Default	
				Y = 0	N/A	
				X = 1	Exit Serial Port Setting Mode	
				X = 0	N/A	
			MSB	0x00		
8	Ambient Light Level	R	0x0001 → 1 Lux | | 0x07D0 → 2000 Lux			
9	Occupancy	R	LSB	0b0000000Y Y = 0, Vacant Y = 1, Occupied		
			MSB	N/A		
10*	ON Delay 1Step = 1Second	R/W	0x0000, Disable 0x0001 ~ 0x012C, 1 ~ 300 Sec (max) 0x012D ~ 0xFFFF, Ignore			0x0000
11*	OFF Delay 1Step = 1Second	R/W	0x0000 ~ 0x0004, Ignore 0x0005 ~ 0x0708, 5 ~ 1800 Sec (max) 0x0709 ~ 0xFFFF, Ignore			0x0258
12*	Sampling Rate of Ambient Light 1Step = 1Second	R/W	0x0000 ~ 0x0001, Ignore 0x0002 ~ 0x003C, 2 ~ 60 Sec (max) 0x003D ~ 0xFFFF, Ignore			0x000F
13*	LED Control	R/W	LSB	0b0000000Y Y = 1, LED Enable Y = 0, LED Disable		0x0001
			MSB	N/A		
14*	PIR Sensitivity	R/W	LSB	0b000000PP PP= 00, High Sensitivity PP= 01, Nomal Sensitivity PP= 10, Low Sensitivity PP= 11, ignore		0x0001
			MSB	N/A		