K50 Pro Optical Sensor with Modbus® Product Manual

Original Instructions
p/n: 246258 Rev. A
30-May-25

Contents

Chapter Contents

Chapter 1 Features

50 mm Programmable Multicolor RGB Optical Sensor and Indicator

- Modbus® control allows access to full color and advanced animations
- Touchless activation removes the need for physical force to activate
- Rugged IP66, IP67, IP69K per ISO 20653 and UL Type 4X and UL Type 13 design
- Resistant to ambient light, EMI, and RFI interference
- Sensing and indication in one device
- Bright, uniform indicator light
- Translucent polycarbonate dome
- PICK-IQ®-compatible communication enables greater speed and accuracy

WARNING:

- **Do not use this device for personnel protection**
- Using this device for personnel protection could result in serious injury or death.
- This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A device failure or malfunction can cause either an energized (on) or de-energized (off) output condition.

Models

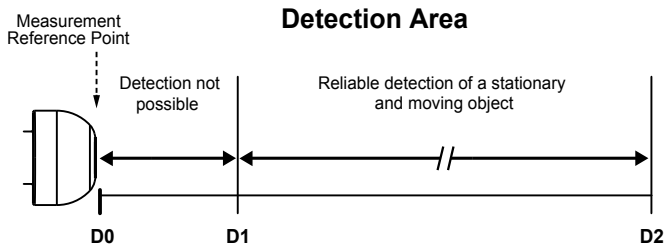
Family	Style	Color and Input	Connector[1]
K50PS	**AF1000**	**S**	**Q**
	AF1000 = 1000 mm Adjustable Field Sensor	S = Modbus	Q = Integral 4-pin M12 male quick-disconnect connector

Overview

The K50 Pro Optical Sensor with Modbus is an adjustable field optical sensor that can detect a wide variety of materials and objects.

Configure the sensor by manually entering Switch Points into registers or using Remote Teach to sense objects up to a specific distance, ignoring objects beyond this distance (background suppression), or within a windowed range.

[1] Models with a quick-disconnect connector require a mating cordset.



Model	D0 (mm)	Switch Point D1 (mm)	Switch Point D2 (mm)
K50PSAF1000SQ	0	20	1000

Class 1 Laser Description and Safety Information

Laser light. Do not stare into the beam.

Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 56, dated May 8, 2019.

CLASS 1 LASER PRODUCT

CAUTION:

- **Never stare directly into the sensor lens.**
- Laser light can damage your eyes.
- Avoid placing any mirror-like object in the beam. Never use a mirror as a retroreflective target.

CAUTION:

- **Return defective units to the manufacturer.**
- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
- Do not attempt to disassemble this sensor for repair. A defective unit must be returned to the manufacturer.

CAUTION:

- **Ne regardez jamais directement la lentille du capteur.**
- La lumière laser peut endommager la vision.
- Évitez de placer un objet réfléchissant (de type miroir) dans la trajectoire du faisceau. N'utilisez jamais de miroir comme cible rétro-réfléchissante.

CAUTION:

- **Tout dispositif défectueux doit être renvoyé au fabricant.**
- L'utilisation de commandes, de réglages ou de procédures autres que celles décrites dans le présent document peut entraîner une exposition dangereuse aux radiations.
- N'essayez pas de démonter ce capteur pour le réparer. Tout dispositif défectueux doit être renvoyé au fabricant.

Class 1 lasers are lasers that are safe under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing.

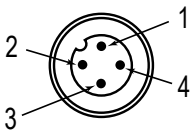
Complies with IEC 60825-1:2014 and EN 60825-1:2014+A11:2021.

For safe laser use:

- Do not stare at the laser.
- Do not point the laser at a person’s eye.
- Mount open laser beam paths either above or below eye level, where practical.
- Terminate the beam emitted by the laser product at the end of its useful path.

Chapter Contents

Chapter 2 Wiring

Pinout	Pin	Wire Color	Connection
	1	brown	10 V DC to 30 V DC
	2	white	RS-485 (+)
	3	blue	DC common
	4	black	RS-485 (-)

Chapter Contents

Chapter 3 Modbus Register Map

Holding Register Column Heading Definitions

Base 0 Address

Registers are addressed with the first register starting at zero

Base 1 Address

Registers are addressed with the first register starting at one

Description

Lists the functionality of the register

Holding Register Representation

Lists the allowed values of the register and the definition of those values

Default Value

Lists the factory default value of the register

Saved

Yes: The register value is stored in non-volatile memory, and is preserved when power is cycled
No: The register value is stored in volatile memory, and is reset to the default value when power is cycled

Access

Read Only (RO): The register can be read, but not written to
Read and Write (RW): The register can be read and written to

Device Information

The following registers list the model name and other device-specific information.

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
1000	1001	Low word model number	Example: 0x0002A734 (hex) = 173876 (dec) High word = 0x0002 Low word = 0xA734	See Device	Yes	RO
1001	1002	High word model number			Yes	RO
1002	1003	Model version (BCD)		See Device	Yes	RO
1003-1018	1004-1019	Model name, string		See Device	Yes	RO
1019	1020	Low word configuration number	Example: 0x00016D43 (hex) = 93507 (dec) High word = 0x0001 Low word = 0x6D43	See Device	Yes	RO
1020	1021	High word configuration number			Yes	RO
1021	1022	Configuration version (BCD)		See Device	Yes	RO

Continued on page 8

Continued from page 7

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
1022-1037	1023-1038	Serial number/date code, string		See Device	Yes	RO
1038-1053	1039-1054	Serial number, string		See Device	Yes	RO

Modbus Configuration

Use these registers to configure Modbus communications.

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
6100	6101	Device ID: the Modbus individual node ID	1-247	1	Yes	RW
6101	6102	Baud rate	12 = 1200 24 = 2400 48 = 4800 96 = 9600 192 = 19200	192	Yes	RW
6102	6103	Parity	0 = none 1 = odd 2 = even	0	Yes	RW
6103	6104	Stop Bits	1 = 1 2 = 2 3 = 1.5	1	Yes	RW
6120	6121	Saving: When the Saving value is 0, affected registers are saved immediately after every change. When Saving is set to 1, those registers are not saved until the Saving register is set to 0.	0 = Registers are saved to non-volatile memory (including this register) 1 = Registers are not saved to non-volatile memory (including this register)	0	0 = Yes 1 = No	RW

Operation Mode

Use this register to select the main operation mode of the device.

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3200	3201	Operation Mode	0 = Multicolor Mode 1 = Four State Full Logic Mode 2 = Advanced Mode 3 = LED Control Mode 4 = Demo Mode 5 = PICK-IQ Mode 6 = Distance Mode 7 = Coarse Distance Mode	5	Yes	RW

Multicolor Mode

Use one register to activate the defined device state. Use additional non-volatile registers to define output settings, control delays, color, intensity, flash, and other animation types for State 1, State 2, State 3, and State 4.

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3450	3451	Switch Point D1 (mm)	20-1000	20	Yes	RW
3451	3452	Switch Point D2 (mm)	20-1000	1000	Yes	RW
3010	3011	Distance Measured (mm) Values above 1000 that may be measured may not be valid	20-1000	See Device	No	RO
3000	3001	Output Active / Sensor Triggered	0 = Inactive, 1 = Active	0	No	RO
3001	3002	Current Multicolor Mode Animation State	0 = State 1 1 = State 2 2 = State 3 3 = State 4	0	No	RO
3020	3021	Set Multicolor Mode Animation State	0 = State 1 1 = State 2 2 = State 3 3 = State 4	0	No	RW
3300	3301	State 1 Animation Type	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = 50/50 5 = 50/50 Rotate 6 = Chase 7 = Intensity Sweep 8 = Color Sweep 9 = Sequence 10 = Wave 11 = Double Wave	1	Yes	RW
3301	3302	State 1 Animation Direction	0 = Counter Clockwise, 1 = Clockwise	0	Yes	RW
3302	3303	State 1 Animation Pattern	0 = Flash 1 = Strobe 2 = Three Pulse 3 = SOS 4 = Random	0	Yes	RW
3303	3304	State 1 Animation Speed	0 = Slow 1 = Medium 2 = Fast 3 = Custom	1	Yes	RW
3304	3305	Reserved				
3305	3306	State 1 Off Delay Type	0 = Leading Edge, 1 = Trailing Edge	1	Yes	RW
3306	3307	State 1 Off Delay (ms)	0-65535	0	Yes	RW

Continued on page 9

Continued from page 9

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3307	3308	State 1 On Delay (ms)	0-65535	0	Yes	RW
3308	3309	State 1 Static Sequence Value	0-255	0	Yes	RW
3309	3310	State 1 Sequence Start Location	0 = LED1 1 = LED2 2 = LED3 3 = LED4 4 = LED5 5 = LED6 6 = LED7 7 = LED8	0	Yes	RW
3310	3311	State 1 Color 1	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW
3311	3312	State 1 Color 1 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW

Continued on page 11

Continued from page 10

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3312	3313	State 1 Color 2	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW
3313	3314	State 1 Color 2 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3320	3321	State 2 Animation Type	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = 50/50 5 = 50/50 Rotate 6 = Chase 7 = Intensity Sweep 8 = Color Sweep 9 = Sequence 10 = Wave 11 = Double Wave	1	Yes	RW
3321	3322	State 2 Animation Direction	0 = Counter Clockwise, 1 = Clockwise	0	Yes	RW
3322	3323	State 2 Animation Pattern	0 = Flash 1 = Strobe 2 = Three Pulse 3 = SOS 4 = Random	0	Yes	RW

Continued on page 12

Continued from page 11

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3323	3324	State 2 Animation Speed	0 = Slow 1 = Medium 2 = Fast 3 = Custom	1	Yes	RW
3324	3325	Reserved				
3325	3326	State 2 Off Delay Type	0 = Leading Edge, 1 = Trailing Edge	1	Yes	RW
3326	3327	State 2 Off Delay (ms)	0-65535	0	Yes	RW
3327	3328	State 2 On Delay (ms)	0-65535	0	Yes	RW
3328	3329	State 2 Static Sequence Value	0-255	0	Yes	RW
3329	3330	State 2 Sequence Start Location	0 = LED1 1 = LED2 2 = LED3 3 = LED4 4 = LED5 5 = LED6 6 = LED7 7 = LED8	0	Yes	RW
3330	3331	State 2 Color 1	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	1	Yes	RW
3331	3332	State 2 Color 1 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW

Continued on page 13

Continued from page 12

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3332	3333	State 2 Color 2	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW
3333	3334	State 2 Color 2 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3340	3341	State 3 Animation Type	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = 50/50 5 = 50/50 Rotate 6 = Chase 7 = Intensity Sweep 8 = Color Sweep 9 = Sequence 10 = Wave 11 = Double Wave	1	Yes	RW
3341	3342	State 3 Animation Direction	0 = Counter Clockwise, 1 = Clockwise	0	Yes	RW
3342	3343	State 3 Animation Pattern	0 = Flash 1 = Strobe 2 = Three Pulse 3 = SOS 4 = Random	0	Yes	RW

Continued on page 14

Continued from page 13

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3343	3344	State 3 Animation Speed	0 = Slow 1 = Medium 2 = Fast 3 = Custom	1	Yes	RW
3344	3345	Reserved				
3345	3346	State 3 Off Delay Type	0 = Leading Edge, 1 = Trailing Edge	1	Yes	RW
3346	3347	State 3 Off Delay (ms)	0-65535	0	Yes	RW
3347	3348	State 3 On Delay (ms)	0-65535	0	Yes	RW
3348	3349	State 3 Static Sequence Value	0-255	0	Yes	RW
3349	3350	State 3 Sequence Start Location	0 = LED1 1 = LED2 2 = LED3 3 = LED4 4 = LED5 5 = LED6 6 = LED7 7 = LED8	0	Yes	RW
3350	3351	State 3 Color 1	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	4	Yes	RW
3351	3352	State 3 Color 1 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW

Continued on page 15

Continued from page 14

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3352	3353	State 3 Color 2	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW
3353	3354	State 3 Color 2 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3360	3361	State 4 Animation Type	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = 50/50 5 = 50/50 Rotate 6 = Chase 7 = Intensity Sweep 8 = Color Sweep 9 = Sequence 10 = Wave 11 = Double Wave	1	Yes	RW
3361	3362	State 4 Animation Direction	0 = Counter Clockwise, 1 = Clockwise	0	Yes	RW
3362	3363	State 4 Animation Pattern	0 = Flash 1 = Strobe 2 = Three Pulse 3 = SOS 4 = Random	0	Yes	RW

Continued on page 16

Continued from page 15

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3363	3364	State 4 Animation Speed	0 = Slow 1 = Medium 2 = Fast 3 = Custom	1	Yes	RW
3364	3365	Reserved				
3365	3366	State 4 Off Delay Type	0 = Leading Edge, 1 = Trailing Edge	1	Yes	RW
3366	3367	State 4 Off Delay (ms)	0-65535	0	Yes	RW
3367	3368	State 4 On Delay (ms)	0-65535	0	Yes	RW
3368	3369	State 4 Static Sequence Value	0-255	0	Yes	RW
3369	3370	State 4 Sequence Start Location	0 = LED1 1 = LED2 2 = LED3 3 = LED4 4 = LED5 5 = LED6 6 = LED7 7 = LED8	0	Yes	RW
3370	3371	State 4 Color 1	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	9	Yes	RW
3371	3372	State 4 Color 1 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW

Continued on page 17

Continued from page 16

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3372	3373	State 4 Color 2	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW
3373	3374	State 4 Color 2 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW

Four State Full Logic Mode

Use a register to define the Job State and to read the sensor state and device state (Waiting State, Mispick State, Job State, Acknowledge State). Use additional non-volatile registers to define color, intensity, flash, speed, select animation type, and define output settings.

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3450	3451	Switch Point D1 (mm)	20-1000	20	Yes	RW
3451	3452	Switch Point D2 (mm)	20-1000	1000	Yes	RW
3010	3011	Distance Measured (mm) Values above 1000 that may be measured may not be valid	20-1000	See Device	No	RO
3000	3001	Output Active / Sensor Triggered	0 = Inactive, 1 = Active	0	No	RO
3001	3002	Current Four State Full Logic Animation State	0 = Waiting State 1 = Mispick State 2 = Job State 3 = Acknowledge State	0	No	RO
3040	3041	Set Four State Full Logic Job State	0 = Waiting State, 1 = Job State	0	No	RW

Continued on page 18

Continued from page 17

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3300	3301	Waiting State Animation Type	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = 50/50 5 = 50/50 Rotate 6 = Chase 7 = Intensity Sweep 8 = Color Sweep 9 = Sequence 10 = Wave 11 = Double Wave	1	Yes	RW
3301	3302	Waiting State Animation Direction	0 = Counter Clockwise, 1 = Clockwise	0	Yes	RW
3302	3303	Waiting State Animation Pattern	0 = Flash 1 = Strobe 2 = Three Pulse 3 = SOS 4 = Random	0	Yes	RW
3303	3304	Waiting State Animation Speed	0 = Slow 1 = Medium 2 = Fast 3 = Custom	1	Yes	RW
3304	3305	Reserved				
3305	3306	Waiting State Off Delay Type	0 = Leading Edge, 1 = Trailing Edge	1	Yes	RW
3306	3307	Waiting State Off Delay (ms)	0-65535	0	Yes	RW
3307	3308	Waiting State On Delay (ms)	0-65535	0	Yes	RW
3308	3309	Waiting State Static Sequence Value	0-255	0	Yes	RW
3309	3310	Waiting State Sequence Start Location	0 = LED1 1 = LED2 2 = LED3 3 = LED4 4 = LED5 5 = LED6 6 = LED7 7 = LED8	0	Yes	RW

Continued on page 19

Continued from page 18

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3310	3311	Waiting State Color 1	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW
3311	3312	Waiting State Color 1 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3312	3313	Waiting State Color 2	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW

Continued on page 20

Continued from page 19

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3313	3314	Waiting State Color 2 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3320	3321	Mispick State Animation Type	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = 50/50 5 = 50/50 Rotate 6 = Chase 7 = Intensity Sweep 8 = Color Sweep 9 = Sequence 10 = Wave 11 = Double Wave	1	Yes	RW
3321	3322	Mispick State Animation Direction	0 = Counter Clockwise, 1 = Clockwise	0	Yes	RW
3322	3323	Mispick State Animation Pattern	0 = Flash 1 = Strobe 2 = Three Pulse 3 = SOS 4 = Random	0	Yes	RW
3323	3324	Mispick State Animation Speed	0 = Slow 1 = Medium 2 = Fast 3 = Custom	1	Yes	RW
3324	3325	Reserved				
3325	3326	Mispick State Off Delay Type	0 = Leading Edge, 1 = Trailing Edge	1	Yes	RW
3326	3327	Mispick State Off Delay (ms)	0-65535	0	Yes	RW
3327	3328	Mispick State On Delay (ms)	0-65535	0	Yes	RW
3328	3329	Mispick State Static Sequence Value	0-255	0	Yes	RW
3329	3330	Mispick State Sequence Start Location	0 = LED1 1 = LED2 2 = LED3 3 = LED4 4 = LED5 5 = LED6 6 = LED7 7 = LED8	0	Yes	RW

Continued on page 21

Continued from page 20

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3330	3331	Mispick State Color 1	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	1	Yes	RW
3331	3332	Mispick State Color 1 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3332	3333	Mispick State Color 2	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW

Continued on page 22

Continued from page 21

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3333	3334	Mispick State Color 2 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3340	3341	Job State Animation Type	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = 50/50 5 = 50/50 Rotate 6 = Chase 7 = Intensity Sweep 8 = Color Sweep 9 = Sequence 10 = Wave 11 = Double Wave	1	Yes	RW
3341	3342	Job State Animation Direction	0 = Counter Clockwise, 1 = Clockwise	0	Yes	RW
3342	3343	Job State Animation Pattern	0 = Flash 1 = Strobe 2 = Three Pulse 3 = SOS 4 = Random	0	Yes	RW
3343	3344	Job State Animation Speed	0 = Slow 1 = Medium 2 = Fast 3 = Custom	1	Yes	RW
3344	3345	Reserved				
3345	3346	Job State Off Delay Type	0 = Leading Edge, 1 = Trailing Edge	1	Yes	RW
3346	3347	Job State Off Delay (ms)	0-65535	0	Yes	RW
3347	3348	Job State On Delay (ms)	0-65535	0	Yes	RW
3348	3349	Job State Static Sequence Value	0-255	0	Yes	RW
3349	3350	Job State Sequence Start Location	0 = LED1 1 = LED2 2 = LED3 3 = LED4 4 = LED5 5 = LED6 6 = LED7 7 = LED8	0	Yes	RW

Continued on page 23

Continued from page 22

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3350	3351	Job State Color 1	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	4	Yes	RW
3351	3352	Job State Color 1 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3352	3353	Job State Color 2	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW

Continued on page 24

Continued from page 23

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3353	3354	Job State Color 2 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3360	3361	Acknowledge State Animation Type	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = 50/50 5 = 50/50 Rotate 6 = Chase 7 = Intensity Sweep 8 = Color Sweep 9 = Sequence 10 = Wave 11 = Double Wave	1	Yes	RW
3361	3362	Acknowledge State Animation Direction	0 = Counter Clockwise, 1 = Clockwise	0	Yes	RW
3362	3363	Acknowledge State Animation Pattern	0 = Flash 1 = Strobe 2 = Three Pulse 3 = SOS 4 = Random	0	Yes	RW
3363	3364	Acknowledge State Animation Speed	0 = Slow 1 = Medium 2 = Fast 3 = Custom	1	Yes	RW
3364	3365	Reserved				
3365	3366	Acknowledge State Off Delay Type	0 = Leading Edge, 1 = Trailing Edge	1	Yes	RW
3366	3367	Acknowledge State Off Delay (ms)	0-65535	0	Yes	RW
3367	3368	Acknowledge State On Delay (ms)	0-65535	0	Yes	RW
3368	3369	Acknowledge State Static Sequence Value	0-255	0	Yes	RW
3369	3370	Acknowledge State Sequence Start Location	0 = LED1 1 = LED2 2 = LED3 3 = LED4 4 = LED5 5 = LED6 6 = LED7 7 = LED8	0	Yes	RW

Continued on page 25

Continued from page 24

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3370	3371	Acknowledge State Color 1	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	9	Yes	RW
3371	3372	Acknowledge State Color 1 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3372	3373	Acknowledge State Color 2	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW

Continued on page 26

Continued from page 25

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3373	3374	Acknowledge State Color 2 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW

Advanced Mode

Use volatile registers to control color, intensity, flash, and other animation types. Use custom registers to create custom colors, intensity, speeds, and to define output and sensor settings.

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3450	3451	Switch Point D1 (mm)	20-1000	20	Yes	RW
3451	3452	Switch Point D2 (mm)	20-1000	1000	Yes	RW
3010	3011	Distance Measured (mm) Values above 1000 that may be measured may not be valid	20-1000	See Device	No	RO
3000	3001	Output Active / Sensor Triggered	0 = Inactive, 1 = Active	0	No	RO
3060	3061	Animation Type	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = 50/50 5 = 50/50 Rotate 6 = Chase 7 = Intensity Sweep 8 = Color Sweep 9 = Sequence 10 = Wave 11 = Double Wave	0	No	RW
3061	3062	Animation Direction	0 = Counter Clockwise, 1 = Clockwise	0	No	RW
3062	3063	Animation Pattern	0 = Flash 1 = Strobe 2 = Three Pulse 3 = SOS 4 = Random	0	No	RW
3063	3064	Animation Speed	0 = Slow 1 = Medium 2 = Fast 3 = Custom	0	No	RW
3064	3065	Reserved				
3065	3066	Reserved				
3066	3067	Reserved				

Continued on page 27

Continued from page 26

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3067	3068	Reserved				
3068	3069	Set Sequence Value	0-255 = 0-100% Filled	0	No	RW
3069	3070	Sequence Start Location	0 = LED1 1 = LED2 2 = LED3 3 = LED4 4 = LED5 5 = LED6 6 = LED7 7 = LED8	0	No	RW
3070	3071	Color 1	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	No	RW
3071	3072	Color 1 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	No	RW

Continued on page 28

Continued from page 27

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3072	3073	Color 2	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	No	RW
3073	3074	Color 2 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	No	RW

LED Control Mode

Use volatile registers to define the color and intensity of each individual LED. Use custom registers to define customer colors and intensities.

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3450	3451	Switch Point D1 (mm)	20-1000	20	Yes	RW
3451	3452	Switch Point D2 (mm)	20-1000	1000	Yes	RW
3010	3011	Distance Measured (mm) Values above 1000 that may be measured may not be valid	20-1000	See Device	No	RO
3000	3001	Output Active / Sensor Triggered	0 = Inactive 1 = Active	0	No	RO

Continued on page 29

Continued from page 28

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3080	3081	LED 1 Color	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	No	RW
3081	3082	LED 1 Intensity	0-10 = 0-100%	0	No	RW
3082	3083	LED 2 Color	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	No	RW
3083	3084	LED 2 Intensity	0-10 = 0-100%	0	No	RW

Continued on page 30

Continued from page 29

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3084	3085	LED 3 Color	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	No	RW
3085	3086	LED 3 Intensity	0-10 = 0-100%	0	No	RW
3086	3087	LED 4 Color	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	No	RW
3087	3088	LED 4 Intensity	0-10 = 0-100%	0	No	RW

Continued on page 31

Continued from page 30

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3088	3089	LED 5 Color	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	No	RW
3089	3090	LED 5 Intensity	0-10 = 0-100%	0	No	RW
3090	3091	LED 6 Color	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	No	RW
3091	3092	LED 6 Intensity	0-10 = 0-100%	0	No	RW

Continued on page 32

Continued from page 31

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3092	3093	LED 7 Color	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	No	RW
3093	3094	LED 7 Intensity	0-10 = 0-100%	0	No	RW
3094	3095	LED 8 Color	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	No	RW
3095	3096	LED 8 Intensity	0-10 = 0-100%	0	No	RW

Demo Mode

Cycles through color spectrum, 50/50 rotate, intensity sweep, and sequence mode. Triggering the sensor initiates state showing individually colored LEDs. When set to demo mode, the device will cycle through the defined sequence when power is applied regardless of its connection to a Modbus master.

PICK-IQ Mode

Basic Mode - This operating mode is the most straightforward to configure. In basic mode, the master controls all aspects of the device. The master must communicate all logic functions by defining what the transitions will look like.

State Mode - State mode requires the configuration of the device to define the visual settings for the four standard pick-to-light logic states, defined below. These settings are embedded inside the device and do not require communication from the master device to change visual states after the device is actuated. This allows the device to respond immediately to any interaction and allows the communication to the master to happen simultaneously.

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
7940	7941	Modbus slave ID of active device, same as register 6100	1-247	1	Yes	RO
7941	7942	Device latch; values in this register will latch until acknowledged and cleared by the master (either by changing the value in this register or in register 8700) OR will clear after the timeout elapses as defined in register 8812	0 = None triggered, 1 = Primary triggered	1	Yes	RW
7942	7943	Device output status; values in this register will reflect the real time status of the output	0 = None triggered, 1 = Primary triggered	0	Yes	RO
7943	7944	Distance Measured (mm) Values above 1000 that may be measured may not be valid	20-1000	See Device	No	RO
3450	3451	Switch Point D1 (mm)	20-1000	20	Yes	RW
3451	3452	Switch Point D2 (mm)	20-1000	1000	Yes	RW
8810	8811	Common ID	1 - 247	195	Yes	RW
8811	8812	Global on delay that applies to sensor (stacks on top of on delays in registers 6001 and 6003) (ms)	0 - 65535 (65535 value is infinite)	0	Yes	RW
8812	8813	Latch timeout for register 7941 (ms)	0 - 65535 (65535 value is infinite)	1000	Yes	RW
8813	8814	Minimum output on time for register 7942, off delay (ms)	0 - 65535 (65535 value is infinite)	0	Yes	RW
-	-	-	-	-	-	-
3000	3001	Output Active / Sensor Triggered	0 = Inactive, 1 = Active	0	No	RO
3001	3002	Current PICK-IQ Animation State	0 = Waiting State 1 = Mispick State 2 = Job State 3 = Acknowledge State	0	No	RO
-	-	-	-	-	-	-
6300	6301	Enable Basic or State Mode	0 = Basic Mode, 1 = State Mode	0	Yes	RW
			Basic Mode Registers			
8701	8702	Basic Animation Type	0 = Off 1 = Steady 2 = Flash 3 = Strobe 11-20 N-Pulse (N = Index - 10) (for example, 13 = 3 Pulse)	0	No	RW

Continued on page 34

Continued from page 33

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
8702	8703	Basic Color 1	0 = Off 1 = Red 2 = Green 3= Yellow 4 = Blue 5 = Magenta 6 = Cyan 7 = White 8 = Amber 9 = Rose 10 = Lime Green 11 = Orange 12 = Sky Blue 13 = Violet 14 = Spring Green	0	No	RW
6200	6201	Basic Color 1 Intensity	0 = Low 1 = Medium 2 = High	1	Yes	RW
State Mode Registers						
8700	8701	Job State Any write to this register resets the device latch in Register 7941	0 = Waiting State, 1 = Job State	0	No	RW
8701	8702	Job State Override Animation Active when Job State = 1. This value will then override the value in register 6323.	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = Half/Half Top/Bottom 5 = Half/Half Left/Right 6 = Half/Half Rotate 7 = Chase 8 = Intensity Sweep	0	No	RW

Continued on page 35

Continued from page 34

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
8702	8703	Job State Override Color 1 Active when Job State = 1. This value will then override the value in register 6324.	0 = Red 1 = Green 2 = Yellow 3 = Blue 4 = Magenta 5 = Cyan 6 = White 7 = Amber 8 = Rose 9 = Lime Green 10 = Orange 11 = Sky Blue 12 = Violet 13 = Spring Green	0	No	RW
6301	6302	Waiting State: Animation	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = Half/Half Top/Bottom 5 = Half/Half Left/Right 6 = Half/Half Rotate 7 = Chase 8 = Intensity Sweep	1	Yes	RW
6302	6303	Waiting State: Color 1	0 = Red 1 = Green 2 = Yellow 3 = Blue 4 = Magenta 5 = Cyan 6 = White 7 = Amber 8 = Rose 9 = Lime Green 10 = Orange 11 = Sky Blue 12 = Violet 13 = Spring Green	1	Yes	RW

Continued on page 36

Continued from page 35

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
6303	6304	Waiting State: Color 2	0 = Red 1 = Green 2 = Yellow 3 = Blue 4 = Magenta 5 = Cyan 6 = White 7 = Amber 8 = Rose 9 = Lime Green 10 = Orange 11 = Sky Blue 12 = Violet 13 = Spring Green	1	Yes	RW
6304	6305	Waiting State: Intensity for Color 1	0 = High 1 = Medium 2 = Low 3 = Off	0	Yes	RW
6305	6306	Waiting State: Intensity for Color 2	0 = High 1 = Medium 2 = Low 3 = Off	0	Yes	RW
6306	6307	Waiting State: Animation Speed	0 = Slow 1 = Standard 2 = Fast	1	Yes	RW
6307	6308	Waiting State: Animation Pattern	0 = Normal 1 = Strobe 2 = 3-Pulse 3 = SOS 4 = Random	0	Yes	RW
6308	6309	Waiting State: Animation Direction	0 = Clockwise, 1 = Counterclockwise	1	Yes	RW
6309	6310	Waiting State: Visual On Delay (ms)	0 - 65535	0	Yes	RW
6310	6311	Waiting State: Visual Off Delay (ms)	0 - 65535	0	Yes	RW
6311	6312	Reserved				

Continued on page 37

Continued from page 36

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
6312	6313	Mispick State: Animation	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = Half/Half Top/Bottom 5 = Half/Half Left/Right 6 = Half/Half Rotate 7 = Chase 8 = Intensity Sweep	1	Yes	RW
6313	6314	Mispick State: Color 1	0 = Red 1 = Green 2 = Yellow 3 = Blue 4 = Magenta 5 = Cyan 6 = White 7 = Amber 8 = Rose 9 = Lime Green 10 = Orange 11 = Sky Blue 12 = Violet 13 = Spring Green	2	Yes	RW
6314	6315	Mispick State: Color 2	0 = Red 1 = Green 2 = Yellow 3 = Blue 4 = Magenta 5 = Cyan 6 = White 7 = Amber 8 = Rose 9 = Lime Green 10 = Orange 11 = Sky Blue 12 = Violet 13 = Spring Green	1	Yes	RW
6315	6316	Mispick State: Intensity for Color 1	0 = High 1 = Medium 2 = Low 3 = Off	0	Yes	RW

Continued on page 38

Continued from page 37

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
6316	6317	Mispick State: Intensity for Color 2	0 = High 1 = Medium 2 = Low 3 = Off	0	Yes	RW
6317	6318	Mispick State: Animation Speed	0 = Slow 1 = Standard 2 = Fast	1	Yes	RW
6318	6319	Mispick State: Animation Pattern	0 = Normal 1 = Strobe 2 = 3-Pulse 3 = SOS 4 = Random	0	Yes	RW
6319	6320	Mispick State: Animation Direction	0 = Clockwise, 1 = Counterclockwise	1	Yes	RW
6320	6321	Mispick State: Visual On Delay (ms)	0 - 65535	0	Yes	RW
6321	6322	Mispick State: Visual Off Delay (ms)	0 - 65535	0	Yes	RW
6322	6323	Reserved			Yes	RW
6323	6324	Job State: Animation	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = Half/Half Top/Bottom 5 = Half/Half Left/Right 6 = Half/Half Rotate 7 = Chase 8 = Intensity Sweep	1	Yes	RW
6324	6325	Job State: Color 1	0 = Red 1 = Green 2 = Yellow 3 = Blue 4 = Magenta 5 = Cyan 6 = White 7 = Amber 8 = Rose 9 = Lime Green 10 = Orange 11 = Sky Blue 12 = Violet 13 = Spring Green	0	Yes	RW

Continued on page 39

Continued from page 38

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
6325	6326	Job State: Color 2	0 = Red 1 = Green 2 = Yellow 3 = Blue 4 = Magenta 5 = Cyan 6 = White 7 = Amber 8 = Rose 9 = Lime Green 10 = Orange 11 = Sky Blue 12 = Violet 13 = Spring Green	1	Yes	RW
6326	6327	Job State: Intensity for Color 1	0 = High 1 = Medium 2 = Low 3 = Off	0	Yes	RW
6327	6328	Job State: Intensity for Color 2	0 = High 1 = Medium 2 = Low 3 = Off	0	Yes	RW
6328	6329	Job State: Animation Speed	0 = Slow 1 = Standard 2 = Fast	1	Yes	RW
6329	6330	Job State: Animation Pattern	0 = Normal 1 = Strobe 2 = 3-Pulse 3 = SOS 4 = Random	0	Yes	RW
6330	6331	Job State: Animation Direction	0 = Clockwise, 1 = Counterclockwise	1	Yes	RW
6331	6332	Job State: Visual On Delay (ms)	0 - 65535	0	Yes	RW
6332	6333	Job State: Visual Off Delay (ms)	0 - 65535	0	Yes	RW
6333	6334	Reserved			Yes	RW

Continued on page 40

Continued from page 39

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
6334	6335	Acknowledge State: Animation	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = Half/Half Top/Bottom 5 = Half/Half Left/Right 6 = Half/Half Rotate 7 = Chase 8 = Intensity Sweep	1	Yes	RW
6335	6336	Acknowledge State: Color 1	0 = Red 1 = Green 2 = Yellow 3 = Blue 4 = Magenta 5 = Cyan 6 = White 7 = Amber 8 = Rose 9 = Lime Green 10 = Orange 11 = Sky Blue 12 = Violet 13 = Spring Green	3	Yes	RW
6336	6337	Acknowledge State: Color 2	0 = Red 1 = Green 2 = Yellow 3 = Blue 4 = Magenta 5 = Cyan 6 = White 7 = Amber 8 = Rose 9 = Lime Green 10 = Orange 11 = Sky Blue 12 = Violet 13 = Spring Green	1	Yes	RW
6337	6338	Acknowledge State: Intensity for Color 1	0 = High 1 = Medium 2 = Low 3 = Off	0	Yes	RW

Continued on page 41

Continued from page 40

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
6338	6339	Acknowledge State: Intensity for Color 2	0 = High 1 = Medium 2 = Low 3 = Off	0	Yes	RW
6339	6340	Acknowledge State: Animation Speed	0 = Slow 1 = Standard 2 = Fast	1	Yes	RW
6340	6341	Acknowledge State: Animation Pattern	0 = Normal 1 = Strobe 2 = 3-Pulse 3 = SOS 4 = Random	0	Yes	RW
6341	6342	Acknowledge State: Animation Direction	0 = Clockwise, 1 = Counterclockwise	1	Yes	RW
6342	6343	Acknowledge State: Visual On Delay (ms)	0 - 65535	0	Yes	RW
6343	6344	Acknowledge State: Visual Off Delay (ms)	0 - 65535	0	Yes	RW
6344	6345	Reserved				

Distance Mode

Set the device to operate as a gauge, which allows the user to configure a background color and a fill color to display how far an object is within the Detection Area.

As an object moves along the sensing range, the proportion of fill color to background color changes in a clockwise (CW) or counter-clockwise (CCW) direction. The proportion of fill color increases as an object approaches the maximum range, and decreases as it moves towards the minimum.

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3450	3451	Switch Point D1 (mm) (Only used to determine register 3000 output state)	20-1000	20	Yes	RW
3451	3452	Switch Point D2 (mm) (Only used to determine register 3000 output state)	20-1000	1000	Yes	RW
3000	3001	Output Active / Sensor Triggered (Determined by register 3450 and 3451 values)	0 = Inactive, 1 = Active	0	No	RO
3010	3011	Distance Measured (mm) Values above 1000 that may be measured may not be valid	20-1000	See Device	No	RO
3452	3453	Distance Mode Switch Point D1 (mm)	20-1000	20	Yes	RW
3453	3454	Distance Mode Switch Point D2 (mm)	20-1000	1000	Yes	RW
3301	3302	Sequence Animation Direction	0 = Counter Clockwise, 1 = Clockwise	0	Yes	RW

Continued on page 42

Continued from page 41

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3309	3310	Sequence Start Location	0 = LED1 1 = LED2 2 = LED3 3 = LED4 4 = LED5 5 = LED6 6 = LED7 7 = LED8	0	Yes	RW
3310	3311	Color 1	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW
3311	3312	Color 1 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW

Continued on page 43

Continued from page 42

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3312	3313	Color 2	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW
3313	3314	Color 2 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3320	3321	Out of Range Animation Type	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = 50/50 5 = 50/50 Rotate 6 = Chase 7 = Intensity Sweep 8 = Color Sweep 9 = Sequence 10 = Wave 11 = Double Wave	1	Yes	RW
3321	3322	Out of Range Animation Direction	0 = Counter Clockwise, 1 = Clockwise	0	Yes	RW
3322	3323	Out of Range Animation Pattern	0 = Flash 1 = Strobe 2 = Three Pulse 3 = SOS 4 = Random	0	Yes	RW

Continued on page 44

Continued from page 43

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3323	3324	Out of Range Animation Speed	0 = Slow 1 = Medium 2 = Fast 3 = Custom	1	Yes	RW
3324	3325	Reserved				
3325	3326	Reserved				
3326	3327	Reserved				
3327	3328	Reserved				
3328	3329	Out of Range Static Sequence Value	0-255	0	Yes	RW
3329	3330	Out of Range Sequence Start Location	0 = LED1 1 = LED2 2 = LED3 3 = LED4 4 = LED5 5 = LED6 6 = LED7 7 = LED8	0	Yes	RW
3330	3331	Out of Range Color 1	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	1	Yes	RW
3331	3332	Out of Range Color 1 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW

Continued on page 45

Continued from page 44

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3332	3333	Out of Range Color 2	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW
3333	3334	Out of Range Color 2 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW

Coarse Distance Mode

Divide the Detection Area into custom zones to generate a unique animation when an object is present within that zone distance.

Configure up to five zones for animation and output state.

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3000	3001	Output Active / Sensor Triggered	0 = Inactive, 1 = Active	0	No	RO
3001	3002	Current Coarse Distance Animation State	0 = State 1 1 = State 2 2 = State 3 3 = State 4 4 = State 5 5 = Out of Range	0	No	RO
3010	3011	Distance Measured (mm) Values above 1000 that may be measured may not be valid	20-1000	See Device	No	RO
3314	3315	State 1 Switch Point D1 (mm)	20-1000	20	Yes	RW
3315	3316	State 1 Switch Point D2 (mm)	20-1000	105	Yes	RW
3316	3317	Enable Output in State 1	0 = Disabled, 1 = Enabled	0	Yes	RW

Continued on page 46

Continued from page 45

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3300	3301	State 1 Animation Type	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = 50/50 5 = 50/50 Rotate 6 = Chase 7 = Intensity Sweep 8 = Color Sweep 9 = Sequence 10 = Wave 11 = Double Wave	1	Yes	RW
3301	3302	State 1 Animation Direction	0 = Counter Clockwise, 1 = Clockwise	0	Yes	RW
3302	3303	State 1 Animation Pattern	0 = Flash 1 = Strobe 2 = Three Pulse 3 = SOS 4 = Random	0	Yes	RW
3303	3304	State 1 Animation Speed	0 = Slow 1 = Medium 2 = Fast 3 = Custom	1	Yes	RW
3304	3305	Reserved				
3305	3306	State 1 Off Delay Type	0 = Leading Edge, 1 = Trailing Edge	1	Yes	RW
3306	3307	State 1 Off Delay (ms)	0-65535	0	Yes	RW
3307	3308	State 1 On Delay (ms)	0-65535	0	Yes	RW
3308	3309	State 1 Static Sequence Value	0-255	0	Yes	RW
3309	3310	State 1 Sequence Start Location	0 = LED1 1 = LED2 2 = LED3 3 = LED4 4 = LED5 5 = LED6 6 = LED7 7 = LED8	0	Yes	RW

Continued on page 47

Continued from page 46

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3310	3311	State 1 Color 1	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW
3311	3312	State 1 Color 1 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3312	3313	State 1 Color 2	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW

Continued on page 48

Continued from page 47

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3313	3314	State 1 Color 2 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3334	3335	State 2 Switch Point D1 (mm)	20-1000	95	Yes	RW
3335	3336	State 2 Switch Point D2 (mm)	20-1000	155	Yes	RW
3336	3337	Enable Output in State 2	0 = Disabled, 1 = Enabled	1	Yes	RW
3320	3321	State 2 Animation Type	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = 50/50 5 = 50/50 Rotate 6 = Chase 7 = Intensity Sweep 8 = Color Sweep 9 = Sequence 10 = Wave 11 = Double Wave	1	Yes	RW
3321	3322	State 2 Animation Direction	0 = Counter Clockwise, 1 = Clockwise	0	Yes	RW
3322	3323	State 2 Animation Pattern	0 = Flash 1 = Strobe 2 = Three Pulse 3 = SOS 4 = Random	0	Yes	RW
3323	3324	State 2 Animation Speed	0 = Slow 1 = Medium 2 = Fast 3 = Custom	1	Yes	RW
3324	3325	Reserved				
3325	3326	State 2 Off Delay Type	0 = Leading Edge, 1 = Trailing Edge	1	Yes	RW
3326	3327	State 2 Off Delay (ms)	0-65535	0	Yes	RW
3327	3328	State 2 On Delay (ms)	0-65535	0	Yes	RW
3328	3329	State 2 Static Sequence Value	0-255	0	Yes	RW

Continued on page 49

Continued from page 48

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3329	3330	State 2 Sequence Start Location	0 = LED1 1 = LED2 2 = LED3 3 = LED4 4 = LED5 5 = LED6 6 = LED7 7 = LED8	0	Yes	RW
3330	3331	State 2 Color 1	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	1	Yes	RW
3331	3332	State 2 Color 1 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW

Continued on page 50

Continued from page 49

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3332	3333	State 2 Color 2	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW
3333	3334	State 2 Color 2 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3354	3355	State 3 Switch Point D1 (mm)	20-1000	145	Yes	RW
3355	3356	State 3 Switch Point D2 (mm)	20-1000	205	Yes	RW
3356	3357	Enable Output in State 3	0 = Disabled, 1 = Enabled	0	Yes	RW
3340	3341	State 3 Animation Type	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = 50/50 5 = 50/50 Rotate 6 = Chase 7 = Intensity Sweep 8 = Color Sweep 9 = Sequence 10 = Wave 11 = Double Wave	1	Yes	RW
3341	3342	State 3 Animation Direction	0 = Counter Clockwise, 1 = Clockwise	0	Yes	RW

Continued on page 51

Continued from page 50

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3342	3343	State 3 Animation Pattern	0 = Flash 1 = Strobe 2 = Three Pulse 3 = SOS 4 = Random	0	Yes	RW
3343	3344	State 3 Animation Speed	0 = Slow 1 = Medium 2 = Fast 3 = Custom	1	Yes	RW
3344	3345	Reserved				
3345	3346	State 3 Off Delay Type	0 = Leading Edge, 1 = Trailing Edge	1	Yes	RW
3346	3347	State 3 Off Delay (ms)	0-65535	0	Yes	RW
3347	3348	State 3 On Delay (ms)	0-65535	0	Yes	RW
3348	3349	State 3 Static Sequence Value	0-255	0	Yes	RW
3349	3350	State 3 Sequence Start Location	0 = LED1 1 = LED2 2 = LED3 3 = LED4 4 = LED5 5 = LED6 6 = LED7 7 = LED8	0	Yes	RW
3350	3351	State 3 Color 1	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	4	Yes	RW

Continued on page 52

Continued from page 51

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3351	3352	State 3 Color 1 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3352	3353	State 3 Color 2	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW
3353	3354	State 3 Color 2 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3374	3375	State 4 Switch Point D1 (mm)	20-1000	195	Yes	RW
3375	3376	State 4 Switch Point D2 (mm)	20-1000	255	Yes	RW
3376	3377	Enable Output in State 4	0 = Disabled, 1 = Enabled	0	Yes	RW
3360	3361	State 4 Animation Type	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = 50/50 5 = 50/50 Rotate 6 = Chase 7 = Intensity Sweep 8 = Color Sweep 9 = Sequence 10 = Wave 11 = Double Wave	1	Yes	RW

Continued on page 53

Continued from page 52

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3361	3362	State 4 Animation Direction	0 = Counter Clockwise, 1 = Clockwise	0	Yes	RW
3362	3363	State 4 Animation Pattern	0 = Flash 1 = Strobe 2 = Three Pulse 3 = SOS 4 = Random	0	Yes	RW
3363	3364	State 4 Animation Speed	0 = Slow 1 = Medium 2 = Fast 3 = Custom	1	Yes	RW
3364	3365	Reserved				
3365	3366	State 4 Off Delay Type	0 = Leading Edge, 1 = Trailing Edge	1	Yes	RW
3366	3367	State 4 Off Delay (ms)	0-65535	0	Yes	RW
3367	3368	State 4 On Delay (ms)	0-65535	0	Yes	RW
3368	3369	State 4 Static Sequence Value	0-255	0	Yes	RW
3369	3370	State 4 Sequence Start Location	0 = LED1 1 = LED2 2 = LED3 3 = LED4 4 = LED5 5 = LED6 6 = LED7 7 = LED8	0	Yes	RW
3370	3371	State 4 Color 1	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	9	Yes	RW

Continued on page 54

Continued from page 53

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3371	3372	State 4 Color 1 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3372	3373	State 4 Color 2	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW
3373	3374	State 4 Color 2 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3394	3395	State 5 Switch Point D1 (mm)	20-1000	245	Yes	RW
3395	3396	State 5 Switch Point D2 (mm)	20-1000	300	Yes	RW
3396	3397	Enable Output in State 5	0 = Disabled, 1 = Enabled	0	Yes	RW
3380	3381	State 5 Animation Type	0 = Off 1 = Steady 2 = Flash 3 = Two Color Flash 4 = 50/50 5 = 50/50 Rotate 6 = Chase 7 = Intensity Sweep 8 = Color Sweep 9 = Sequence 10 = Wave 11 = Double Wave	1	Yes	RW

Continued on page 55

Continued from page 54

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3381	3382	State 5 Animation Direction	0 = Counter Clockwise, 1 = Clockwise	0	Yes	RW
3382	3383	State 5 Animation Pattern	0 = Flash 1 = Strobe 2 = Three Pulse 3 = SOS 4 = Random	0	Yes	RW
3383	3384	State 5 Animation Speed	0 = Slow 1 = Medium 2 = Fast 3 = Custom	1	Yes	RW
3384	3385	Reserved				
3385	3386	State 5 Off Delay Type	0 = Leading Edge, 1 = Trailing Edge	1	Yes	RW
3386	3387	State 5 Off Delay (ms)	0-65535	0	Yes	RW
3387	3388	State 5 On Delay (ms)	0-65535	0	Yes	RW
3388	3389	State 5 Static Sequence Value	0-255	0	Yes	RW
3389	3390	State 5 Sequence Start Location	0 = LED1 1 = LED2 2 = LED3 3 = LED4 4 = LED5 5 = LED6 6 = LED7 7 = LED8	0	Yes	RW
3390	3391	State 5 Color 1	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	11	Yes	RW

Continued on page 56

Continued from page 55

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3391	3392	State 5 Color 1 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW
3392	3393	State 5 Color 2	0 = Green 1 = Red 2 = Orange 3 = Amber 4 = Yellow 5 = Lime Green 6 = Spring Green 7 = Cyan 8 = Sky Blue 9 = Blue 10 = Violet 11 = Magenta 12 = Rose 13 = White 14 = Custom 1 15 = Custom 2	0	Yes	RW
3393	3394	State 5 Color 2 Intensity	0 = High 1 = Medium 2 = Low 3 = Custom 4 = Off	0	Yes	RW

Custom Settings Configuration

Use these registers to configure custom colors, intensity, speeds, and to define output and sensor settings.

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3400	3401	Custom Color 1 Green, Custom Color 1 Red	0-255, 0-255 (Two 8-bit numbers)	255, 255	Yes	RW
3401	3402	Custom Color 1 Blue	0-255	255	Yes	RW
3410	3411	Custom Color 2 Green, Custom Color 2 Red	0-255, 0-255 (Two 8-bit numbers)	255, 255	Yes	RW
3411	3412	Custom Color 2 Blue	0-255	255	Yes	RW
3420	3421	Custom Intensity	0-100	100	Yes	RW
3421	3422	Custom Speed	5-255	15	Yes	RW
3422	3423	Restrict To Gamut	0 = Off, 1 = On	0	Yes	RW
3433 / 6001	3434 / 6002	Sensor On-Delay (ms)	0-65535	0	Yes	RW

Continued on page 57

Continued from page 56

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
3441	3442	Output Off-Delay Type	0 = Leading Edge, 1 = Trailing Edge	0	Yes	RW
3442	3443	Output Off-Delay (ms)	0-65535	0	Yes	RW
6000	6001	Sensor Enable	0 = Disabled, 1 = Enabled	1	Yes	RW

Test Mode and Restore Factory Defaults

Use these registers to enter test mode and to restore the factory defaults of the device.

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
6500	6501	Enable Test Mode: Indicator flashes blue	0 = Disabled, 1 = Enabled	0	No	RW
6600	6601	Restore Factory Defaults	0 = Disabled, 1 - 65335 = Enable	0	No	RW
6601	6602	Restore Factory Defaults Key 1	43690(0xAAAA) = Enable	0	No	RW
6602	6603	Restore Factory Defaults Key 2	21845(0x5555) = Enable	0	No	RW

Remote Teach

See Configuring a Sensor for more information.

Base 0 Address	Base 1 Address	Description	Holding Register Representation	Default Value	Saved	Access
6510	6511	Remote teach sensor	0 = Teach sensor 1 = Enter Object Mode teach procedure 2 = Enter Background Mode teach procedure 3 = Enter Window Mode teach procedure 4 = Remote Teach inactive	4	No	RW

Chapter Contents

Chapter 4 Configuring a Sensor

As an alternative to manually setting Switch Point D1 in register 3450 and Switch Point D2 in register 3451 for all operating modes except Distance Mode, the K50 Pro Optical Sensor with Modbus has three Teach modes. These modes are indicated with a Teach Status color.

The Signal Level color flashes in between the Teach Status color. The color of the Signal Level depends on the signal strength of the target:

Green: Best signal, accepts Teach
Yellow: Acceptable signal, can accept Teach
Red: Poor signal, rejects Teach

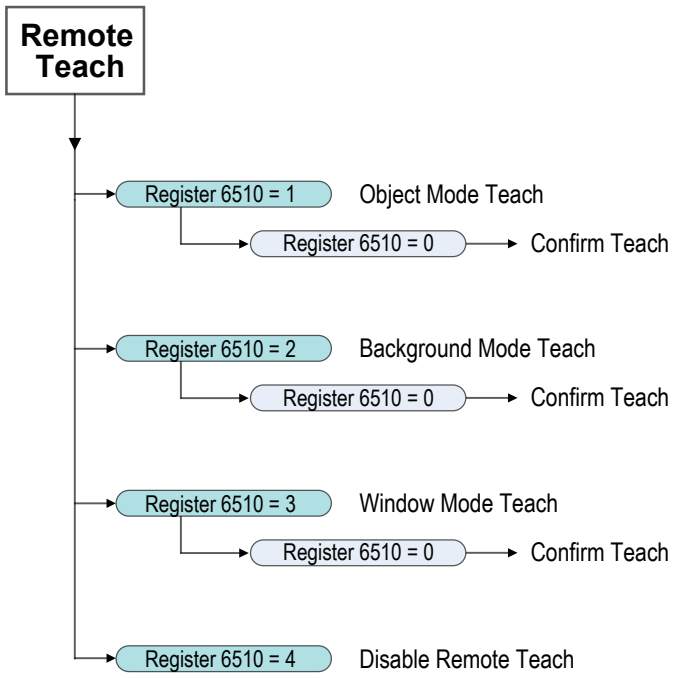
Remote Teach Procedure

Use the following procedure to teach the Set Point.

1. Set register 6510 to one of the following:
   - 1 = Object Teach: The indicator alternates between a blue Teach Status color and the Signal Level color.
   - 2 = Background Teach: The indicator alternates between a magenta Teach Status color and the Signal Level color.
   - 3 = Window Teach: The indicator alternates between a cyan Teach Status color and the Signal Level color.
2. Present the Set Point.
3. Teach the Set Point by setting register 6510 to 0.
4. Confirm that the sensor functions correctly.

   If the Set Point wasn't programmed, readjust the sensor until the Signal Level color turns green or yellow, and then start the procedure again.

Remote Input Map



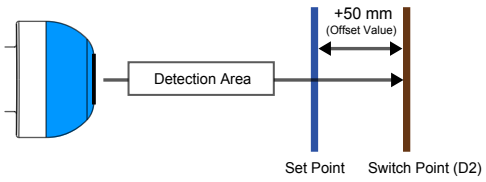
Teach Modes and Operation

Object Mode

Teach Status Color: Blue

Object Mode sets the total Detection Area from the sensor (Switch Point D1 in register 3450) to the Set Point plus the Offset Value (50 mm), which becomes Switch Point D2 in register 3451. Switch Point D1 remains unchanged, with a minimum and default value of 20 mm. Use Object Mode to trigger a change in state when an object is present between the sensor minimum and Switch Point D2.

Set register 6510 value to 1 to enable Object Mode. Successfully entering Object Mode causes the device to alternate between the Teach Status color (Blue) and the Signal Level color.

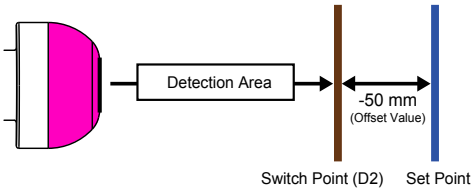


Background Mode

Teach Status Color: Magenta

Background Mode sets the total Detection Area from the sensor (Switch Point D1 in register 3450) to the Set Point minus the Offset Value (50 mm), which becomes Switch Point D2 in register 3451. Switch Point D1 remains unchanged, with a minimum and default value of 20 mm. Use Background Mode when there is a constant background object present and a state change is desired when another object is in front of that background.

Set register 6510 value to 2 to enable Background Mode. Successfully entering Background Mode causes the device to alternate between the Teach Status color (Magenta) and the Signal Level color.

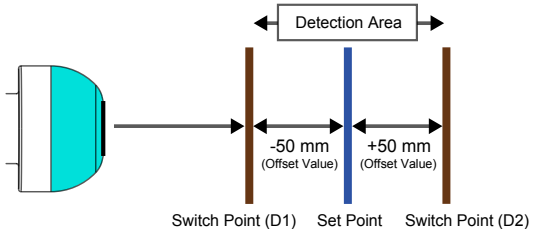


Window Mode

Teach Status Color: Cyan

Window Mode centers the total Detection Area at the Set Point plus (Switch Point D2 in register 3451) and minus (Switch Point D1 in register 3450) the Offset Value (50 mm). Configuring a window near the minimum and maximum ranges shifts this window to ensure that it maintains this value. Use Window Mode when a change in state is desired within a specific narrow area, and not when outside this area.

Set register 6510 value to 3 to enable Window Mode. Successfully entering Window Mode causes the device to alternate between the Teach Status color (Cyan) and the Signal Level color.



Chapter Contents

Chapter 5 Specifications

Supply Voltage and Current

10 V DC to 30 V DC

- 220 mA at 10 V DC (exclusive of load)
- 190 mA at 12 V DC (exclusive of load)
- 115 mA at 24 V DC (exclusive of load)
- 100 mA at 30 V DC (exclusive of load)

Supply Protection Circuitry

Protected against reverse polarity and transient voltages

Vibration and Mechanical Shock

Meets IEC 60068-2-6 requirements (Vibration: 10 Hz to 55 Hz, 1.0 mm amplitude, 5 minutes sweep, 30 minutes dwell)

Meets IEC 60068-2-27 requirements (Shock: 30G 11 ms duration, half sine wave)

Operating Conditions

–20 °C to +50 °C (–4 °F to +122 °F)

90% at +50 °C maximum relative humidity (non-condensing)

Storage Temperature: –40 °C to +70 °C (–40 °F to +158 °F)

Environmental Rating

IP66, IP67, IP69K per ISO 20653

Connections

Integral 4-pin M12 male quick-disconnect connector

Mounting

M30 by 1.5 threaded base, maximum torque 4.5 N·m (40 inch-lbf)

Mounting nut included

Construction

Base and Dome: Polycarbonate

Mounting Nut: Polybutylene terephthalate (PBT)

Application Note

For the most accurate measurements, allow 5 minutes for the sensor to warm up

Repeatability

5 mm from 20 to 300 mm

8 mm from 300 mm to 600 mm

14 mm from 600 mm to 1000 mm

Temperature Effect

<±5 mm from –20 °C to +50 °C (–4 °F to +122 °F)

Required Overcurrent Protection

WARNING: Electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations.

Overcurrent protection is required to be provided by end product application per the supplied table.

Overcurrent protection may be provided with external fusing or via Current Limiting, Class 2 Power Supply.

Supply wiring leads < 24 AWG shall not be spliced.

For additional product support, go to www.bannerengineering.com.

Supply Wiring (AWG)	Required Overcurrent Protection (A)	Supply Wiring (AWG)	Required Overcurrent Protection (A)
20	5.0	26	1.0
22	3.0	28	0.8
24	1.0	30	0.5

Certifications

Banner Engineering BV
Park Lane, Culliganlaan 2F bus 3
1831 Diegem, BELGIUM

Range

The sensor can detect an object at the following ranges, depending on the material and size of the target: 20 mm to 1000 mm

Sensing Beam

Infrared, 940 nm

Default Indicator Characteristics

Color	Dominant Wavelength (nm) or Color Temperature (CCT)	Color Coordinates[2]		Lumen Output Per Segment (Typical at 25 °C)
		X	Y	
Green	522	0.154	0.7	19.5
Red	620	0.689	0.309	10.3
Yellow	576	0.477	0.493	25.8
Blue	466	0.14	0.054	3.6
White	5700K	0.328	0.337	30.5
Cyan	493	0.17	0.34	22.1
Magenta	-	0.379	0.172	12.7
Amber	589	0.556	0.42	17.9
Rose	-	0.525	0.237	10.6
Lime Green	562	0.383	0.523	25.3
Sky Blue	486	0.145	0.24	17.8
Orange	599	0.616	0.37	14.3
Violet	-	0.224	0.099	14.3
Spring Green	508	0.155	0.524	20

FCC Part 15 Class B for Unintentional Radiators

(Part 15.105(b)) This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

(Part 15.21) Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Industry Canada ICES-003(B)

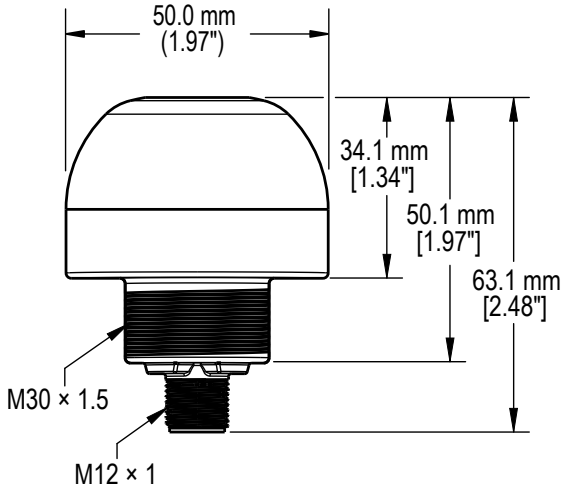
This device complies with CAN ICES-3 (B)/NMB-3(B). Operation is subject to the following two conditions: 1) This device may not cause harmful interference; and 2) This device must accept any interference received, including interference that may cause undesired operation.

Cet appareil est conforme à la norme NMB-3(B). Le fonctionnement est soumis aux deux conditions suivantes : (1) ce dispositif ne peut pas occasionner d'interférences, et (2) il doit tolérer toute interférence, y compris celles susceptibles de provoquer un fonctionnement non souhaité du dispositif.

[2] Refer to CIE 1931 chromaticity diagram or color chart to show equivalent color with indicated color coordinates. Actual coordinates may differ by 10%.

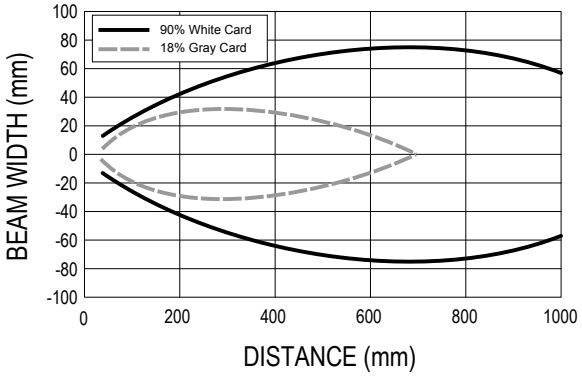
Dimensions

All measurements are listed in millimeters [inches], unless noted otherwise. The measurements provided are subject to change.



Beam Pattern

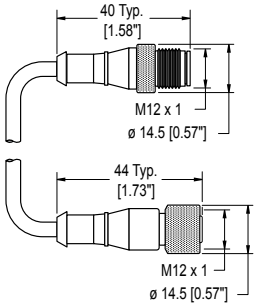
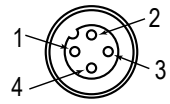
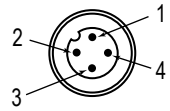
Typical beam pattern, in millimeters



Chapter Contents

Chapter 6 Accessories

Cordsets

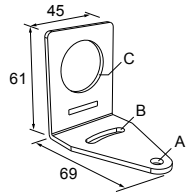
4-Pin Double-Ended M12 Female to M12 Male Cordsets				
Model	**Length**	**Style**	**Dimensions**	**Pinout**
MQDEC-401SS	0.31 m (1 ft)	Male Straight/Female Straight		Female  Male  1 = Brown 2 = White 3 = Blue 4 = Black
MQDEC-403SS	0.91 m (2.99 ft)			
MQDEC-406SS	1.83 m (6 ft)			
MQDEC-412SS	3.66 m (12 ft)			
MQDEC-415SS	4.58 m (15 ft)			
MQDEC-420SS	6.10 m (20 ft)			
MQDEC-430SS	9.14 m (30.2 ft)			
MQDEC-450SS	15.2 m (49.9 ft)			

Brackets

SMB30A

- Right-angle bracket with curved slot for versatile orientation
- Clearance for M6 (¼ in) hardware
- Mounting hole for 30 mm sensor
- 12-gauge stainless steel

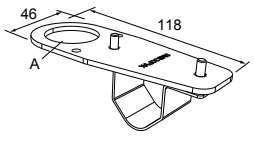
Hole center spacing: A to B=40
Hole size: A=ø 6.3, B= 27.1 × 6.3, C=ø 30.5



SMB30FVK

- V-clamp, flat bracket and fasteners for mounting to pipe or extensions
- Clamp accommodates 28 mm dia. tubing or 1 in. square extrusions
- 30 mm hole for mounting sensors

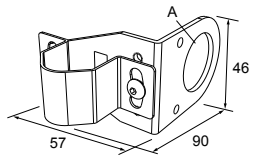
Hole size: A= ø 31



SMB30RAVK

- V-clamp, right-angle bracket and fasteners for mounting sensors to pipe or extrusion
- Clamp accommodates 28 mm dia. tubing or 1 in. square extrusions
- 30 mm hole for mounting sensors

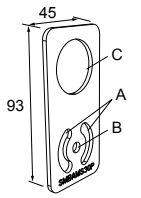
Hole size: A = ø 30.5



SMBAMS30P

- Flat SMBAMS series bracket
- 30 mm hole for mounting sensors
- Articulation slots for 90°+ rotation
- 12-gauge 300 series stainless steel

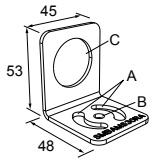
Hole center spacing: A=26.0, A to B=13.0
Hole size: A=26.8 × 7.0, B=ø 6.5, C=ø 31.0



SMBAMS30RA

- Right-angle SMBAMS series bracket
- 30 mm hole for mounting sensors
- Articulation slots for 90°+ rotation
- 12-gauge (2.6 mm) cold-rolled steel

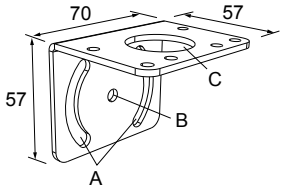
Hole center spacing: A=26.0, A to B=13.0
Hole size: A=26.8 × 7.0, B=ø 6.5, C=ø 31.0



SMB30MM

- 12-gauge stainless steel bracket with curved mounting slots for versatile orientation
- Clearance for M6 (¼ in) hardware
- Mounting hole for 30 mm sensor

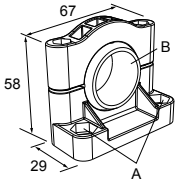
Hole center spacing: A = 51, A to B = 25.4
Hole size: A = 42.6 × 7, B = ø 6.4, C = ø 30.1



SMB30SC

- Swivel bracket with 30 mm mounting hole for sensor
- Black reinforced thermoplastic polyester
- Stainless steel mounting and swivel locking hardware included

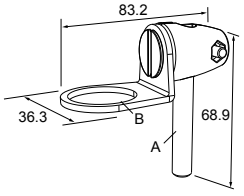
Hole center spacing: A=ø 50.8
Hole size: A=ø 7.0, B=ø 30.0



SMB30FA

- Swivel bracket with tilt and pan movement for precise adjustment
- Mounting hole for 30 mm sensor
- 12-gauge 304 stainless steel
- Easy sensor mounting to extrude rail T-slot
- Metric- and inch-size bolt available

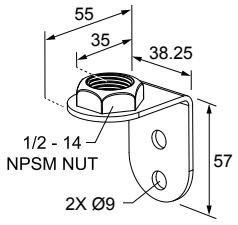
Bolt thread: SMB30FA, A= 3/8 - 16 × 2 in; SMB30FAM10, A= M10 - 1.5 × 50
Hole size: B= ø 30.1



LMBE12RA35

- Direct mounting of stand-off pipe, with common bracket type
- Zinc-plated steel
- 1/2-14 NPSM nut
- Mounting distance from the wall to the center of the 1/2-14 NPSM nut is 35 mm

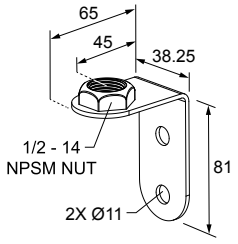
Hole center spacing: 20.0



LMBE12RA45

- Direct mounting of stand-off pipe, with common bracket type
- Zinc-plated steel
- 1/2-14 NPSM nut
- Mounting distance from the wall to the center of the 1/2-14 NPSM nut is 45 mm

Hole center spacing: 35.0



All measurements are listed in millimeters [inches], unless noted otherwise. The measurements provided are subject to change.

Elevated Mount System

Model		Description	Components
SA-M30E12P - Black Acetal		• Streamlined black acetal stand-off pipe adapter/cover • Connects between 30 mm light base and ½ in. NPSM/ DN15 pipe • Mounting hardware included	
Black Anodized Aluminum	**Clear Anodized Aluminum**	• Elevated-use stand-off pipe (½ in. NPSM/DN15) • Polished 304 stainless steel, black anodized aluminum, or clear anodized aluminum surface • ½ in. NPT thread at both ends: one end screws into the internal threads of the light's base, and one end screws into the mounting base adapter/cover • Compatible with most industrial environments	
SOP-E12-150A 150 mm (6 in) long	**SOP-E12-150AC** 150 mm (6 in) long		
SOP-E12-300A 300 mm (12 in) long	**SOP-E12-300AC** 300 mm (12 in) long		
SOP-E12-600A 600 mm (24 in) long	**SOP-E12-600AC** 600 mm (24 in) long		
SOP-E12-900A 900 mm (36 in) long	**SOP-E12-900AC** 900 mm (36 in) long		

Chapter Contents

Chapter 7 Product Support and Maintenance

Animation Definitions

The following table describes the definitions for device states.

Name	Description
Animation Type:	
Off	Indicator is off
Steady	Color 1 is solid on at defined intensity
Flash	Color 1 flashes at defined speed, color intensity, and pattern
Two Color Flash	Color 1 and Color 2 flash alternately at defined speed, color intensities, and pattern
50/50	Color 1 is displayed on 50% of the indicator and Color 2 is displayed on the other 50% of the indicator at the defined color intensities
50/50 Rotate	Color 1 is displayed on 50% of the indicator and Color 2 is displayed on the other 50% of the indicator while rotating at the defined speed, color intensities, and rotational direction
Chase	Color 1 is displayed as a single spot against the background of Color 2 while rotating at the defined speed, color intensities, and rotational direction
Intensity Sweep	Color 1 repeatedly increases and decreases intensity between 0% to 100% at defined speed and color intensity
Color Sweep	Color 1 and Color 2 transition alternately at defined speed and color intensities
Sequence	Color 1 increments against the background of Color 2 at defined Dynamic or Static Sequence Value (Advanced mode and other modes respectively)
Wave	Color 1 increments in a sweeping pattern around the perimeter of the device
Double Wave	Color 1 increments against the background of Color 2 in a sweeping pattern around the perimeter of the device
Animation Direction	Defines the direction of rotation for the 50/50 rotate, chase, and sequence animations (CW or CCW)
Animation Pattern	Defines the flash pattern for flash and two color flash animations (normal, strobe, three pulse, SOS, or random)
Animation Speed	Defines the animation speed (slow, medium, fast, or custom)
Off Delay Type	Defines if the Off Delay should be measured from when the conditions for the State began (Leading Edge) or from when the conditions ended (Trailing Edge)
Off Delay (ms)	The duration of the animation Off Delay. Leading Edge Off Delays can be used to ensure the animation is active for at least a minimum amount of time.
Static Sequence Value	Defines the span of Color 1 in the Sequence animation [0-255]. 0 means no portion of the animation will be Color 1, and it increases in a circular manner to 255 which indicates the full circumference will be Color 1.
Sequence Shift	Shifts the beginning of the sequence animation to the specified LED (LED1 at 12 o'clock continuing in the direction indicated by the Animation Direction parameter
Color 1	Defines Color 1 of defined animation
Color 1 Intensity	Defines the intensity of Color 1 in the animation (high, medium, low, off, or custom)
Color 2	Defines Color 2 of defined animation
Color 2 Intensity	Defines the intensity of Color 2 in the animation (high, medium, low, off, or custom)

Clean with Mild Detergent and Warm Water

Wipe down the device with a soft cloth dampened with a mild detergent and warm water solution. Do not use any other chemicals for cleaning.

Repairs

Contact Banner Engineering for troubleshooting of this device. **Do not attempt any repairs to this Banner device; it contains no field-replaceable parts or components.** If the device, device part, or device component is determined to be defective by a Banner Applications Engineer, they will advise you of Banner's RMA (Return Merchandise Authorization) procedure.

> **IMPORTANT:** If instructed to return the device, pack it with care. Damage that occurs in return shipping is not covered by warranty.

Contact Us

Banner Engineering Corp. headquarters is located at: 9714 Tenth Avenue North | Plymouth, MN 55441, USA | Phone: + 1 888 373 6767

For worldwide locations and local representatives, visit www.bannerengineering.com.

Banner Engineering Corp Limited Warranty

Banner Engineering Corp. warrants its products to be free from defects in material and workmanship for one year following the date of shipment. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture which, at the time it is returned to the factory, is found to have been defective during the warranty period. This warranty does not cover damage or liability for misuse, abuse, or the improper application or installation of the Banner product.

THIS LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED (INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), AND WHETHER ARISING UNDER COURSE OF PERFORMANCE, COURSE OF DEALING OR TRADE USAGE.

This Warranty is exclusive and limited to repair or, at the discretion of Banner Engineering Corp., replacement. **IN NO EVENT SHALL BANNER ENGINEERING CORP. BE LIABLE TO BUYER OR ANY OTHER PERSON OR ENTITY FOR ANY EXTRA COSTS, EXPENSES, LOSSES, LOSS OF PROFITS, OR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM ANY PRODUCT DEFECT OR FROM THE USE OR INABILITY TO USE THE PRODUCT, WHETHER ARISING IN CONTRACT OR WARRANTY, STATUTE, TORT, STRICT LIABILITY, NEGLIGENCE, OR OTHERWISE.**

Banner Engineering Corp. reserves the right to change, modify or improve the design of the product without assuming any obligations or liabilities relating to any product previously manufactured by Banner Engineering Corp. Any misuse, abuse, or improper application or installation of this product or use of the product for personal protection applications when the product is identified as not intended for such purposes will void the product warranty. Any modifications to this product without prior express approval by Banner Engineering Corp will void the product warranties. All specifications published in this document are subject to change; Banner reserves the right to modify product specifications or update documentation at any time. Specifications and product information in English supersede that which is provided in any other language. For the most recent version of any documentation, refer to: www.bannerengineering.com.

For patent information, see www.bannerengineering.com/patents.

LinkedIn

X (formerly Twitter)

Facebook