K50 Pro Indicator with IO-Link Product Manual

Original Instructions
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Chapter Contents

Models 3

Chapter 1 Features

50 mm Programmable Multicolor RGB Indicator



- Bright, uniform indicator light
- IO-Link control allows access to full color, flashing, and dimming controls as well as advanced animations
- Millions of color possibilities
- 30 mm threaded polycarbonate base
- Translucent polycarbonate dome
- Rugged IP66, IP67, IP69K per ISO 20653 and UL Type 4X and UL Type 13 design

Models

Family	Style	Color and Input	Connector[1]
K50	**PSL**	**K**	**Q**
	PSL = Pro Indicator	K = IO-Link	Q = Integral 4-pin M12 male quick-disconnect connector

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

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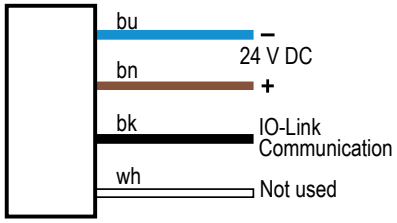
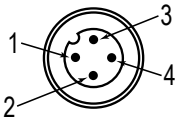
Chapter Contents

Chapter 2 Wiring

Diagram	Pinout
	 1 = Brown (bn) 2 = White (wh) 3 = Blue (bu) 4 = Black (bk)

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Chapter 3 IO-Link®

IO-Link® is a point-to-point communication link between a master device and a sensor and/or light. It can be used to automatically parameterize sensors or lights and to transmit process data. For the latest IO-Link protocol and specifications, please visit www.io-link.com.

For the latest IODD files, please refer to the Banner Engineering Corp website at: www.bannerengineering.com.

IO-Link Process Data In (Device to Master)

Use process data to read the device output state. When the device is in Four State Full Logic mode, use process data to read the device logic state in addition to the output state.

Name	Description
Output State	Output state follows touch, optical sensor, or push button input
Device State	Current state (State 1, State 2, State 3, State 4). Only available with Operation Mode set to Four State Full Logic or Multicolor

IO-Link Process Data Out (Master to Device)

Use process data out to define device states. Use parameter data to define device modes, states, output settings, and custom colors.

Multicolor Mode

Use process data to activate the defined device state. Use parameter data to define output settings, control delays, color, intensity, flash, and other animation types for State 1, State 2, State 3, and State 4.

Four State Full Logic Mode

Use process data to define the Job Input state and device state (State 1, State 2, State 3, State 4). See below for more information about how to achieve legacy logic types (C, D, E, and H). Use parameter data to change color, intensity, flash, speed, select animation type, and define output settings.

Advanced Mode

Use process data to control delays, color, intensity, flash, and other animation types. Process data is also used to control the sequence value dynamically. Use parameter data to create custom colors, intensity, speeds, and to define output settings.

Definitions for device states in Multicolor Mode, Four State Full Logic Mode, and Advanced Mode

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

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Name	Description
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 2 increments across the background of Color 1
Double Wave	Color 2 increments across the background of Color 1, and then the reverse occurs
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); also defines the pattern of the vibration feedback
Animation Speed	Defines the animation speed (slow, medium, fast, or custom); also defines the speed of the vibration feedback pattern
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. In Advanced Mode, this is in process data and is called Dynamic Sequence Value. In the other modes, this is in parameter data and is called Static Sequence Value.
Sequence Start Location	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)

LED Control Mode

Use process data to define the color and intensity of each individual LED. Use parameter data to define customer colors and intensities. LED1 is oriented at the 12 o'clock position, continuing clockwise through LED8 near 11 o'clock position.

IO-Link Data Map

This section refers to the following IODD file: Banner_Engineering-K50PSTKQ-20250107-IODD1.1-en (3).html. The IODD file and support files can be found on www.bannerengineering.com under the download section of the product family page.

Communication Parameters

The following communication parameters are used.

Parameter	Value	Parameter	Value
IO-Link revision	V1.1	Port class	A
Process data in length	32 bits	SIO mode	No
Process data out length	320 bits	Smart sensor profile	Yes

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Parameter	Value	Parameter	Value
Bit rate	38400 bps	Block parameterization	Yes
Minimum cycle time	5 ms	Data storage	Yes
Device ID	0×060012		

Process Data: Multicolor

ProcessData id=V_Pd_Multicolor (condition V_OperationMode == 0)

IO-Link Process Data Out (Master to Device)

ProcessDataOut id=V_Pd_OutMulticolor

- Bit Length: 64
- Data Type: 64-bit Record (subindex access not supported)

Subindex	Bit Offset	Data Type	Allowed Values	Name	Description
1	56	3-bit UInteger	0 = State 1, 1 = State 2, 2 = State 3, 3 = State 4	State	Animation State. Related parameters are defined in Four State Full Logic/Multicolor parameter data.

Octet 0								
Bit offset	63	62	61	60	59	58	57	56
Subindex	-	-	-	-	-	-	1	
Element bit							1	0

Octet 1								
Bit offset	55	54	53	52	51	50	49	48
Subindex	-	-	-	-	-	-	-	-

Octet 2								
Bit offset	47	46	45	44	43	42	41	40
Subindex	-	-	-	-	-	-	-	-

Octet 3								
Bit offset	39	38	37	36	35	34	33	32
Subindex	-	-	-	-	-	-	-	-

Octet 4								
Bit offset	31	30	29	28	27	26	25	24
Subindex	-	-	-	-	-	-	-	-

Octet 5								
Bit offset	23	22	21	20	19	18	17	16
Subindex	-	-	-	-	-	-	-	-

Octet 6								
Bit offset	15	14	13	12	11	10	9	8
Subindex	-	-	-	-	-	-	-	-

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Octet 7								
Bit offset	7	6	5	4	3	2	1	0
Subindex	-	-	-	-	-	-	-	-

Process Data: Four State Full Logic

ProcessData id=V_Pd_FourStateFullLogic (condition V_OperationMode == 1)

IO-Link Process Data Out (Master to Device)

ProcessDataOut id=V_Pd_OutFourStateFullLogic

- Bit Length: 64
- Data Type: 64-bit Record (subindex access not supported)

Subindex	Bit Offset	Data Type	Allowed Values	Name	Description
1	56	Boolean	false = Off, true = On	Job Input	The Job Input for Four State Full Logic mode.
2	57	Boolean	false = Off, true = On	User Input	The User Input for Four State Full Logic mode.

Octet 0								
Bit offset	63	62	61	60	59	58	57	56
Subindex	-	-	-	-	-	-	2	1

Octet 1								
Bit offset	55	54	53	52	51	50	49	48
Subindex	-	-	-	-	-	-	-	-

Octet 2								
Bit offset	47	46	45	44	43	42	41	40
Subindex	-	-	-	-	-	-	-	-

Octet 3								
Bit offset	39	38	37	36	35	34	33	32
Subindex	-	-	-	-	-	-	-	-

Octet 4								
Bit offset	31	30	29	28	27	26	25	24
Subindex	-	-	-	-	-	-	-	-

Octet 5								
Bit offset	23	22	21	20	19	18	17	16
Subindex	-	-	-	-	-	-	-	-

Octet 6								
Bit offset	15	14	13	12	11	10	9	8
Subindex	-	-	-	-	-	-	-	-

Octet 7								
Bit offset	7	6	5	4	3	2	1	0
Subindex	-	-	-	-	-	-	-	-

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Process Data: Advanced

ProcessData id=V_Pd_Advanced (condition V_OperationMode == 2)

IO-Link Process Data Out (Master to Device)

ProcessDataOut id=V_Pd_OutAdvanced

- Bit Length: 64
- Data Type: 64-bit Record (subindex access not supported)

Subindex	Bit Offset	Data Type	Allowed Values	Name	Description
1	56	4-bit UInteger	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	Animation Type	The animation type
2	60	Boolean	false = CW, true = CCW	Animation Direction	The direction the animation rotates
3	61	3-bit UInteger	0 = Flash, 1 = Strobe, 2 = Three Pulse, 3 = SOS, 4 = Random	Animation Pattern	The pattern of the animation
4	48	2-bit UInteger	0 = Slow, 1 = Medium, 2 = Fast, 3 = Custom	Animation Speed	The speed of the animation
5	24	8-bit UInteger	0..255	Static Sequence Value (0-255)	The value that describes the LED position of the device. LED state is defined in Parameters Set Using IO-Link.
6	16	3-bit UInteger	0 = LED 1, 1 = LED 2, 2 = LED 3, 3 = LED 4, 4 = LED 5, 5 = LED 6, 6 = LED 7, 7 = LED 8	Sequence Start Location	Defines the LED location where the sequence animation is initiated.
7	8	5-bit UInteger	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	Color 1	The main color of the animation. Custom Colors are defined in Parameters Set Using IO-Link.
8	13	3-bit UInteger	0 = High, 1 = Medium, 2 = Low, 3 = Off, 4 = Custom	Color 1 Intensity	The intensity of Color 1. Custom Intensity is defined in Parameters Set Using IO-Link.
9	0	5-bit UInteger	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	Color 2	The secondary color of the animation. Custom Colors are defined in Parameters Set Using IO-Link.
10	5	3-bit UInteger	0 = High, 1 = Medium, 2 = Low, 3 = Off, 4 = Custom	Color 2 Intensity	The intensity of Color 2. Custom Intensity is defined in Parameters Set Using IO-Link.

Octet 0								
Bit offset	63	62	61	60	59	58	57	56
Subindex	3			2	1			
Element Bit	2	1	0		3	2	1	0

Octet 1								
Bit offset	55	54	53	52	51	50	49	48
Subindex	-	-	-	-	-	-	4	
Element Bit							1	0

Octet 2								
Bit offset	47	46	45	44	43	42	41	40
Subindex	-	-	-	-	-	-	-	-

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Octet 3								
Bit offset	39	38	37	36	35	34	33	32
Subindex	-	-	-	-	-	-	-	-

Octet 4								
Bit offset	31	30	29	28	27	26	25	24
Subindex	5							
Element Bit	7	6	5	4	3	2	1	0

Octet 5								
Bit offset	23	22	21	20	19	18	17	16
Subindex	-	-	-	-	-	6		
Element Bit						2	1	0

Octet 6								
Bit offset	15	14	13	12	11	10	9	8
Subindex	8			7				
Element Bit	2	1	0	4	3	2	1	0

Octet 7								
Bit offset	7	6	5	4	3	2	1	0
Subindex	10			9				
Element Bit	2	1	0	4	3	2	1	0

Process Data: LED Control

ProcessData id=V_Pd_LedControl (condition V_OperationMode == 3)

IO-Link Process Data Out (Master to Device)

ProcessDataOut id=V_Pd_OutLedControl

- Bit Length: 64
- Data Type: 64-bit Record (subindex access not supported)

Subindex	Bit Offset	Data Type	Allowed Values	Name	Description
1	56	4-bit UInteger	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	LED 1 Color	Defines the color of the designated LED. LED 1 is oriented at the 12 o'clock position.
2	60	4-bit UInteger	0..10	LED 1 Intensity (0-10)	Defines the intensity of the designated LED
3	48	4-bit UInteger	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	LED 2 Color	Defines the color of the designated LED
4	52	4-bit UInteger	0..10	LED 2 Intensity (0-10)	Defines the intensity of the designated LED

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Subindex	Bit Offset	Data Type	Allowed Values	Name	Description
5	40	4-bit UInteger	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	LED 3 Color	Defines the color of the designated LED
6	44	4-bit UInteger	0..10	LED 3 Intensity (0-10)	Defines the intensity of the designated LED
7	32	4-bit UInteger	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	LED 4 Color	Defines the color of the designated LED
8	36	4-bit UInteger	0..10	LED 4 Intensity (0-10)	Defines the intensity of the designated LED
9	24	4-bit UInteger	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	LED 5 Color	Defines the color of the designated LED
10	28	4-bit UInteger	0..10	LED 5 Intensity (0-10)	Defines the intensity of the designated LED
11	16	4-bit UInteger	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	LED 6 Color	Defines the color of the designated LED
12	20	4-bit UInteger	0..10	LED 6 Intensity (0-10)	Defines the intensity of the designated LED
13	8	4-bit UInteger	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	LED 7 Color	Defines the color of the designated LED
14	12	4-bit UInteger	0..10	LED 7 Intensity (0-10)	Defines the intensity of the designated LED
15	0	4-bit UInteger	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	LED 8 Color	Defines the color of the designated LED
16	4	4-bit UInteger	0..10	LED 8 Intensity (0-10)	Defines the intensity of the designated LED

Octet 0								
Bit offset	63	62	61	60	59	58	57	56
Subindex	2				1			
Element Bit	3	2	1	0	3	2	1	0

Octet 1								
Bit offset	55	54	53	52	51	50	49	48
Subindex	4				3			
Element Bit	3	2	1	0	3	2	1	0

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Octet 2								
Bit offset	47	46	45	44	43	42	41	40
Subindex	6				5			
Element Bit	3	2	1	0	3	2	1	0

Octet 3								
Bit offset	39	38	37	36	35	34	33	32
Subindex	8				7			
Element Bit	3	2	1	0	3	2	1	0

Octet 4								
Bit offset	31	30	29	28	27	26	25	24
Subindex	10				9			
Element Bit	3	2	1	0	3	2	1	0

Octet 5								
Bit offset	23	22	21	20	19	18	17	16
Subindex	12				11			
Element Bit	3	2	1	0	3	2	1	0

Octet 6								
Bit offset	15	14	13	12	11	10	9	8
Subindex	14				13			
Element Bit	3	2	1	0	3	2	1	0

Octet 7								
Bit offset	7	6	5	4	3	2	1	0
Subindex	16				15			
Element Bit	3	2	1	0	3	2	1	0

Parameters Set Using IO-Link

Index	Subindex	Name	Length	Value Range	Default	Access Rights	Data Storage?
0	1-16	Direct Parameters 1	128			rw	
1	1-16	Direct Parameters 2	128			rw	
2		Standard Command	8	65 = Teach Object Mode 66 = Teach Background Mode 67 = Teach Window Mode 68 = Teach Cancel 69 = Teach Off 130 = Restore Factory Settings		wo	
3-11							
12		**Direct Access Locks**	16				
	1	Parameter (write) Access Lock	1	0 = Off, 1 = On	False	rw	y
	2	Data Storage Lock	1	0 = Off, 1 = On	False	rw	y
	3	Local Parameterization Lock	1	0 = Off, 1 = On		rw	y
	4	Local User Interface Lock	1	0 = Off, 1 = On		rw	y
13-15							

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Index	Subindex	Name	Length	Value Range	Default	Access Rights	Data Storage?
16		Vendor Name string	240	Banner Engineering Corporation		ro	
17		Vendor Text string	232	More Sensors. More Solutions.		ro	
18		Product Name string	256	K50		ro	
19		Product ID string	256	K50PSLKQ		ro	
20		Product Text string	256	K50 ToF with IOL		ro	
21		Serial Number	128			ro	
22		Hardware Version	512			ro	
23		Firmware Version	128			ro	
24		App Specific Tag (user defined)	256			rw	y
25-35							
36		Device Status	8	0 = Device is OK 1 = Maintenance required 2 = Out of specification 3 = Functional check 4 = Failure 5–255 = Reserved		ro	
37		Detailed Device Status	Array[6] of 3-octet			ro	
38-79							
80		Operation Mode	3	0 = Multicolor 1 = Full State Full Logic 2 = Advanced 3 = LED Control 4 = Demo	2	rw	y
81		**Setting**	24				
	1	Custom Intensity (0 - 100%)	8	0..100	100	rw	y
	2	Custom Flash Rate (0.5 - 25.5 Hz)	8	5..255	15	rw	y
	3	Restrict To Gamut	8	0 = Off, 1 = On	0	rw	y
82		**User Input Settings**	56				
	1	Function	1	false = Momentary, true = Latched	False	rw	
	2	Mute Enable	1	false = Off, true = On	False	rw	
	3	On Delay (ms)	16	0..65535	0	rw	
	4	Target Threshold Low (mm)	16	20..1500	20	rw	
	5	Target Threshold High(mm)	16	20..1500	500	rw	
83		**Output Settings**	24				
	1	Output State	1	false = Normally Closed, true = Normally Open	True	rw	
	2	Off Delay Type	1	false = Leading Edge, true = Trailing Edge	False	rw	
	3	Off Delay (ms)	16	0..65535	0	rw	
84		**State 1 Parameters**					
	1	Animation Type	4	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	rw	y
	2	Animation Direction	1	false = CW, true = CCW	False	rw	y
	3	Animation Pattern	3	0 = Flash, 1 = Strobe, 2 = Three Pulse, 3 = SOS, 4 = Random	0	rw	y
	4	Animation Speed	2	0 = Slow, 1 = Medium, 2 = Fast, 3 = Custom	1	rw	y
	5	Reserved	2	0	0	rw	y
	6	Off Delay Type	1	false = Leading Edge, true = Trailing Edge	False	rw	y
	7	Off Delay (ms)	16	0..65535	0	rw	y
	8	Static Sequence Value (0-255)	8	0..255	0	rw	y

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Index	Subindex	Name	Length	Value Range	Default	Access Rights	Data Storage?
	9	Sequence Start Location	3	0 = LED 1, 1 = LED 2, 2 = LED 3, 3 = LED 4, 4 = LED 5, 5 = LED 6, 6 = LED 7, 7 = LED 8	0	rw	y
	10	Color 1	5	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	rw	y
	11	Color 1 Intensity	3	0 = High, 1 = Medium, 2 = Low, 3 = Off, 4 = Custom	0	rw	y
	12	Color 2	5	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	rw	y
	13	Color 2 Intensity	3	0 = High, 1 = Medium, 2 = Low, 3 = Off, 4 = Custom	0	rw	y
85		**State 2 Parameters**					
	1	Animation Type	4	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	rw	y
	2	Animation Direction	1	false = CW, true = CCW	False	rw	y
	3	Animation Pattern	3	0 = Flash, 1 = Strobe, 2 = Three Pulse, 3 = SOS, 4 = Random	0	rw	y
	4	Animation Speed	2	0 = Slow, 1 = Medium, 2 = Fast, 3 = Custom	1	rw	y
	5	Reserved	2	0	0	rw	y
	6	Off Delay Type	1	false = Leading Edge, true = Trailing Edge	False	rw	y
	7	Off Delay (ms)	16	0..65535	0	rw	y
	8	Static Sequence Value (0-255)	8	0..255	0	rw	y
	9	Sequence Start Location	3	0 = LED 1, 1 = LED 2, 2 = LED 3, 3 = LED 4, 4 = LED 5, 5 = LED 6, 6 = LED 7, 7 = LED 8	0	rw	y
	10	Color 1	5	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	rw	y
	11	Color 1 Intensity	3	0 = High, 1 = Medium, 2 = Low, 3 = Off, 4 = Custom	0	rw	y
	12	Color 2	5	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	rw	y
	13	Color 2 Intensity	3	0 = High, 1 = Medium, 2 = Low, 3 = Off, 4 = Custom	0	rw	y
86		**State 3 Parameters**					
	1	Animation Type	4	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	rw	y
	2	Animation Direction	1	false = CW, true = CCW	False	rw	y
	3	Animation Pattern	3	0 = Flash, 1 = Strobe, 2 = Three Pulse, 3 = SOS, 4 = Random	0	rw	y
	4	Animation Speed	2	0 = Slow, 1 = Medium, 2 = Fast, 3 = Custom	1	rw	y
	5	Reserved	2	0	0	rw	y
	6	Off Delay Type	1	false = Leading Edge, true = Trailing Edge	False	rw	y
	7	Off Delay (ms)	16	0..65535	0	rw	y
	8	Static Sequence Value (0-255)	8	0..255	0	rw	y
	9	Sequence Start Location	3	0 = LED 1, 1 = LED 2, 2 = LED 3, 3 = LED 4, 4 = LED 5, 5 = LED 6, 6 = LED 7, 7 = LED 8	0	rw	y
	10	Color 1	5	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	rw	y
	11	Color 1 Intensity	3	0 = High, 1 = Medium, 2 = Low, 3 = Off, 4 = Custom	0	rw	y

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Index	Subindex	Name	Length	Value Range	Default	Access Rights	Data Storage?
	12	Color 2	5	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	rw	y
	13	Color 2 Intensity	3	0 = High, 1 = Medium, 2 = Low, 3 = Off, 4 = Custom	0	rw	y
87		**State 4 Parameters**					
	1	Animation Type	4	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	rw	y
	2	Animation Direction	1	false = CW, true = CCW	False	rw	y
	3	Animation Pattern	3	0 = Flash, 1 = Strobe, 2 = Three Pulse, 3 = SOS, 4 = Random	0	rw	y
	4	Animation Speed	2	0 = Slow, 1 = Medium, 2 = Fast, 3 = Custom	1	rw	y
	5	Reserved	2	0	0	rw	y
	6	Off Delay Type	1	false = Leading Edge, true = Trailing Edge	False	rw	y
	7	Off Delay (ms)	16	0..65535	0	rw	y
	8	Static Sequence Value (0-255)	8	0..255	0	rw	y
	9	Sequence Start Location	3	0 = LED 1, 1 = LED 2, 2 = LED 3, 3 = LED 4, 4 = LED 5, 5 = LED 6, 6 = LED 7, 7 = LED 8	0	rw	y
	10	Color 1	5	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	rw	y
	11	Color 1 Intensity	3	0 = High, 1 = Medium, 2 = Low, 3 = Off, 4 = Custom	0	rw	y
	12	Color 2	5	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	rw	y
	13	Color 2 Intensity	3	0 = High, 1 = Medium, 2 = Low, 3 = Off, 4 = Custom	0	rw	y
88		**Custom Color 1**	24				
	1	Red	8	0..255	255	rw	y
	2	Green	8	0..255	255	rw	y
	3	Blue	8	0..255	255	rw	y
89		**Custom Color 2**	24				
	1	Red	8	0..255	255	rw	y
	2	Green	8	0..255	255	rw	y
	3	Blue	8	0..255	255	rw	y

IO-Link Events

Events and Error Types are acyclic transmissions from the IO-Link device to the IO-Link master. Events can be error messages and/or warning or maintenance data.

Event Types		
Code	**Type**	**Description**
0 (0x0000)	Notification	No malfunction
20480 (0x5000)	Error	Device hardware fault/Device exchange

Error Types			
Code	**Additional Code**	**Name**	**Description**
128 (0x80)	0 (0x00)	Device application error - no details	Service has been refused by the device application and no detailed information of the incident is available

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Error Types			
Code	**Additional Code**	**Name**	**Description**
	17 (0x11)	Index not available	Access occurs to a not existing device
	18 (0x12)	Subindex not available	Access occurs to a not existing subindex
	32 (0x20)	Service temporarily not available	Parameter is not accessible because of the current state of the device application
	35 (0x23)	Access denied	Write access on a read-only parameter
	48 (0x30)	Parameter value out of range	Written parameter value is outside its permitted value range
	49 (0x31)	Parameter value above limit	Written parameter value is above its specific value limit
	51 (0x33)	Parameter length overrun	Written parameter length is above its predefined length
	52 (0x34)	Parameter length underrun	Written parameter length is below its predefined length
	53 (0x35)	Function not available	Written command is not supported by the device application
	54 (0x36)	Function temporarily unavailable	Written command is not available because of the current state of the device application
	65 (0x41)	Inconsistent parameter set	Parameter inconsistencies were found at the end of the block parameter transfer, device plausibility check failed

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Chapter 4 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

Leakage Current Immunity

400 µA

Input Response Time

250 milliseconds maximum

Flash

Default 1.5 Hz flash rate using flash input wire

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

–40 °C to +50 °C (–40 °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)

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

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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	25.1
Red	620	0.689	0.309	13.9
Yellow	576	0.477	0.493	38.1
Blue	466	0.14	0.054	4
White	5700K	0.328	0.337	38.8
Cyan	493	0.17	0.34	27.9
Magenta	-	0.379	0.172	16.8

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%.

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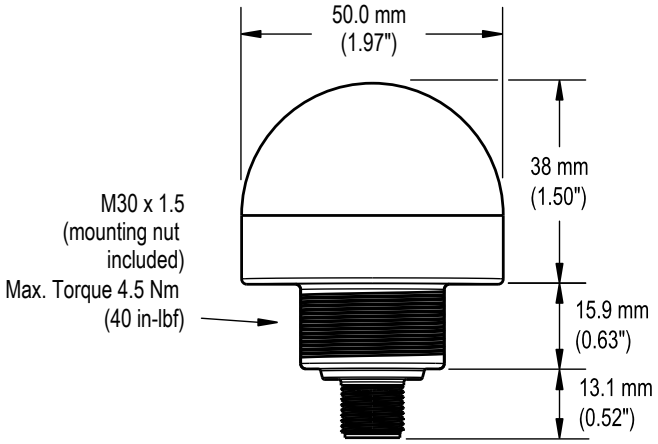
Dimensions

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



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Brackets 20
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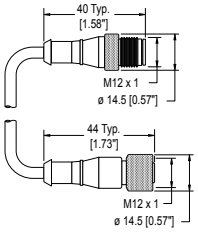
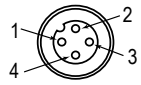
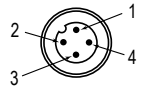
Elevated Mount System 22

Chapter 5 Accessories

Cordsets

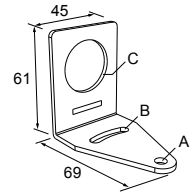
4-pin A-Code Double-Ended M12 Female to M12 Male Cordsets				
Model	**Length**	**Dimensions (mm)**	**Pinouts**	
BC-M12F4-M12M4-22-1	1 m (3.28 ft)		Female  Male 	1 = Brown 2 = White 3 = Blue 4 = Black
BC-M12F4-M12M4-22-2	2 m (6.56 ft)			
BC-M12F4-M12M4-22-3	3 m (9.84 ft)			
BC-M12F4-M12M4-22-4	4 m (13.12 ft)			
BC-M12F4-M12M4-22-5	5 m (16.4 ft)			
BC-M12F4-M12M4-22-10	10 m (30.81 ft)			
BC-M12F4-M12M4-22-15	15 m (49.2 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

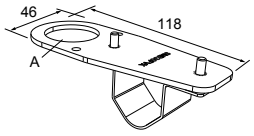
Hole center spacing: A to B=40
Hole size: A=ø 6.3, B= 27.1 × 6.3, C=ø 30.5



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

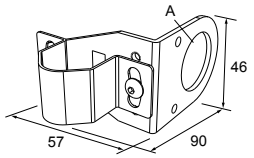
Hole size: A= ø 31



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



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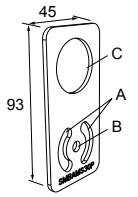
SMBAMS30P

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

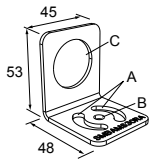
Hole center spacing: A=26.0, A to B=13.0
Hole size: A=26.8 × 7.0, B=ø 6.5, C=ø 31.0



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

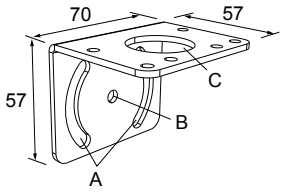
Hole center spacing: A=26.0, A to B=13.0
Hole size: A=26.8 × 7.0, B=ø 6.5, C=ø 31.0



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

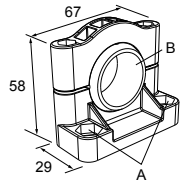
Hole center spacing: A = 51, A to B = 25.4
Hole size: A = 42.6 × 7, B = ø 6.4, C = ø 30.1



SMB30SC

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

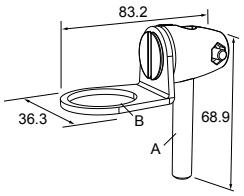
Hole center spacing: A=ø 50.8
Hole size: A=ø 7.0, B=ø 30.0



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

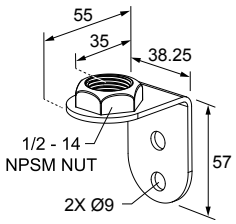
Bolt thread: SMB30FA, A= 3/8 - 16 × 2 in; SMB30FAM10, A= M10 - 1.5 × 50
Hole size: B= ø 30.1



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



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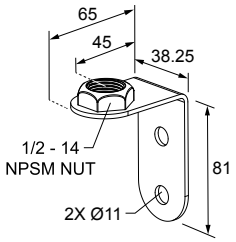
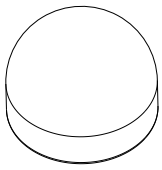
LMBE12RA45 • Direct mounting of stand-off pipe, with common bracket type • Zinc-plated steel • 1/2-14 NPSM nut • Mounting distance from the wall to the center of the 1/2-14 NPSM nut is 45 mm **Hole center spacing:** 35.0	

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

Wash-Down Cover

WC-K50 Washdown Cover • FDA-grade silicone • Fits K50 indicators • IP67 and IP69K rated	

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		

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Chapter 6 Product Support and Maintenance

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.

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