

TL50 Pro Tower Light with IO-Link



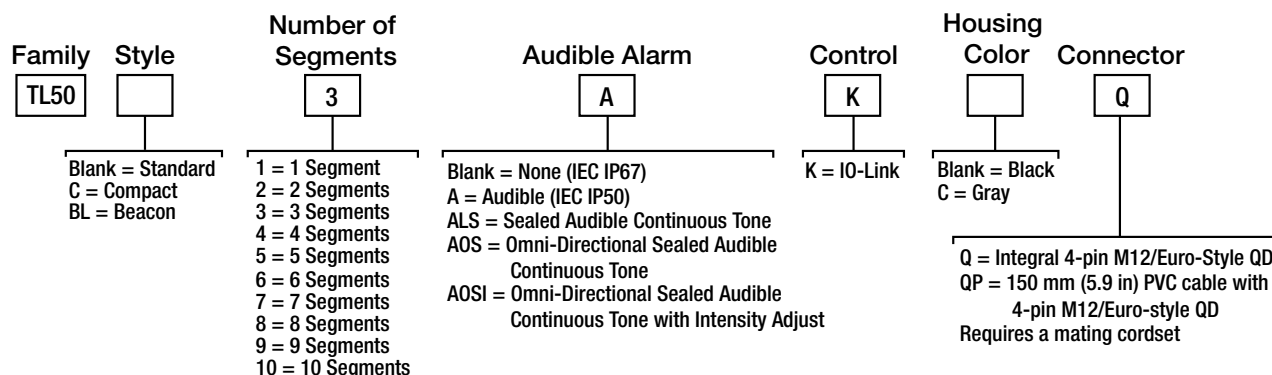
Datasheet

50 mm IO-Link Controlled Multicolor RGB Tower Light

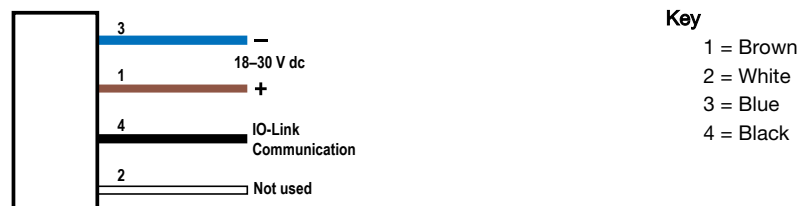


- Rugged, cost-effective, and easy-to-install multi-segment tower lights
- Illuminated segments provide easy-to-see operator guidance and indication of equipment status
- IO-Link gives full access to color, flashing, rotating, and dimming settings, as well as advanced animations like run and level modes which provides dynamic response to changing machine conditions
- Up to 10 segments available
- Available in black or light gray housing to match different machine styles
- Audible models available with standard, sealed, or omni-directional audible element
- Compact and beacon models are more intense in a smaller form factor compared to standard models

Models



Wiring Diagram



IO-Link Process Data Out (Master to Device)

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.

Basic Segment Mode

Use process data to set each segment to off, solid on, flash, or animation mode. Use parameter data to change color, intensity, flash speed, and select animation type.

Animation	Description
Off	Segment is off
Steady	Color 1 is solid on at defined intensity
Flash	Color 1 flashes at defined speed, color intensity, and pattern (normal, strobe, three pulse, SOS, or random)
Two Color Flash	Color 1 and Color 2 flash alternately at defined speed, color intensities, and pattern (normal, strobe, three pulse, SOS, or random)
50/50	Color 1 is displayed on 50% of the segment and Color 2 is displayed on the other 50% of the segment at the defined color intensities
50/50 Rotate	Color 1 is displayed on 50% of the segment and Color 2 is displayed on the other 50% of the segment 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

Advanced Segment Mode

Use process data to activate each segment and control color, intensity, flash, and other animation types. Use parameter data to create custom colors, intensity, and flash speeds.

Animation	Description
Off	Segment is off
Steady	Color 1 is solid on at defined intensity
Flash	Color 1 flashes at defined speed, color intensity, and pattern (normal, strobe, three pulse, SOS, or random)
Two Color Flash	Color 1 and Color 2 flash alternately at defined speed, color intensities, and pattern (normal, strobe, three pulse, SOS, or random)
50/50	Color 1 is displayed on 50% of the segment and Color 2 is displayed on the other 50% of the segment at the defined color intensities
50/50 Rotate	Color 1 is displayed on 50% of the segment and Color 2 is displayed on the other 50% of the segment 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

Run Mode

Use process data to control entire tower light and select color, intensity, flash and run mode animations. Use parameter data to create custom colors, intensity, and flash speeds.

Animation	Description
Off	Tower is off
Steady	Color 1 is solid on for every segment at defined intensity
Flash	Color 1 flashes on every segment at defined speed, color intensity, and pattern (normal, strobe, three pulse, SOS, or random)
Two Color Flash	Color 1 and Color 2 flash alternately on every segment at defined speed, color intensities, and pattern (normal, strobe, three pulse, SOS, or random)
50/50	Color 1 is displayed on 50% of every segment and Color 2 is displayed on the other 50% of every segment at the defined color intensities
50/50 Rotate	Color 1 is displayed on 50% of every segment and Color 2 is displayed on the other 50% of every segment while rotating at the defined speed, color intensities, rotational direction, and segment shift

Animation	Description
Chase	Color 1 is displayed as a single spot against the background of Color 2 while rotating at the defined speed, color intensities, rotational direction, and segment shift
Intensity Sweep	Color 1 repeatedly increases and decreases intensity between 0% to 100% on every segment at defined speed and color intensity
Scroll	Color 1 fills a defined number of segments and those segments move in one direction up or down against the background of Color 2 at the defined speed, color intensities, and rotational direction
Bounce	Color 1 fills a defined number of segments and those segments move up and down between the top and bottom of the tower against the background of Color 2 at the defined speed, color intensities, and rotational direction
Color Spectrum	The tower scrolls through the 14 predefined colors with a different color on each segment at the defined speed, Color 1 intensity, and rotational direction
Demo	Cycles through color spectrum, 50/50 rotate, bounce, and level mode animations

Level Mode

Use process data to set the level value. Use parameter data to set range, thresholds, colors, intensities, flash speeds, and animation types.

Animation	Description
Level Mode Value	Value of the level of the tower (between 0 to 65,535)
Full Scale Value	Set the upper limit of the Level Mode Value (between 0 to 65535)
Threshold Type: None	Level Mode Values are displayed on tower as defined by Base color, intensity, and state (steady or flashing).
Threshold Type: Low	Level Mode Values below Low Threshold Value are displayed on segments defined by Low Threshold color, intensity, and state (steady or flashing). Level Mode Values above Low Threshold Value are displayed on segments defined by Base color, intensity, and state (steady or flashing).
Threshold Type: High	Level Mode Values below High Threshold Value are displayed on segments defined by Base color, intensity, and state (steady or flashing). Level Mode Values above High Threshold Value are displayed on segments defined by High Threshold color, intensity, and state (steady or flashing).
Threshold Type: High and Low	Level Mode Values below Low Threshold Value are displayed on segments defined by Low Threshold color, intensity, and state (steady or flashing). Level Mode Values between Low and High Threshold Values are displayed on segments defined by Base color, intensity, and state (steady or flashing). Level Mode Values above High Threshold Value are displayed on segments defined by High Threshold color, intensity, and state (steady or flashing).
Base, Low Threshold, High Threshold, and Background	Colors, Intensities, and States - Set the colors, intensities, and states (steady or flash) the tower will display if the Level Mode Value conforms to the defined threshold type
Dominance	If Non-Dominant is defined, segments display their defined threshold color; if Dominant is defined, all segments display the active threshold color
Segment Style	If Level Mode Value is a partial percentage of a segment, select if segment will be on steady, flashing, or analog dimmed to the partial percentage

Specifications

Supply Voltage and Current

18 V dc to 30 V dc
Maximum current per LED segment:
100 mA at 18 V dc
75 mA at 24 V dc
60 mA at 30 V dc

Maximum current for Standard Audible Alarm: 25 mA
Maximum current for Omni-Directional Sealed Audible: 45 mA
Maximum current for Sealed Audible Alarm: 35 mA



Note: Different IO-Link masters have different maximum current limits. Use the current draw data per segment to calculate the maximum current draw of each configuration. For example, a 5 segment tower light with standard audible has a maximum current draw of 0.4 A at 24 V dc.

Supply Protection Circuitry

Protected against reverse polarity and transient voltages

Input Response Time

Indicator On/Off: 20 ms (maximum)

Indicator Characteristics

Color	Dominant Wavelength (nm) or Color Temperature (CCT)	Color Coordinates ¹		Lumen Output Per Segment (Typical at 25 °C)		
		X	Y	Standard	Compact	Beacon
Red	625	0.688	0.301	7.2	6.3	9.8
Green	535	0.220	0.694	17.5	14.1	21.8
Yellow	575	0.460	0.496	23.8	18.9	29.2
Blue	465	0.145	0.052	3.4	2.5	4.1
Magenta	–	0.372	0.171	10.4	8.3	12.6
Cyan	492	0.176	0.339	19.2	14.9	22.9
White	6150 K	0.319	0.337	24.8	19.5	29.9
Amber	588	0.543	0.424	15.3	12.3	19.2
Rose	–	0.507	0.220	8.2	6.7	10.1
Lime Green	561	0.372	0.562	21.2	16.8	25.9
Orange	599	0.606	0.375	11.3	9.3	14.5
Sky Blue	485	0.167	0.253	20.1	15.6	24.0
Violet	–	0.216	0.089	6.6	5.1	8.0
Spring Green	509	0.194	0.502	18.2	14.2	21.9

Audible Adjustment

Standard Audible Alarm: Unscrew the cover (up to 1.5 turns maximum) to adjust the audible intensity. (Do not exceed 1.5 turns or the cover may detach during operation.) For maximum intensity, rotate the center plug 180° counterclockwise to remove it.

Sealed Audible Alarm and Omni-Directional Sealed Audible Alarm with Intensity Adjustment: Rotate the front cover until the desired intensity is reached.

Omni-Directional Sealed Audible Alarm: No adjustment.

Audible Alarm

Standard Audible Alarm: 2.7 kHz $\pm$ 500 Hz oscillation frequency; maximum intensity 92 dB at 1 m (3.3 ft) (typical)

Sealed Audible Alarm: 2.9 kHz $\pm$ 250 Hz oscillation frequency; maximum intensity 94 dB at 1 m (3.3 ft) (typical)

Omni-Directional Sealed Audible Alarm: 2.1 kHz $\pm$ 250 Hz oscillation frequency; maximum intensity 99 dB at 1 m (3.3 ft) (typical)

Omni-Directional Sealed Audible Alarm with Intensity Adjustment: 2.1 kHz $\pm$ 250 Hz oscillation frequency; maximum intensity 95 dB at 1 m (3.3 ft) (typical)

¹ Refer to CIE 1931 chromaticity diagram or color chart to show equivalent color with indicated color coordinates

Connections

Integral 4-pin M12/Euro-style quick disconnect, or 150 mm (6 in) PVC cable with quick disconnect, depending on model
Requires a mating cordset

Construction

Bases and Covers: ABS
Light Segment: Polycarbonate

Operating Conditions

Non-Audible: -40 °C to +50 °C (-40 °F to +122 °F)
Standard and Audible Sealed: -20 °C to +50 °C (-4 °F to +122 °F)
95% at +50 °C maximum relative humidity (non-condensing)

Environmental Rating

NEMA/UL Type 13
Non-Audible and Sealed Audible: IEC IP67
Standard Audible: IEC IP50

Vibration and Mechanical Shock

Vibration 10 Hz to 55 Hz 1.0 mm p-p amplitude per IEC 60068-2-6
Shock 30G 11 ms duration, half sine wave per IEC 60068-2-27

Certifications



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 (Amps)
20	5.0
22	3.0
24	2.0
26	1.0
28	0.8
30	0.5

Dimensions

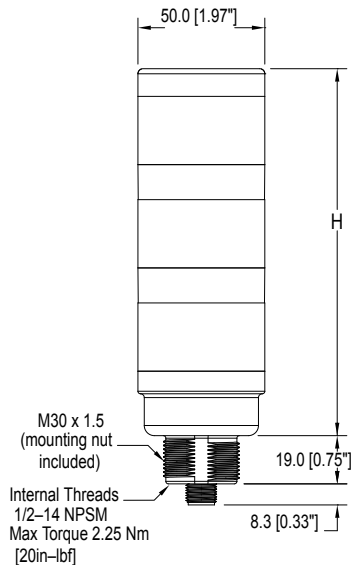


Figure 1. Standard Model Dimensions

Table 1: Standard Models

# of Segments	Non-Audible	Standard Audible	Sealed Audible	Omni-Directional Sealed Audible
1	61.2 (2.4)	92 (3.6)	115.1 (4.5)	129.1 (5.1)
2	101.9 (4)	132.7 (5.2)	155.8 (6.1)	169 (6.7)
3	142.6 (5.6)	173.4 (6.8)	196.5 (7.7)	210.5 (8.3)
4	183.3 (7.2)	214.1 (8.4)	237.2 (9.3)	251.2 (9.9)
5	224 (8.8)	254.8 (10)	277.9 (10.9)	291.9 (11.5)
6	264.7 (10.4)	295.5 (11.6)	318.6 (12.5)	332.6 (13.1)
7	305.4 (12)	336.2 (13.2)	359.3 (14.1)	373.3 (14.7)
8	346.1 (13.6)	376.9 (14.8)	400 (15.7)	414 (16.3)
9	386.8 (15.2)	417.6 (16.4)	440.7 (15.7)	454.7 (17.9)
10	427.5 (16.8)	458.3 (18)	481.4 (18.9)	495.4 (19.5)

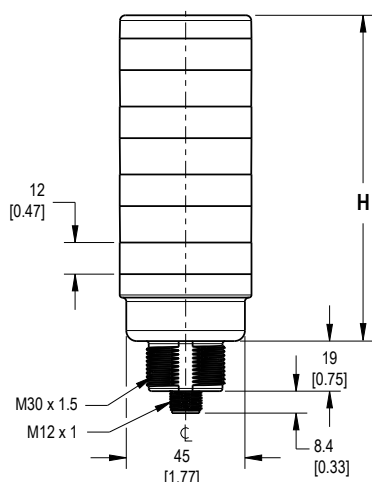


Figure 2. Compact and Beacon Model Dimensions

Table 2: Compact and Beacon Models

# of Segments	Non-Audible	Standard Audible	Sealed Audible	Omni-Directional Sealed Audible
1	46.2 (1.9)	77.1 (3.1)	110.2 (4)	114.2 (4.5)
2	72 (2.9)	102.9 (4.1)	126 (5)	140 (5.5)
3	97.8 (123.6)	128.7 (5.1)	151.8 (6)	165.8 (6.5)
4	123.6 (4.9)	154.5 (6.1)	177.6 (7)	191.6 (7.5)
5	149.4 (5.9)	180.3 (7.1)	203.4 (8)	217.4 (8.5)
6	175.2 (6.9)	206.1 (8.1)	229.2 (9)	243.2 (9.5)
7	201 (7.9)	231.9 (9.1)	255 (10)	269 (10.5)
8	226.8 (8.9)	257.7 (10.1)	280.8 (11)	294.8 (11.5)
9	252.6 (9.9)	283.5 (11.1)	306.6 (12)	320.6 (12.5)
10	278.4 (10.9)	309.3 (12.1)	332.4 (13)	346.4 (13.5)

All measurements are listed in millimeters [inches], unless noted otherwise.

Accessories

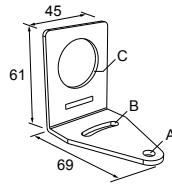
Cordsets

4-Pin Threaded M12/Euro-Style Cordsets—Double Ended				
Model	Length	Style	Dimensions	Pinout
MQDEC-401SS	0.31 m (1 ft)	Male Straight/ Female Straight		Female
MQDEC-403SS	0.91 m (3 ft)			
MQDEC-406SS	1.83 m (6 ft)			Male
MQDEC-412SS	3.66 m (12 ft)			
MQDEC-420SS	6.10 m (20 ft)			1 = Brown 2 = White 3 = Blue 4 = Black
MQDEC-430SS	9.14 m (30 ft)			
MQDEC-450SS	15.2 m (50 ft)			

Mounting Brackets

SMB30A

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

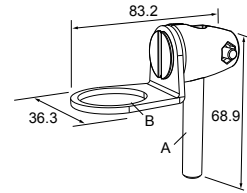


Hole center spacing: A to B=40

Hole size: A=ø 6.3, B= 27.1 x 6.3, C=ø 30.5

SMB30FA

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

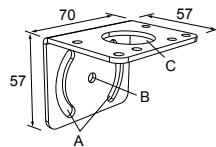


Bolt thread: SMB30FA, A= 3/8 - 16 x 2 in; SMB30FAM10, A= M10 - 1.5 x 50

Hole size: B= ø 30.1

SMB30MM

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

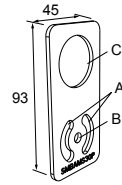


Hole center spacing: A = 51, A to B = 25.4

Hole size: A = 42.6 x 7, B = ø 6.4, C = ø 30.1

SMBAMS30P

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

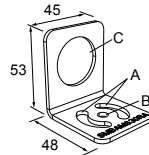


Hole center spacing: A=26.0, A to B=13.0

Hole size: A=26.8 x 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-ga. (2.6 mm) cold-rolled steel

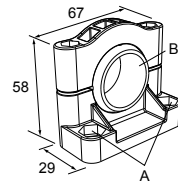


Hole center spacing: A=26.0, A to B=13.0

Hole size: A=26.8 x 7.0, B=ø 6.5, C=ø 31.0

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

All measurements are listed in millimeters [inches], unless noted otherwise.

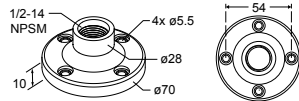
LMB Sealed Right-Angle Bracket

Model	Description	Construction	
LMB30RA	Direct-Mount Models: Bracket kit with base, 30 mm adapter, set screw, fasteners, o-rings, and gaskets	Black polycarbonate	
LMB30RAC		Gray polycarbonate	
LMBE12RA	Pipe-Mount Models: Bracket kit with base, ½-14 pipe adapter, set screw, fasteners, o-rings, and gaskets. For use with stand-off pipe (listed and sold separately)	Black polycarbonate	
LMBE12RAC		Gray polycarbonate	

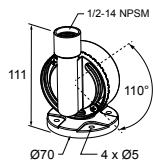
Elevated Mount System

Model			Features	Components
SA-M30TE12 - Black Acetal			- Streamlined black acetal or white UHMW stand-off pipe adapter/cover - Connects between 30 mm light base and ½ in. NPSM/DN15 pipe - Mounting hardware included	
SA-M30TE12C - White UHMW				
Polished 304 Stainless Steel	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 - Compatible with most industrial environments	
SOP-E12-150SS 150 mm (6 in) long	SOP-E12-150A 150 mm (6 in) long	SOP-E12-150AC 150 mm (6 in) long		
SOP-E12-300SS 300 mm (12 in) long	SOP-E12-300A 300 mm (12 in) long	SOP-E12-300AC 300 mm (12 in) long		
SOP-E12-900SS 900 mm (36 in) long	SOP-E12-900A 900 mm (36 in) long	SOP-E12-900AC 900 mm (36 in) long		
SA-E12M30 - Black Acetal			- Streamlined black acetal or white UHMW mounting base adapter/cover - Connects between ½ in. NPSM/DN15 pipe and 30 mm (1-3/16 in) drilled hole - Mounting hardware included	
SA-E12M30C - White UHMW				

Pipe Mounting Flange

Pipe Mounting Flange			
Model	Features	Construction	
SA-F12	- For use elevated stand-off pipes (½ in. NPSM/DN15) - M5 mounting hardware and nitrile gasket included	Die-cast zinc base with black paint	

Foldable Mounting Brackets

Foldable Mounting Brackets			
Model	Features	Construction	
SA-FFB12	- For use with 1/2 inch stand-off pipes - Stainless steel hardware	Black polycarbonate	
SA-FFB12C		Gray polycarbonate	

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.

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FCC Part 15 and CAN ICES-3 (B)/NMB-3(B)

This device complies with part 15 of the FCC Rules and 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.

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 and CAN ICES-3 (B)/NMB-3(B). 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 manufacturer.