TL70 Pro Tower Light with IO-Link Quick Start Guide

Important Information

70 mm IO-Link Controlled Modular Multicolor RGB Tower Light

This guide is designed to help you set up and install the TL70 Pro Tower Light with IO-Link. For complete information on programming, performance, troubleshooting, dimensions, and accessories, please refer to the datasheet at www.bannerengineering.com. Search for p/n 225504 to view the datasheet. Use of this document assumes familiarity with pertinent industry standards and practices.

Models

TL70 Pro with IO-Link Base

Housing	Style	Control	—	Connection[1]	Housing Color
B-TL70	**P**	**K**	**—**	**Q**	
Base Module	P = Pro	K = IO-Link		Q = Integral 4-pin M12 male quick-disconnect connector QP = 150 mm (6 in) PVC-jacketed cable with a 4-pin M12 male quick-disconnect connector	Blank = Black C = Gray

TL70 Pro Light Segments

Housing	Style	—	Color	Housing Color
SG-TL70	**P**	**—**	**RGB**	
TL70 Segment	P = Pro		RGB = RGB Configurable	Blank = Black C = Gray

TL70 Pro Audible Alarm Segments

Housing	—	Audible Alarm[2]	Housing Color
SG-TL70	**—**	**A**	
TL70 Segment		Blank = None A = Standard Audible AL = Loud Audible AP = Programmable Audible	Blank = Black C = Gray

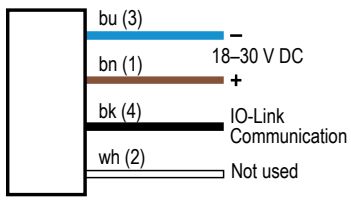
- Example base model number: B-TL70PK-Q
- Example light segment model number: SG-TL70P-RGB
- Example audible alarm segment model number: SG-TL70-A

TL70 Pro with IO-Link Pre-Assembled Models

Family	Style	Number of Segments	Audible Alarm[2]	Control	Housing Color	Connection[1]
TL70	**P**	**3**	**A**	**K**		**Q**
	P = Pro	1 = 1 segment 2 = 2 segments 3 = 3 segments 4 = 4 segments 5 = 5 segments 6 = 6 segments	Blank = None A = Standard Audible AL = Loud Audible AP = Programmable Audible	K = IO-Link	Blank = Black C = Gray	Q = Integral 4-pin M12 male quick-disconnect connector QP = 150 mm (6 in) PVC-jacketed cable with a 4-pin M12 male quick-disconnect connector

- Example pre-assembled model number: TL70P4ALKCQP

Wiring Diagram

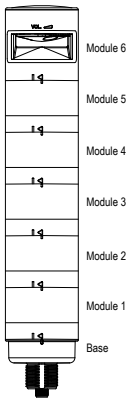


Key
1 = Brown
2 = White
3 = Blue
4 = Black

[1] Models with a quick-disconnect connector require a mating cordset.
[2] Not available with six-light models.

Configuring the Module Position

Turn on the appropriate DIP switch to set the order of the components, counting up from the tower light's base. Factory default DIP position is OFF for segments ordered individually.

Assembly Options		DIP Switches							
		1	2	3	4	5	6	7	8
Position	Module 1	ON							
	Module 2		ON						
	Module 3			ON					
	Module 4				ON				
	Module 5					ON			
	Module 6*						ON		

Standard Audible Module Settings	Pulse 1.5 Hz							ON	OFF
	Chirp Alarm							ON	ON
	Siren Alarm							OFF	ON
	Continuous Alarm*							OFF	OFF

NOTE: Audible modules must be configured as module position 6.

Assembly Options		DIP Switches									
		1	2	3	4	5	6	7	8	9	10
Loud Audible Module Settings	Pulse 1.5 Hz							ON	OFF		
	Chirp Alarm							ON	ON		
	Siren Alarm							OFF	ON		
	Continuous Alarm*							OFF	OFF		
	Low Intensity*									OFF	OFF
	Med. Intensity									ON	OFF
	Med./Loud Intensity									OFF	ON
	Loud Intensity									ON	ON

* Factory default setting

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.

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.

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.

Run Mode and Segment Mode Animations	
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)
Intensity Sweep	Color 1 repeatedly increases and decreases intensity between 0% to 100% at defined speed and color intensity
Two Color Sweep	Color 1 and Color 2 define the end values of a line across the color gamut. The segment continuously displays a color by moving along the line at the defined speed and color intensities
Spectrum	The segment scrolls through 13 predefined colors with a different color on each LED at the defined speed, Color 1 intensity, and direction

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Run Mode and Segment Mode Animations	
Animation	**Description**
Two Color Shift	Color 1 and Color 2 flash alternately on adjacent segments at defined speed and color intensities (Run Mode Only)
Scroll	Color 1 fills the segment as defined by Percent Width of Color 1 and moves in one direction up or down against the background of Color 2 at the defined speed, color intensities, style, and direction (Run Mode Only)
Center Scroll	Color 1 fills the segment as defined by Percent Width of Color 1 and moves in or out from the center of the segment against the background of Color 2 at the defined speed, color intensities, style, and direction (Run Mode Only)
Bounce	Color 1 fills the segment as defined by Percent Width of Color 1 and moves up and down against the background of Color 2 at the defined speed, color intensities, and style (Run Mode Only)
Center Bounce	Color 1 fills the segment as defined by Percent Width of Color 1 and moves in and out from the center of the segment against the background of Color 2 at the defined speed, color intensities, and style (Run Mode Only)
Single End Steady	Color 1 is solid ON at the defined intensity on one end of the device (Run Mode Only)
Single End Flash	Color 1 flashes at the defined speed, color intensity, and pattern (normal, strobe, three pulse, SOS, or random) on one end of the device (Run Mode Only)

Level Mode

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

Level Mode Animations	
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

Gauge Mode

Gauge mode uses the light to display a colored band of LEDs in a position proportional to the gauge mode value.
Use process data to set the gauge mode value. Use parameter data to set range, thresholds, colors, intensities, flash speeds, background, threshold markers, and animation types.

Gauge Mode Settings	
General Settings	**Description**
Gauge Mode Value	Value of the band position within the light (between 0 to 65,535)
Full Scale Value	Set the upper limit of the Gauge Mode Value (between 0 to 65,535)
Filtering	Smooths the input signal by varying the sample size None: There is no filtering Low: The sample size is short and changes to the input signal are more noticeable High: The sample size is long and changes to the input signal are less noticeable
Hysteresis	Determines the signal value change needed to transition between thresholds and to prevent chatter None: The value follows the input signal High: A large value change is needed to transition between thresholds
Gauge Mode Threshold Markers	Threshold markers display LED(s) at the defined thresholds and can be configured as either dominant or non-dominant. Threshold marker location and width are defined by the offset and width parameter, respectively, in segment mode.

Center, Threshold 1, and Threshold 2 Settings	Description
Threshold Type: Center	Gauge Mode Values not in Threshold 1 or Threshold 2 are positioned on a band of LEDs as defined by the center threshold color, intensity, flash speeds, backgrounds, band size percent width, and run mode animation types
Threshold Type: 1 & 2	Gauge Mode Values that conform to Threshold Comparison Type ≤ or ≥ and the Threshold Value Percent are positioned on a band of LEDs as defined by the threshold color, intensity, flash speeds, backgrounds, band size percent width, and run mode animation types

Specifications

Supply Voltage and Current

18 V DC to 30 V DC

Indicator Color or Audible Model	Maximum Current (mA)		
	at 18 V DC	at 24 V DC	at 30 V DC
RGB Segment	216	156	127
Standard Audible	31	30	30
Loud Audible (Intensity 1)	24	21	19
Loud Audible (Intensity 2)	38	34	32
Loud Audible (Intensity 3)	96	75	63
Loud Audible (Intensity 4)	153	115	96
Programmable Audible	145	112	97

Supply Protection Circuitry

Protected against reverse polarity and transient voltages

Audible Alarm

Standard Audible: 2.6 kHz ± 250 Hz oscillation frequency; maximum intensity (typical) 92 dB at 1 m (3.3 ft)

Loud Audible: 2.6 kHz ± 250 Hz oscillation frequency; maximum intensity (typical) at 1 m (3.3 ft) (see table)

NOTE: Audible module position must be configured as Module 6

DIP Switches		Maximum Intensity (typical) at 1 meter dB
9	10	
ON	ON	Intensity 4: 109 dB
OFF	ON	Intensity 3: 106 dB
ON	OFF	Intensity 2: 101 dB
OFF	OFF	Intensity 1: 94 dB

Audible Adjustment

Standard Audible: Rotate the cover until the desired volume is reached

Loud Audible Alarm: Select the desired volume using DIP switches 9 and 10

Typical Reduction in Sound Intensity with Audible Adjustment (maximum to minimum):

- **Standard Audible:** 8 dB
- **Loud Audible:** 16 dB

Certifications

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1831 Diegem, BELGIUM

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Blenheim Court
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GREAT BRITAIN

c UL us LISTED

IO-Link®

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

Input Response Time

Indicator On/Off Response Time: 20 ms (maximum)

Connections

Integral 4-pin M12 male quick-disconnect connector; 150 mm (6 in) PVC-jacketed cable with a 4-pin M12 male quick-disconnect connector

Construction

Bases, Covers, Light Segment: Polycarbonate

Operating Conditions

–40 °C to +50 °C (–40 °F to +122 °F)

95% at +50 °C maximum relative humidity (non-condensing)

Environmental Rating

IP65, UL Type 1

Vibration and Mechanical Shock

Vibration: 10 Hz to 55 Hz, 0.5 mm peak-to-peak amplitude per IEC 60068-2-6

Shock: 15G 11 ms duration, half sine wave per IEC 60068-2-27

Indicator Characteristics

Color	Dominant Wavelength (nm) or Color Temperature (CCT)	Color Coordinates[1]		Lumen Output (Typical at 25 °C)
		x	y	
Red	622	0.694	0.304	27.4
Green	527	0.177	0.707	69
Yellow	575	0.456	0.489	46.6
Blue	472	0.128	0.08	17.4
Magenta	–	0.371	0.176	24
Cyan	493	0.161	0.347	49.5
White	5600 K	0.31	0.335	40.9
Amber	589	0.542	0.422	39.9
Rose	–	0.497	0.226	26.6
Lime Green	561	0.369	0.556	53.8
Orange	600	0.606	0.372	35.5
Sky Blue	486	0.146	0.251	41.7
Violet	–	0.222	0.117	21.3
Spring Green	508	0.166	0.531	62.4

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[1] Refer to CIE 1931 chromaticity diagram or color chart, to show equivalent color with indicated color coordinates.