BANNER TL70 Series Pro Modbus Modular Tower Light Instruction Manual

Contents

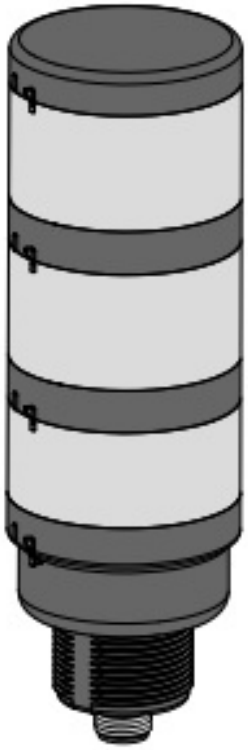
1 BANNER TL70 Series Pro Modbus Modular Tower Light
2 Features
3 Installation Instructions
4 LED Segment Control
5 Audible Segment Control
6 FCC Part 15 Class A for Unintentional Radiators
7 Dimensions
8 Mounting Brackets
9 Banner Engineering Corp Limited Warranty
10 Documents / Resources
10.1 References

BANNER TL70 Series Pro Modbus Modular Tower Light

Chapter 1

Features

Banner’s TL70 Pro Modbus Modular Tower Light is a 70 mm, modular LED indicator with bright and uniform light. The modularity gives the user flexibility to customize tower lights as needed and change positions in the field. The TL70 is also available preassembled for easy installation.
Modbus control allows access to full color, flashing, and dimming settings, as well as advanced animations and audible tones Up to five indicator segments and one audible segment in one device Rugged, water-resistant IP65 housing with UV-stabilized material Bright, uniform indicator segments appear gray when off to eliminate false indications from ambient light Simple and fast connection with M12 quick-disconnect connector.



Models

Segment Models

Model	Description
SG-TL70P-L	RGB light segment
SG-TL70P-A	Audible segment

Pre-Assembled Models

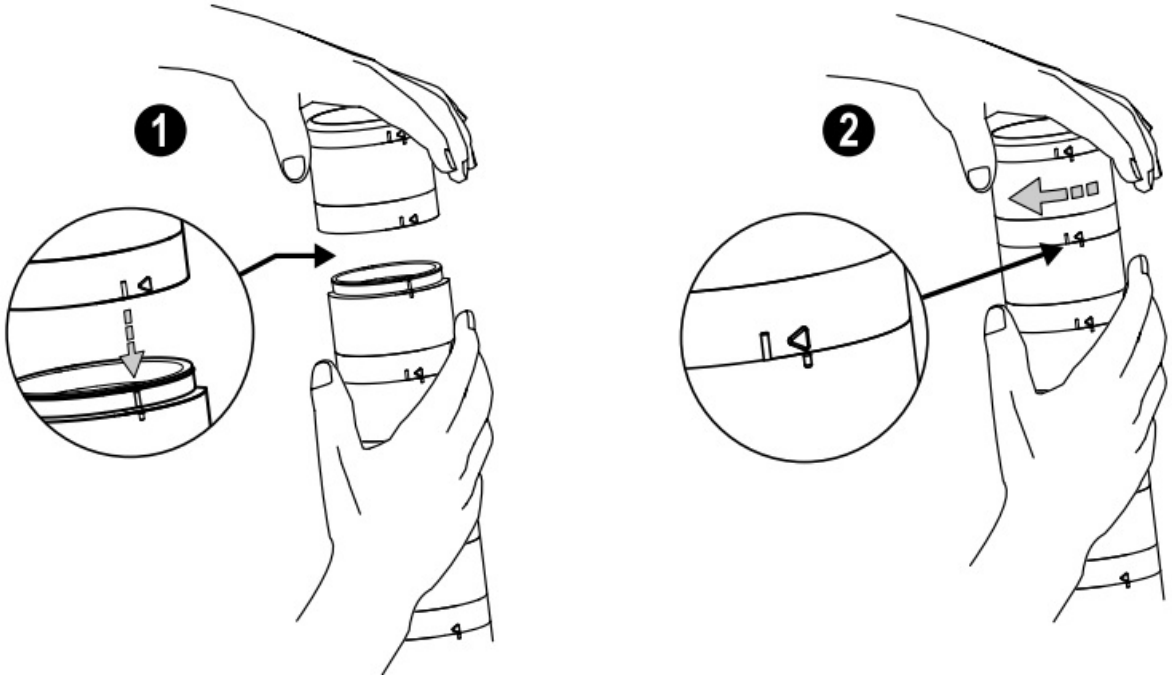
Model	Description
TL70PM3Q	Modbus RS-485 with three RGB segments
TL70PM3AQ	Modbus RS-485 with three RGB segments and an audible segment

Base Models

Model	Description
B-TL70PM-Q	Modbus RS-485 base module with an integral 4-pin M12 A-Code male quick-disconnect connector

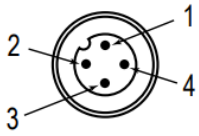
Chapter 2

Installation Instructions



Assembling the Modules

To assemble the modules

Integral 4-pin A-Code M12 Male Quick-Disconnect Connector Pinout	Pin	Wire Color	Connection
	1	Brown	18 V DC to 30 V DC
	2	White	RS-485 (+)
	3	Blue	DC common
	4	Black	RS-485 (-)

Chapter 2 Installation Instructions

1. Align the notches on each module and press together.
2. Rotate the top module clockwise to lock it into place (notches shown in the locked position).

Chapter 3

Wiring for Modbus Models

Chapter 4

Modbus Configuration Instructions

For more information about the TL70 Pro Modbus Modular Tower Light device registers, refer to document PN 243474.

Tower Light Segment Modes

Basic Segment Mode

Use a single run time register per LED segment to set it to Off, On, Flash, or Animation mode. Use a single run time register for an audible segment to set it to Off or On. Use additional configuration registers to change color, intensity, and flash speed, select animation type on LED segments , and change volume and tone on audible segments.

Advanced Segment Mode
Use multiple run time registers per LED segment to control color, intensity, flash, and other animation types. Use multiple run time registers for an audible segment to control sync, volume, and tone settings. Use additional configuration registers to create custom intensity and flash speeds.

LED Segment Control

Animation	Description
Off	Segment is off
Steady	Color 1 is solid at a 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 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 and color intensities
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 a defined speed and color intensity
Demo	The demo sequence cycles through several sets of colors and configurations to highlight example applications

Audible Segment Control

Setting	Description
Audible State	Sets the segment to off, on, or synced to the flash pattern of the last LED segment
Audible Volume	Defines the volume of the audible tone
Audible Tone	Defines the audible tone frequency

Chapter Contents
FCC Part 15 Class A for Unintentional Radiators……. 8
Industry Canada ICES-003(A) …… 8
Dimensions…….. 9

Chapter 5

Specifications

- Supply Voltage
- 18 V DC to 30 V DC

Supply Current

Device	Typical Current (mA) per Device			Max Current (mA)
	18 V DC	24 V DC	30 V DC	
Modbus Base	60	45	40	75
Light and Audible segment	110	85	75	125

- Environmental Rating IP65

Supply Protection Circuitry
Protected against reverse polarity and transient voltages Initial Startup Time 30 seconds

Construction
Bases, segments, and covers: polycarbonate

Operating Temperature

- –40 °C to +50 °C (–40 °F to +122 °F)
- 95% at +50 °C maximum relative humidity (non-condensing)

Connections
See “Wiring” on page 5

Audible Alarm

- Tone 0: 1.7 kHz ± 250 Hz oscillation frequency; maximum intensity (typical) 81 dB at 1 m (3.3 ft)
- Tone 1: 2.2 kHz ± 250 Hz oscillation frequency; maximum intensity (typical) 100 dB at 1 m (3.3 ft)
- Tone 2: 2.7 kHz ± 250 Hz oscillation frequency; maximum intensity (typical) 104 dB at 1 m (3.3 ft)
- Vibration and Mechanical Shock
- Meets IEC 60068-2-6 requirements (Vibration: 10 Hz to 55 Hz, 0.5 mm amplitude, 5 minutes sweep, 30 minutes dwell)
- Meets IEC 60068-2-27 requirements (Shock: 15G 11 ms duration, half sine wave)

Certifications

- Banner Engineering BV
- Park Lane, Culliganlaan 2F bus 3
- 1831 Diegem, BELGIUM
- Turck Banner LTD Blenheim House
- Blenheim Court
- Wickford, Essex SS11 8YT

GREAT BRITAIN

Default Light Segment Characteristics

Color	Dominant Wavelength (nm) or Color Temperature (CCT)	Color Coordinates(1)		Lumen Output Per Segment (Typical at 25 ° C)
		X	Y	
Green	532	0.181	0.735	34.8
Red	621	0.691	0.308	15.4
Yellow	578	0.473	0.474	21
Blue	467	0.137	0.056	27.6
White	5700K	0.328	0.337	29.7
Cyan	492	0.150	0.334	20.9
Magenta	–	0.379	0.177	18.7
Amber	590	0.552	0.414	6.6
Rose	–	0.508	0.230	9.3
Lime Green	565	0.393	0.535	23.8
Sky Blue	485	0.146	0.241	14.1
Orange	600	0.611	0.370	24.1
Violet	–	0.212	0.091	19.6
Spring Green	509	0.157	0.553	12.7

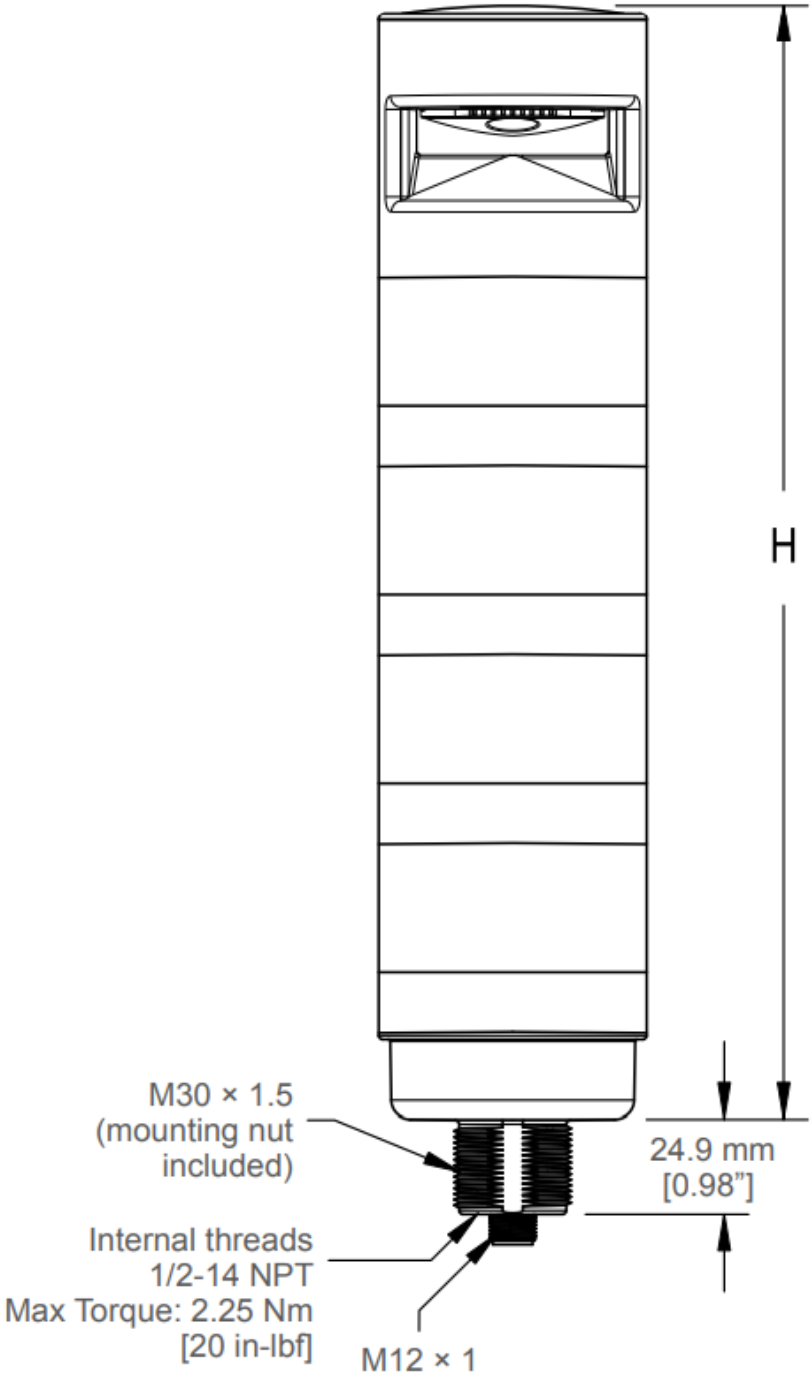
FCC Part 15 Class A for Unintentional Radiators

This equipment has been tested and found to comply with the limits for a Class A digital device, under Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used by the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. (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(A)
This device complies with CAN ICES-3 (A)/NMB-3(A). 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.
Refer to the CIE 1931 chromaticity diagram or color chart to show equivalent color with indicated color coordinates. Actual coordinates may differ by 10%.

Dimensions



Model	Height (H)
1 light module	87.6 mm (3.45 in)
1 light module, 1 audible module	144.3 mm (5.68 in)
2 light modules	137.3 mm (5.41 in)
2 light modules, 1 audible module	194 mm (7.64 in)
3 light modules	187 mm (7.36 in)
3 light modules, 1 audible module	243.7 mm (9.59 in)
4 light modules	236.7 mm (9.32 in)
4 light modules, 1 audible module	293.4 mm (11.55 in)
5 light modules	286.4 mm (11.28 in)
5 light modules, 1 audible module	343.1 mm (13.51 in)

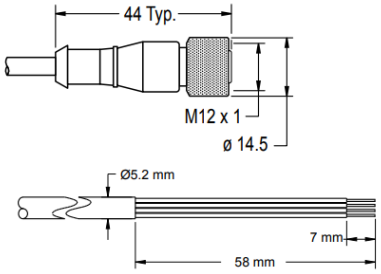
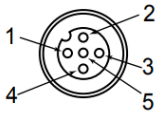
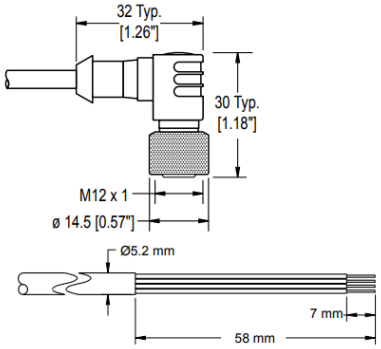
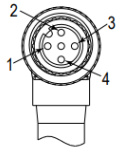
Chapter Contents

Cordsets
…… 10
Mounting
Brackets……..11
Elevated Mount System
…… 12
LMB Sealed Right Angle Bracket
…….. 13

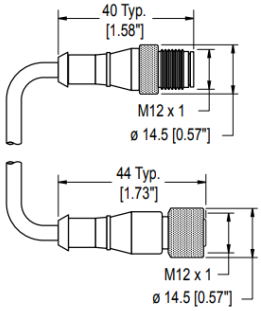
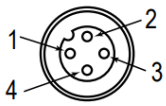
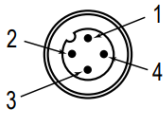
Chapter 6

Accessories

Cordsets

4-Pin Single-Ended, M12 Female Cordsets					
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**	
MQDC-406	2 m (6.56 ft)	Straight			1 = Brown 2 = White 3 = Blue 4 = Black 5 = Unused
MQDC-415	5 m (16.4 ft)				
MQDC-430	9 m (29.5 ft)				
MQDC-450	15 m (49.2 ft)				
MQDC-406RA	2 m (6.56 ft)	Right-Angle			
MQDC-415RA	5 m (16.4 ft)				
MQDC-430RA	9 m (29.5 ft)				
MQDC-450RA	15 m (49.2 ft)				

4-Pin Double-Ended, M12 Female-M12 Male Cordset

4-Pin Double-Ended, M12 Female-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)			

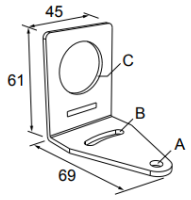
Mounting Brackets

All measurements are listed in millimeters unless noted otherwise.

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

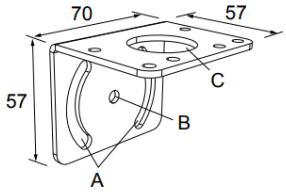
Hole center spacing: A to B=40
Hole size: A=ø 6.3, B= 27.1 × 6.3, C=ø 30.5



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

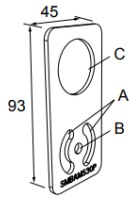
Hole center spacing: A = 51, A to B = 25.4
Hole size: A = 42.6 × 7, B = ø 6.4, C = ø 30.1



SMBAMS30P

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

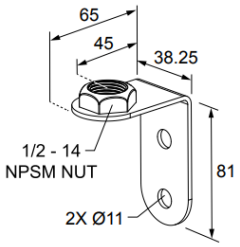
Hole center spacing: A=26.0, A to B=13.0
Hole size: A=26.8 × 7.0, B=ø 6.5, C=ø 31.0



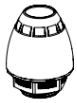
LMBE12RA45

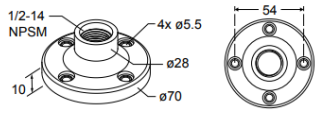
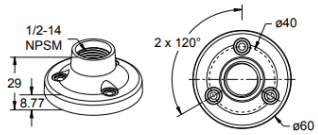
- Direct mounting of stand-off pipe, with common bracket type
- Zinc-plated steel
- 1/2-14 NPSM nut
- Mounting distance from the wall to the center of the 1/2-14 NPSM nut is 45 mm

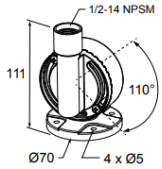
Hole center spacing: 35.0



Elevated Mount System

<table>
<tr><th colspan="3">Model</th><th>Features</th><th>Components</th></tr>
<tr><td colspan="3">SA-M30 - Black Polycarbonate</td><td>• Streamlined black PC or Gray PC thread cover
• Covers M30 thread on the light base
• Mounting hardware included</td><td>  </td></tr>
<tr><td>Polished 304 Stainless Steel</td><td>Black Anodized Aluminum</td><td>Clear Anodized Aluminum</td><td rowspan="4">• 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</td><td rowspan="4">  </td></tr>
<tr><td>SOP-E12-150SS
150 mm (6 in) long</td><td>SOP-E12-150A
150 mm (6 in) long</td><td>SOP-E12-150AC
150 mm (6 in) long</td></tr>
<tr><td>SOP-E12-300SS
300 mm (12 in) long</td><td>SOP-E12-300A
300 mm (12 in) long</td><td>SOP-E12-300AC
300 mm (12 in) long</td></tr>
<tr><td>SOP-E12-900SS
900 mm (36 in) long</td><td>SOP-E12-900A
900 mm (36 in) long</td><td>SOP-E12-900AC
900 mm (36 in) long</td></tr>
<tr><td colspan="3">SA-E12M30 - Black Acetal</td><td>• 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</td><td>  </td></tr>
</table>

Pipe Mounting Flange			
Model	**Description**	**Construction**	
SA-F12	• Elevated-use stand-off pipes (½ in, NPSM/DN15) • M5 mounting hardware and nitrile gasket included	Die-cast zinc base with black paint	
SA-F12-3	• Elevated-use stand-off pipes (½ in, NPSM/DN15) • M4 mounting hardware and nitrile blend gasket included	Black Polycarbonate	

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

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	
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	

Chapter 7

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 improper application or installation of the Banner product.

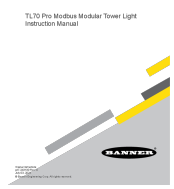
THIS LIMITED WARRANTY IS EXCLUSIVE AND INSTEAD OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED (INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), AND WHETHER ARISING UNDER THE COURSE OF PERFORMANCE, COURSE OF DEALING, OR TRADE USAGE.

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 THE 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**.

Documents / Resources

	**BANNER TL70 Series Pro Modbus Modular Tower Light** [pdf] Instruction Manual TL70 Series Pro Modbus Modular Tower Light, TL70 Series, Pro Modbus Modular Tower Light, Modular Tower Light, Tower Light, Light

References

- **Banner Engineering**
- **Banner Engineering**
- **User Manual**