Features

Compact, single-point devices for error-proofing of bin-picking operations



Fixed field and polarized retroreflective models



Capacitive touch models

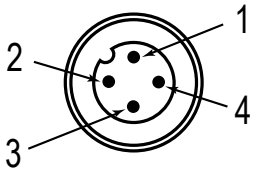


Push button models

- Rugged, cost-effective, and easy-to-install solutions for error-proofing and parts-verification applications
- Illuminated dome provides easy-to-see job light status
- Choose either polarized retroreflective, fixed-field, touch, or push button models
- Fully encapsulated IP67 construction
- Modbus RTU communication minimizes the cabling requirements

Models	Sensing Mode	Range	Colors	Connection
K50FF25GRYS1Q	Fixed field, infrared, 880 nm	25 mm cutoff	Green, Red, Yellow	Integral 4-pin M12 male quick-disconnect connector
K50FF25GRYS1QP				150 mm (6 in) PVC-jacketed cable with a 4-pin M12 male quick-disconnect connector
K50FF50GRYS1Q		50 mm cutoff		Integral 4-pin M12 male quick-disconnect connector
K50FF50GRYS1QP				150 mm (6 in) PVC-jacketed cable with a 4-pin M12 male quick-disconnect connector
K50FF100GRYS1Q		100 mm cutoff		Integral 4-pin M12 male quick-disconnect connector
K50FF100GRYS1QP				150 mm (6 in) PVC-jacketed cable with a 4-pin M12 male quick-disconnect connector
K50LPGRYS1Q	Polarized Retroreflective, visible red, 680 nm	2 m (6 ft)		Integral 4-pin M12 male quick-disconnect connector
K50LPGRYS1QP				150 mm (6 in) PVC-jacketed cable with a 4-pin M12 male quick-disconnect connector
K50TGRYS1Q	Capacitive Touch	N/A		Integral 4-pin M12 male quick-disconnect connector
K50TGRYS1QP				150 mm (6 in) PVC-jacketed cable with a 4-pin M12 male quick-disconnect connector
K50PBGRYS1Q	Push Button			Integral 4-pin M12 male quick-disconnect connector
K50PBGRYS1QP				150 mm (6 in) PVC-jacketed cable with a 4-pin M12 male quick-disconnect connector

Wiring

4-pin M12 Quick-Disconnect Connector (Male)	Pins	Wire Color	Sensor Connection
	1	Brown	Power IN (+), 12 V DC to 30 V DC
	2	White	RS-485 +
	3	Blue	Ground (-)
	4	Black	RS-485 (-)

- For cables, use Turck's BL ident® cables or their equivalent. For example:
  - RK 4.5T-2-RS 4.5T/S2501 2 meter double-ended male/female
  - RK 4.5T-1-RS 4.5T/S2501 1 meter double-ended male/female
  - RK 4.5T-2/S2501 single-ended 2 meter female
- For tees, use Turck RSC 2RKC 57
- For terminators, use Banner model EZL-RTM-M or EZL-RTM-F

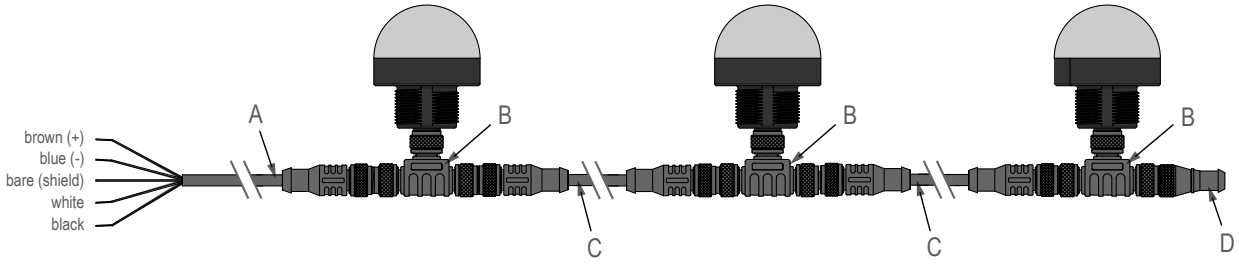
Original Instructions
10-Jun-25

© Banner Engineering Corp. All rights reserved.
www.bannerengineering.com

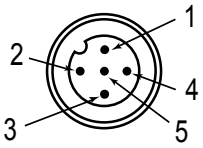
183981
p/n: 183981 Rev. F

ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

Typical Installation



A	Single-ended cable
B	Tee
C	Double-ended cable
D	Terminator. Contains a 120 Ohm termination resistor connected across pins 2 and 4. Use the terminator for long cables or long lines of cascaded units to prevent signal reflections from occurring on the communication lines.

5-pin M12 Quick-Disconnect Connector (Male)	Pin	Wire Color
	1	Brown
	2	White
	3	Blue
	4	Black
	5	Bare (Shield). Connect the shield to ground at the power supply connection.

Modbus RTU Registers

The EZ-LIGHT uses the holding registers table for providing read/write access to configuration data. The holding registers are defined in the 40000-49999 address range.

The input registers table is used for providing read-only access to system status data. The input registers are defined in the 30000-39999 address range. **EZ-LIGHT employs a direct addressing scheme.** For example, the input register at address 30000 is accessed by reading address 30000 (0x7530) directly; the starting address is not an offset.

Supported Modbus RTU Functions

Functions	Output Status
03	Reading holding registers
04	Read input registers
06	Write single registers
08	See Diagnostics, Function 8 (0x08) for supported commands.
16 (0x10)	Write multiple registers
23 (0x17)	Read/write multiple registers

Holding Registers

Address	Description	Holding Register Representation
40001	Modbus slave address	1 (default) through 247
40002	Baud	0 = 9.6k 1 = 19.2k (default) 2 = 38.4k
40003	Parity	0 = even (default) 1 = odd 2 = none
40004	Stop bits	1 = 1 stop bit (default) 2 = 2 stop bits

Continued on page 3

© Banner Engineering Corp. All rights reserved.
www.bannerengineering.com

Continued from page 2

Address	Description	Holding Register Representation
40005	Configuration Select	0 = No selectable configuration 1 = Function F2 configuration 2 = Function C3 configuration 3 = Function E5 configuration
40006	Modbus Settings Policy	0 = Apply After Power Cycle (default) 1 = Apply After Write Exception: Writing 'Configuration Select' takes effect immediately. The maximum time to program a new configuration is two seconds.
40100	Job 1 Input Register	0 = Job Inactive (power on value) 1 = Job Active
40101 *	Job 2 Input Register	0 = Job Inactive (power on value) 1 = Job Active
40102 *	Job 3 Input Register	0 = Job Inactive (power on value) 1 = Job Active

* Not in all configurations.

Function F2 Configuration

Three job lights, independent output; lights are independent of output. Color 2 overrides color 1, and color 3 overrides colors 1 and 2.

Job input 1	Job input 2	Job Input 3	FF 'Hand/Pick' Configuration #182186	LP 'Block' Configuration #183942	Touch/Push Button Configuration #188525	Sensor Output	Sensor Color
Not active	Not active	Not active	Not detected	Unblocked	No touch or push button inactive	Not active	Light off
Active	Not active	Not active	Not detected	Unblocked		Not active	Job 1 light on
Active	Not active	Not active	Detected	Blocked	Touch or push button active	Active	Job 1 light on
Not active	Active	Not active	Not detected	Unblocked	No touch or push button inactive	Not active	Job 2 light on
Not active	Active	Not active	Detected	Blocked	Touch or push button active	Active	Job 2 light on
Not active	Not active	Active	Not detected	Unblocked	No touch or push button inactive	Not active	Job 3 light on
Not active	Not active	Active	Detected	Blocked	Touch or push button active	Active	Job 3 light on
Active	Active	Not active	Not detected	Unblocked	No touch or push button inactive	Not active	Job 2 light on
Active	Active	Not active	Detected	Blocked	Touch or push button active	Active	Job 2 light on
Active	Not active	Active	Not detected	Unblocked	No touch or push button inactive	Not active	Job 3 light on
Active	Not active	Active	Detected	Blocked	Touch or push button active	Active	Job 3 light on
Not active	Active	Active	Not detected	Unblocked	No touch or push button inactive	Not active	Job 3 light on
Not active	Active	Active	Detected	Blocked	Touch or push button active	Active	Job 3 light on
Active	Active	Active	Not detected	Unblocked	No touch or push button inactive	Not active	Job 3 light on
Active	Active	Active	Detected	Blocked	Touch or push button active	Active	Job 3 light on

Function C3

Three colors used for Job, Mis-pick, and Acknowledge lights. The Acknowledge light overrides the Job light and incorporates a 500 ms leading-edge output/indicator light OFF delay. Time-out is initiated at the onset of the signal. If the target is present for longer than 500 ms and then removed, the output/indicator immediately turns off. The output and indicator lights' (Mis-pick and Acknowledge) time-outs track together.

Job input	FF 'Hand/Pick' Configuration #183940	LP 'Block' Configuration #183943	Touch/Push Button Configuration #188523	Sensor Output	Sensor Color
Not active	Not detected	Unblocked	No touch or push button inactive	Not active	Light off
Not active	Detected	Blocked	Touch or push button active	Active	Red Mis-pick light on
Active	Not detected	Unblocked	No touch or push button inactive	Not active	Green Job light on
Active	Detected	Blocked	Touch or push button active	Active	Yellow Acknowledge light on

Function E5

Three colors: two Job lights and one Sense light. Both Job lights override the Sense light; and Job light 1 overrides Job light 2.

© Banner Engineering Corp. All rights reserved.
www.bannerengineering.com

Job input 1	Job input 2	FF 'Hand/Pick' Configuration #184292	LP 'Block' Configuration #184293	Touch/Push Button Configuration #188524	Sensor Output	Sensor Color
Not active	Not active	Not detected	Unblocked	No touch or push button inactive	Not active	Light off
Not active	Not active	Detected	Blocked	Touch or push button active	Active	Yellow Sense light on
Active	Not active	Not detected	Unblocked	No touch or push button inactive	Not active	Green Job 1 light on
Active	Not active	Detected	Blocked	Touch or push button active	Active	Green Job 1 light on
Not active	Active	Not detected	Unblocked	No touch or push button inactive	Active	Red Job 2 light on
Not active	Active	Detected	Blocked	Touch or push button active	Active	Red Job 2 light on
Active	Active	Not detected	Unblocked	No touch or push button inactive	Not active	Red Job 2 light on
Active	Active	Detected	Blocked	Touch or push button active	Active	Red Job 2 light on

Input Registers

Address	Description	Input Register Representation
30001	Sensor output status	0 = Not Sensed, 1 = Sensed
The following information registers (31000–31022) must be read as a block; they cannot be read as single registers.		
31000	Low word firmware part number	Example: 0x0002A734 (hex) = 173876 (dec) High word = 0x0002, Low word = 0xA734
31001	High word firmware part number	
31002	Firmware version	Bits 7–4 = Major Version Bits 3–0 = Minor Version. Example: 0x0012 is version 1.2
31003	Build number	0–0xFFFF (hex) = 0–65535 (dec)
31004	Low word model number	Example: 0x00016D43 (hex) = 93507 (dec) High word = 0x0001, Low word = 0x6D43
31005	High word model number	
31006	Model version	Bits 7–4 = Major Version Bits 3–0 = Minor Version. Example: 0x0012 is version 1.2
31007	Low word configuration number	Example: 0x0002C7AA (hex) = 182186 (dec) High word = 0x0002, Low word = 0xC7AA (hex)
31008	High word configuration number	
31009	Configuration version	Bits 7-4=Major Version, Bits 3-0=Minor Version. Example:0x0012 is version 1.2
31013–31013	Date code, 8 bytes	
31014	Low Word Flash Config 1 Part Number	Example: 0x0002C7AA (hex) = 182186 (dec) High word=0x0002, Low word: 0xC7AA 0xFFFFFFFF (hex) = No flash configuration
31015	High Word Flash Config 1 Part Number	
31016	Flash Config 1 Version	Bits 7–4 = Major Version Bits 3–0 = Minor Version 0x00FF = No flash version
31017	Low Word Flash Config 2 Part Number	Example: 0x0002CE84 (hex) = 183940 (dec) High word = 0x0002, Low word = 0xCE84 0xFFFFFFFF (hex) = No flash configuration
31018	High Word Flash Config 2 Part Number	
31019	Flash Config 2 Version	Bits 7–4 = Major Version Bits 3–0 = Minor Version 0x00FF = No flash version
31020	Low Word Flash Config 3 Part Number	Example: 0x0002CFE4 (hex) = 184292 (dec) High word = 0x0002, Low word = 0xCFE4 0xFFFFFFFF (hex) = No flash configuration
31021	High Word Flash Config 3 Part Number	
31022	Flash Config 3 Version	Bits 7–4 = Major Version Bits 3–0 = Minor Version 0x00FF = No flash version
32000	Bus Message Count	Returns same value as Diagnostic Function sub-function 11 (0x0B)
32001	Bus Communication Error Count	Returns same value as Diagnostic Function sub-function 12 (0x0C)

Continued on page 5

© Banner Engineering Corp. All rights reserved.
www.bannerengineering.com

Continued from page 4

Address	Description	Input Register Representation
32002	Bus Exception Error Count	Returns same value as Diagnostic Function sub-function 13 (0x0D)
32003	Server Message Count	Returns same value as Diagnostic Function sub-function 14 (0x0E)
32004	Server NAK Count	Returns same value as Diagnostic Function sub-function 16 (0x10)
32005	Bus Character Overrun Count	Returns same value as Diagnostic Function sub-function 18 (0x12)
32006	Buffer Overrun Count	Returns the number of times a buffer overrun has occurred.

Diagnostics, Funcion 8 (0x08)

Subfunction	Description	
0	Return Query Data	
1	Restart Communications Option	Not supported
2	Return Diagnostic Register	Returns value of 0, any other value is an internal error condition
10 (0x0A)	Clear Counters and Diagnostic Register	
11 (0x0B)	Return Bus Message Count	
12 (0x0C)	Return Bus Communication Error Count	
13 (0x0D)	Return Bus Exception Error Count	
14 (0x0E)	Return Server Message Count	
15 (0x0F)	Return Server No Response Count	Not supported
16 (0X10)	Return Server NAK Count	
17 (0X11)	Return Server Busy Count	Not supported
18 (0x12)	Return Bus Character Overrun Count	
20 (0x14)	Clear Overrun Counter and Flag	

Example Commands and Responses

For these examples, the slave address is 1.

Write Color 1 Active

Master	01109CA4000102000122BD	
Response	01109CA400016E7A	

Write Color 1 Inactive

Master	01109CA40001020000E37D	
Response	01109CA400016E7A	

Read Device Status Registers

Master	0104753100023A08	Command to read both output and sensor status registers
Possible Responses	01040400000000FB84	Output Inactive, button not pressed
	01040400100016B84	Output Active, button pressed
	01040400010000AA44	Output Active, button not pressed

Write Configuration Registers

Master	01109C4100030600010001000100001BC3	Write three registers: Slave address 1, 19200 baud, Even parity
Response	01109C410003FE4C	

Read Configuration Registers

Master	01039C4100037B8F	Command to read all three configuration registers

Continued on page 6

© Banner Engineering Corp. All rights reserved.
www.bannerengineering.com

Continued from page 5

Response	0103060001000100004D75	Response with slave address 1, 19200 baud, even parity

Read Information Registers

Master	010479180017295F	Command to read all info registers
Response	01042EA7340002001000026D4300010010CFE4000200106AF319E27D1240E4C7AA00020010CE8400020010CFE400020010C652	

Specifications

Supply Voltage and Current

12 DC to 30 V DC

Fixed field and polarized retroreflective models: 100 mA at 12 V DC; 110 mA at 30 V DC

Touch and push button models: 100 mA at 12 V DC; 65 mA at 30 V DC

Supply Protection Circuitry

Protected against reverse polarity and transient voltages

Environmental Rating

IP67

Operating Conditions

–40 °C to +50 °C (–40 °F to +122 °F)

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

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

Communication

Interface: RS-485 Serial

Baud Rates: 9.6k, 19.2k (default), or 38.4k

Data format: 8 data bits, no parity (default), 1 stop bit (even or odd parity available)

Protocol: Modbus RTU

Construction

Housing: polycarbonate

Translucent dome: polycarbonate

Mounting Nut: PBT

Connections

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

Vibration and Mechanical Shock

All models meet MIL-STD-202F, Method 201A (Vibration: 10 Hz to 60 Hz maximum, 0.06 inch (1.52 mm) double amplitude, 10G maximum acceleration) requirements. Also meets IEC 60947-5-2 (Shock: 30G 11 ms duration, half sine wave) requirements.

Light Intensity

Color	Wavelength (nm)	Typical Intensity (Lumen)		
		K50FF/LP	K50PB	K50T
Green	525	17	38	39
Red	625	6	13	16
Yellow	590	4	10	13

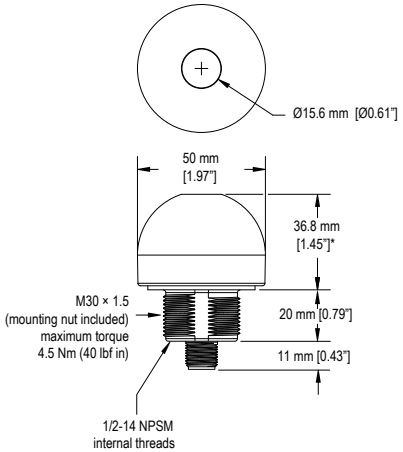
Certifications

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

Dimensions

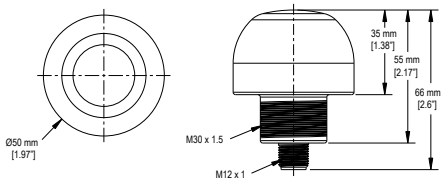
All measurements are listed in millimeters [inches], unless noted otherwise. The measurements provided are subject to change.

Fixed Field, Polarized Retroreflective, and Push Button Models



* For push-button models, this dimension is 44.2 mm (1.74 in).

Capacitance Touch Button Models



© Banner Engineering Corp. All rights reserved.
www.bannerengineering.com

Banner Engineering Corp Limited Warranty

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

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

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

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

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

© Banner Engineering Corp. All rights reserved.