



INDEX LIST

Z4B Series

IO-Link setting file (IODD file) can be

IO-Link

OPTEX FA CO., LTD.

Communication specifications

Minimum cycle time	0.5 ms	
Baud rate	COM3 (230.4 kbps)	
M-Sequence code in Preoperate mode	0	
M-Sequence code in Operate mode	0	
ISDU support	Available	
IO-Link revision	1.1	
Number of process input data bytes	2	
Number of process output data bytes	0	
Vender ID	dec: 1076	hex: 0x0434
Device ID	dec: 65543	hex: 0x010007

Process Data Format

bit 15 bit 14 bit 13 bit 12 bit 11 bit 10 bit 9 bit 8 Numeric process data		Higher order byte								
Numeric process data		oit 15 bit 14 bit 13 bit 12 bit 11 bit 10 bit 9 bit 8	3							

Lower order byte						
bit 7 bit 6 bit 5 bit 4 bit 3 bit 2 bit 1	bit 0					
Numeric process data	ON/OFF					
Numeric process data	etatue					

Numeric process data can be switched with index 0xC0, Select process data

0	Displays the relative value of distance as a percentage. It is displayed so that the value is 100% for ON points. The maximum value is 200%. Data is updated to the average value over a period of 12.8 ms.
1	Displays the detection margin as a percentage.
	Displays the estimated number of days before maintenance is required.

ON/OFF status: This is the output status of the sensor. Output turns ON when the receiving light level is greater than or equal to the threshold.

(During Light ON mode. This behavior is inverted in Dark ON

Output turns ON after the ON delay timer/OFF delay timer

Stability indicator functions



Stability indicator

Indicator status	Description
Lit for 0.5 seconds	Flashes when the Find Me function is in use.
+ off for 0.5 seconds	Use this function to find the location of the
	sensor.
Lit for 0.2 seconds	Flashes when maintenance of the light
+ off for 0.2 seconds	emitting/receiving system is judged to be
	necessary.
	In detail, the indicator flashes when an
	event occurs due to the number of days
	estimated before maintenance is required
	falling below the specified number of days.
	It only flashes when the current detection
	margin is less than 100% during IO-Link
	communication.
Lit for 0.1 seconds	Flashes when IO-Link communication is
+ off for 0.1 seconds	interrupted for three communication cycles.
	The indicator stops flashing when
	communication is established.
Lit for 0.1 seconds	Flashes when the distance to the object is
+ off for 0.4 seconds	within the hysteresis range.

Service data

dec	x No.	Sub index No.	Access*	Name/Value	Default value	Z4B-S08	Z4B-10 Z4B-30
12	0x0C	_	r/w	Device lock bit 0: Setting writing lock bit 1: Storage lock	0		•
14	0x0E	_	ro	Process input data format 1, 1, 0: ON/OFF information, 1-bit width, bit offset 0 3, 15, 1: Receiving light level value, 15-bit width, bit offset 1	3, 15, 1, 3, 15, 1, 3, 15, 1, 1, 1, 0,	~	~
15	0x0F	_	ro	Process output data format 0, 0, 0: No information	0, 0	~	~
16	0x10	_	ro	Vendor name	OPTEX FA	~	
17	0x11	_	ro	Vendor character string	www.optex-fa.com	V	· /
18	0x12	_	ro	Product model	'-	~	~
19	0x13	_	ro	Product code	Z4_BGS	~	~
20	0x14	_	ro	Product function explanation (Z4B-10/Z4B-30) Product function explanation (Z4B-S08)	IO-Link BGS Sensor IO-Link BGS Sensor	V	
	0.45				Small Spot		
21	0x15	_	ro	Serial number	_	<i>V</i>	<u> </u>
22 23	0x16 0x17	_	ro	Hardware version Firmware version	_	<i>v</i>	
24	0x17	_	r/w	Application tag name (max. 16 characters)	*****	<i>'</i>	~
32	0x20	_	ro	Read number of communication errors (max. 65535)	0	· /	~
36	0x24	-	ro	Read device data The internal data is stored here when an event occurs. This area is cleared automatically when the event information is read. 0: Normal 1: Maintenance of the emitting/receiving part is required 4: Internal memory error	0	V	•
40	0x28	_	ro	Read process data	_	~	~
65	0x41	_	r/w	Sensitivity setting Sets the sensitivity for processing received signals. If the sensitivity is increased, the black-and-white difference of the object is reduced at a long distance, but it is more likely to be affected by ambient light. 0: High 1: Middle 2: Low	0		•
66	0x42	_	r/w	Small adjustment of distance Slightly adjust the ON/OFF distance. It can be changed after adjusting with the sensitivity adjuster of the sensor. 50: Shift to the near-side 100: Center 150: Shift to the far-side.	100	~	V
67	0x43	_	r/w	Hysteresis Set the amount of change in the ON/OFF distance. Small allows you to detect small gaps but makes the sensor more susceptible to ambient light. 0: Small 1: Medium 2: Large	0	~	V
68	0x44	-	r/w	Synchronization mode 0: Not synchronized (the ambient light removal function operates) 1: Emission synchronized with IO-Link communication 2: Emission synchronized with IO-Link communication but delayed by 10 μs 3: Emission synchronized with IO-Link communication but delayed by 20 μs 4: Emission synchronized with IO-Link communication but delayed by 30 μs 5: Emission synchronized with IO-Link communication but delayed by 40 μs 6: Emission synchronized with IO-Link communication but delayed by 50 μs 7: Emission synchronized with IO-Link communication but delayed by 60 μs	0	•	V
28	0x80	-	r/w	L-on/D-on switch 0: Set with the L/D selection knob on the main unit 1: L-on (ON: the near-side) 2: D-on (ON: the far-side)	0	~	V
129	0x81	_	r/w	Select timer function 0: No timer 1: ON delay 2: OFF delay 3: One-shot 4: ON delay + OFF delay 5: ON delay + OFF one-shot	0	•	~
30	0x82	-	r/w	ON delay time	10	~	~
31	0x83	_	r/w	1 to 10000: Time for which the output turning ON is delayed (in units of ms) OFF delay time 1 to 10000: Time for which the output turning OFF is delayed (in units of ma)	10	~	~
60	0xA0	-	ro	1 to 10000: Time for which the output turning OFF is delayed (in units of ms) Estimated number of days before maintenance is required This value is the estimated period before the receiving light level drops, leading to unstable detec-	10000	~	~
61	0xA1	-	r/w	tion. The data is updated approx. once every 14 minutes. The maximum value is 10000 days. Number of days before maintenance required notification event generation to 2000: An event occurs when the estimated number of days before maintenance is required falls below this setting.	180	~	~
62	0xA2	1	ro	Operating time information Indicates the time that the sensor is ON. The unit is hours. The sensor being on for	0	~	~
		2	ro	a length of time of 7.5 minutes or less is not added to the total. Detailed operating time information The value is returned in units of 7.5 minutes, the same as above.	0	V	~
63	0xA3	_	ro	The value is returned in units of 7.5 minutes, the same as above. Detection margin Returns as a percentage the margin of the time with the light detected when the output is ON and the margin of the time with the light not detected when the output is OFF. Before the margin is detected, the value –1 is returned. The maximum value is 200%.			
92	0xC0	_	r/w	Select process data 0: Distance (relative value) (bits 15 to 1) + output (bit 0) 1: Detection margin percentage (bits 15 to 1) + output (bit 0) 2: Estimated number of days before maintenance is required (bits 15 to 1) + output (bit 0)	0	~	V
203	0xCB	_	ro	Stability indicator status 0: Stable detection 1: Find Me flashes 2: Unstable detection 3: Requesting maintenance 4: Error, failure	0	~	<i>'</i>
204	0xCC	_	r/w	Find Me function 0: Normal 1: Stability indicator flashes (at an interval of 0.5 seconds)	0	·	•

* ro: read only, r/w: read/write

Ramco Innovations **Events**

Event code		Description	Event No.	Mada	Tuna	Measure	
dec	hex	Description Event No. Mode Type		Type	Measure		
6144		The estimated number of days before maintenance is required has been reached.	1	Occurrence		If the emitting part or receiving part is dirty, clean it. If the light axis is misaligned, adjust it again. To enable stable detection, adjust the sensitivity or execute teaching.	
6145		Setting memory has been rewritten more than 100,000 times.	2	Occurrence		This indicates the end of the product's service life, so we recommend you replace it as soon as possible. Memory is only rewritten when the power supply is turned OFF. The operating time is updated once every 7.5 minutes, so if, for example, the product is used such that the power is turned OFF once every 10 minutes, this event will occur in approx. 2 years.	
20480		A hardware failure has occurred.	4	Occurrence		A hardware error has been detected. Replace the product as soon as possible.	
20497		There is an error in the calibration values stored in memory.	3	Occurrence		Turn the power supply ON again. If the event occurs again, consider replacing the product or having it repaired.	
65425		Settings have been changed either by executing teaching or by writing settings via IO-Link.	0	Single-shot		This event occurs in the IO-Link system and is processed automatically by the IO-Link master.	

System command

Index. No.		Access*	Code	Name/Value		
dec	hex	Access	Code	Name/value		
2	0x02	wo	130 (0x82)	Initialize settings		
			160 (0xA0)	Teaching *Teaching is possible if the distance value (relative value) is 45 to 145.		
			161 (0xA1)	Stop emission		
			162 (0xA2)	Start emission		

^{*} wo: =write only

Maintenance Required Period Estimation Function

Function overview

This function estimates the period until detection will become unstable by observing the changes in stability over time and judging the detection stability from the relationship between the receiving light level and the output ON/OFF threshold.

Detection margin calculation

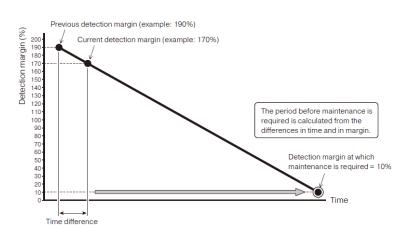
The level at which the receiving light level exceeds the ON point threshold is averaged over a period of 0.2 seconds and is calculated. If the receiving light level is the same as the ON point threshold, the detection margin becomes 0%.

Maintenance period calculation

The detection margin explained above is averaged over an additional 14 minutes. If this averaged detection margin is less than 10%, the current estimated period until maintenance is required is reduced by 25% at a time toward 0 days. If the detection margin is 200% or higher, the current estimated number of days until maintenance is required is increased by 25% at a time toward the number of days obtained by subtracting the operating time from 10000 days. If the detection margin is less than 200%, the number of days until the detection margin drops to 10% is calculated on the basis of the time from the point where there was a difference of 5% or more in the detection margin. Then, the current estimated number of days until maintenance is required is changed by 4% at a time toward this calculated number of days.

Event occurrence

The event for the estimated number of days before maintenance is required occurs once every 14 minutes while the estimated number of days is less than the set number of days for event occurrence.



For Application and Technical Support Contact: Ramco Innovations (800) 280-6933 www.ramcoi.com nsales@ramcoi.com