

IO-Link Data Map

This document refers to the following IODD file: Banner_Engineering-DF-G1-20170222-IODD1.1.xml. The IODD file and support files can be found on www.bannerengineering.com under the download section of the product family page.

Communication Parameters

The following communication parameters are used.

Parameter	Value	Parameter	Value
IO-Link revision	V1.1	Port class	A
Process Data In length	16-bit	SIO mode	Yes
Process Data Out length	N/A	Smart sensor profile	Yes
Bit Rate	38400 bps	Block parameterization	Yes
Minimum cycle time	2.6 ms	Data Storage	Yes

IO-Link Process Data In (Device to Master)

Process Data In is transmitted cyclically to the IO-Link master from the IO-Link device.

The IO-Link Process Data is 16 bits in size and includes the measurement distance, the output state, and alarm state. This information is sent to the IO-Link master every 2.6 ms.

Process Data Input			
Subindex	Name	Number of Bits	Data Values
1	Output State	1	0=inactive, 1=active
2	Hard Alarm State	1	0=inactive, 1=active
3	Measurement	14	Signal Value

Octet 0								
Subindex	3	3	3	3	3	3	3	3
Bit offset	15	14	13	12	11	10	9	8
Value	0	0	0	0	1	1	1	1

Octet 1								
Subindex	3	3	3	3	3	3	2	1
Bit offset	7	6	5	4	3	2	1	0
Value	1	0	1	0	0	0	0	1
Example	Measurement = 1000						Hard Alarm State = Inactive	Output = Active

IO-Link Process Data Out (Master to Device)

Not applicable.



Parameters Set Using IO-Link

These parameters can be read from and/or written to an IO-Link model of the DF-G1 series sensor. Also included is information about whether the variable in question is saved during Data Storage and whether the variable came from the IO-Link Smart Sensor Profile.

Unlike Process Data In, which is transmitted from the IO-Link device to the IO-Link master cyclically, these parameters are read or written acyclically as needed.

Index	Subindex	Name	Length	Value Range	Default	Access Rights	Data Storage?	Smart Sensor Profile?	AOI
0	1-16	Direct Parameter Page 1 (incl. Vendor ID & Device ID)			ro				
1	1-16	Direct Parameters Page 2				rw			
2		Standard Command	8-bit UInteger	65 = SP1 Single Value Teach 67 = SP1 Two Value Teach TP1 68 = SP1 Two Value Teach TP2 71 = SP1 Dynamic Teach Start 72 = SP1 Dynamic Teach Stop 79 = S1 Exit Teach 130 = Restore Factory Settings 160 = Disable Emitter 161 = Enable Emitter		wo		y	y
3		Data Storage Index (device-specific list of parameters to be stored)				rw			
4-11		reserved by IO-Link Specification							
12		Device Access Locks							
12	1	Parameter Write Access Lock		0 = off 1 = on	0	rw	y		y
12	2	Data Storage Lock		0 = off, 1 = on	0	rw	y		y
12	3	Local Parameterization Lock		0 = off, 1 = on	0	rw	y		y
12	4	Local User Interface Lock		0 = off, 1 = on	0	rw	y		y
13		Profile Characteristic				ro			
14		PDInput Descriptor				ro			
15		unused				ro			
16		Vendor Name string		Banner Engineering Corp		ro			
17		Vendor Text string		More Sensors, More Solutions		ro			
18		Product Name string				ro			
19		Product ID string				ro			
20		Product Text string				ro		y	
21		Serial Number				ro			
22		Hardware Revision				ro			
23		Firmware Version				ro		y	
24		App Specific Tag (user defined)				rw	y	y	
25-35		reserved							
36		Device Status	8-bit integer	0 = Device is OK 1 = Maintenance required 2 = Out of specification 3 = Functional check 4 = Failure 5..255 = Reserved		ro			

Index	Subindex	Name	Length	Value Range	Default	Access Rights	Data Storage?	Smart Sensor Profile?	AOI
37		Detailed Device Status	Array[6] of 3-octet			ro			
38-39		reserved							
40		Process Data Input				ro			
41-58		unused/reserved							
59		Teach-In Status							
59	1	Teach State: 4-bit Integer	4-bit integer	0 = Idle 1 = SP1 Success 2 = SP2 Success 3 = SP12 Success 4 = Wait for Command 5 = Busy 7 = Error		ro		y	y
59	2	SP1 TP1	1-bit integer	0 = not taught or unsuccessful 1 = successfully taught		ro		y	y
59	3	SP1 TP2	1-bit integer	0 = not taught or unsuccessful 1 = successfully taught		ro		y	y
59	4	SP2 TP1	1-bit integer	0 = not taught or unsuccessful 1 = successfully taught		ro		y	y
59	6	SP2 TP2	1-bit integer	0 = not taught or unsuccessful 1 = successfully taught		ro		y	y
60		BDC1 Setpoints							
60	1	BDC1 Setpoint SP1 (SP1 switch point)	16-bit integer		0	rw	y	y	y
60	2	BDC1 Setpoint SP2 (unused)	16-bit integer		4000	rw	y	y	y
61		BDC1 Configuration							
61	1	BDC1 Switchpoint Logic	8-bit integer	0 = Light Operate 1 = Dark Operate 128 = Switch Select	128	rw	y	y	y
61	2	BDC1 Mode	8-bit integer	1 = Single Point 128 = Banner Window SET 129 = Banner Light SET 130 = Banner Dark SET	1	rw	y	y	y
61	3	Hysteresis	16-bit integer	0 = 1.0x, 1 = 1.5x, 2 = 2.5x	0	rw	y	y	y
62-63		unused							
64		Configuration							
64	11	Signal/Threshold Readout	1-bit integer	0 = Numeric, 1 = Percentage	0	rw	y		y
64	12	ECO Mode	1-bit integer	0 = Disabled, 1 = Enabled	0	rw	y		y
64	13	Display Orientation	1-bit integer	0 = Normal, 1 = Flipped	0	rw	y		y
64	16	Gain Level	6-bit integer	0 = Gain 1 1 = Gain 2 2 = Gain 3 3 = Gain 4 4 = Gain 5 5 = Gain 6 6 = Gain 7 7 = Gain 8	7	rw	y		y
64	17	Gain Mode	2-bit Uinteger	0 = Fixed Gain, 2 = Auto Gain	2	rw	y		y

Index	Subindex	Name	Length	Value Range	Default	Access Rights	Data Storage?	Smart Sensor Profile?	AOI
64	18	Response Speed	8-bit UInteger	0 = 200 μ s 1 = 500 μ s 2 = 2000 μ s 3 = 5000 μ s	1	rw	y		y
64	19	TEACH Selection	8-bit UInteger	0 = Two-Point TEACH 1 = Dynamic TEACH 2 = Banner Window SET 3 = Banner Light SET 4 = Banner Dark Set 5 = Cal SET	0	rw	y		y
64	30	Auto Threshold	2-bit UInteger	0 = Disabled, 3 = Enabled	0	rw	y		y
64	33	Offset Percent	16-bit UInteger		10	rw	y		y
64	34	Auto-Threshold Response Time	8-bit UInteger	14 = 2.5 s 15 = 5.0 s 16 = 10.0 s 17 = 20.0 s	0	rw	y		y
64	35	Process Data Filter Update Time	16-bit UInteger		0	rw	y		y
64	41	Delay Mode	4-bit UInteger	0 = Off-On Delay 3 = Off Oneshot 12 = On Oneshot	0	rw	y		y
64	43	On Delay/Off Oneshot Time	16-bit UInteger	0-9999	0	rw	y		y
64	44	Off Delay/On Oneshot Time	16-bit UInteger	0-9999	0	rw	y		y
65		Switchpoint Status							
65	2	Upper Threshold	16-bit integer			ro			y
65	3	Upper Hysteresis	16-bit integer			ro			y
65	5	Reference	16-bit integer			ro			y
65	6	Lower Threshold	16-bit integer			ro			y
65	7	Lower Hysteresis	16-bit integer			ro			y
65	17	Output Mode	1-bit integer	0 = Dark Operate, 1 = Light Operate		ro			y
66		Statistics							
66	1	Number of Samples	16-bit integer			ro			
66	2	Sum	32-bit integer			ro			
66	3	Sum Squared	64-bit integer			ro			
66	4	Min	16-bit integer			ro			
66	5	Max	16-bit integer			ro			
66	6	Light -> Dark Transition Count	16-bit integer			ro			

Index	Subindex	Name	Length	Value Range	Default	Access Rights	Data Storage?	Smart Sensor Profile?	AOI
66	7	Dark -> Light Transition Count	16-bit integer			ro			
68		Teachable Limits							
68	1	Min Teachable Reference	16-bit Uinteger			ro			y
68	2	Max Teachable Reference	16-bit Uinteger			ro			y
68	3	Min Adjustable Reference	16-bit Uinteger			ro			y
68	4	Max Adjustable Reference	16-bit integer			ro			y

IO-Links Events

Events are acyclic transmissions from the IO-Link device to the IO-Link master. In general events can be error messages and/or warning or maintenance data. The DF-G1 has a single warning event and three error events defined.

Code	Type	Description
39096 (0x8d00)	Warning	The threshold(s) cannot be optimized, but sensor output will continue to function
36097 (0x8d01)	Error	The threshold(s) cannot be optimized, and sensor output will stop functioning
36098 (0x8d02)	Error	The latest Teach/Set method failed
36112 (0x8d10)	Error	The sensor's internal eeprom had a critical failure