

IO-Link Data Map

This document refers to the following IO-Link file: Banner_Engineering-DF-G3-20170222-IO-Link-Data-Map-1.1.xml. The IO-Link 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	32-bit	SIO mode	Yes
Process Data Out length	N/A	Smart sensor profile	Yes
Bit Rate	38400 bps	Block parameterization	Yes
Minimum cycle time	2.3 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 2.3 ms.

Process Data Input			
Subindex	Name	Number of Bits	Data Values
1	Channel 1 Output State	1	0=inactive, 1=active
2	Channel 2 Output 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						Output 2 = Inactive	Output 1 = 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-G3 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
0	1-15	Direct Parameter Page 1 (incl. Vendor ID & Device ID)			ro			
1	1-15	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 162 = Start discovery 163 = Stop discovery		wo		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	
12	2	Data Storage Lock		0 = off, 1 = on	0	rw	y	
12	3	Local Parameterization Lock		0 = off, 1 = on	0	rw	y	
12	4	Local User Interface Lock		0 = off, 1 = on	0	rw	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 Uinteger	0 = Device is OK 1 = Maintenance required 2 = Out of specification 3 = Functional check 4 = Failure 5..255 = Reserved		ro		
37		Detailed Device Status	Array[6] of 3-octet			ro		
38-39		reserved						

Index	Subindex	Name	Length	Value Range	Default	Access Rights	Data Storage?	Smart Sensor Profile
40		Process Data Input				ro		
41-58		unused/reserved						
58		Teach Channel	8-bit Uinteger	0 = Default, 1 = BDC1, 2 = BDC2	0	rw		
59		Teach-In Status						
59	1	Teach State: 4-bit Integer	4-bit Uinteger	0 = Idle 1 = SP1 Success 2 = SP2 Success 3 = SP12 Success 4 = Wait for Command 5 = Busy 7 = Error		ro		y
59	2	SP1 TP1	1-bit integer	0 = not taught or unsuccessful 1 = successfully taught		ro		y
59	3	SP1 TP2	1-bit integer	0 = not taught or unsuccessful 1 = successfully taught		ro		y
59	4	SP2 TP1	1-bit integer	0 = not taught or unsuccessful 1 = successfully taught		ro		y
59	6	SP2 TP2	1-bit integer	0 = not taught or unsuccessful 1 = successfully taught		ro		y
60		BDC1 Setpoints						
60	1	BDC1 Setpoint SP1 (SP1 switch point)	16-bit integer		5024	rw	y	y
60	2	BDC1 Setpoint SP2 (unused)	16-bit integer		0	rw	y	y
61		BDC1 Configuration						
61	1	BDC1 Switchpoint Logic	8-bit Uinteger	0 = Light Operate, 1 = Dark Operate	0	rw	y	y
61	2	BDC1 Mode	8-bit Uinteger	1 = Single Point 128 = Banner Window SET 129 = Banner Light SET 130 = Banner Dark SET	1	rw	y	y
61	3	Hysteresis	16-bit Uinteger	0 = 1.0x, 1 = 1.5x, 2 = 2.5x	1	rw	y	y
62		BDC2 Setpoints						
62	1	BDC2 Setpoint SP1 (SP1 switch point)	16-bit integer		5024	rw	y	y
62	2	BDC2 Setpoint SP2 (unused)	16-bit integer		0	rw	y	y
63		BDC2 Configuration						
63	1	BDC2 Switchpoint Logic	8-bit Uinteger	0 = Light Operate, 1 = Dark Operate	0	rw	y	y
63	2	BDC1 Mode	8-bit Uinteger	1 = Single Point 128 = Banner Window SET 129 = Banner Light SET 130 = Banner Dark SET	1	rw	y	y
63	3	Hysteresis	16-bit Uinteger	0 = 1.0x, 1 = 1.5x, 2 = 2.5x	1	rw	y	y
64		Configuration						
64	1	Response Speed	8-bit Uinteger	0 = 500 μ s 1 = 1000 μ s 2 = 2 ms 3 = 8 ms 4 = 24 ms	2	rw	y	
64	2	Gain Mode	8-bit Uinteger	0 = Fixed Gain, 1 = Auto Gain	1	rw	y	

Index	Subindex	Name	Length	Value Range	Default	Access Rights	Data Storage?	Smart Sensor Profile
64	3	Gain Level	8-bit Uinteger	0 = Gain 1 1 = Gain 2 2 = Gain 3 3 = Gain 4 4 = Gain 5 5 = Gain 6 6 = Gain 7	6	rw	y	
64	4	Auto-Threshold Response Time	8-bit Uinteger	12 = 2.5 s, 13 = 5.0 s, 14 = 10.0 s, 15 = 20.0 s	13	rw	y	
64	5	Process Data Filter Update Time	16-bit Uinteger		0	rw	y	
64	6	Signal/Threshold Readout	8-bit Uinteger	0 = Numeric, 1 = Percentage	0	rw	y	
64	7	ECO Mode	8-bit Uinteger	0 = Disabled, 1 = Enabled	0	rw	y	
64	8	Display Orientation	8-bit Uinteger	0 = Normal, 1 = Flipped	0	rw	y	
64	9	Secondary Output Function	8-bit Uinteger	0 = Independent Output 1 = Complimentary Output 2 = Health Output 3 = Remote Set Input 4 = Master 5 = Slave 6 = LED Off 7 = LED On 8 = Gate	0	rw	y	
64	10	Slave Number	8-bit Uinteger	1 - 6	1	rw	y	
65		BDC1 Vendor Specific Configuration						
65	1	BDC1 Delay Mode	8-bit Uinteger	0 = Disabled 1 = Off-On Delay 2 = Off Oneshot 3 = On Oneshot	0	rw	y	
65	2	BDC1 Delay Timer 1	16-bit Uinteger	0-9999	0	rw	y	
65	3	BDC1 Delay Timer 2	16-bit Uinteger	0-9999	0	rw	y	
65	4	BDC1 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	
65	5	BDC1 Offset Percent	16-bit Uinteger	0 - 100	100	rw	y	
65	6	BDC1 Auto Threshold	8-bit Uinteger	0 = Disabled, 1 = Enabled	0	rw	y	
66		BDC2 Vendor Specific Configuration						
66	1	BDC2 Delay Mode	8-bit Uinteger	0 = Disabled 1 = Off-On Delay 2 = Off Oneshot 3 = On Oneshot	0	rw	y	
66	2	BDC2 Delay Timer 1	16-bit Uinteger	0-9999	0	rw	y	
66	3	BDC2 Delay Timer 2	16-bit Uinteger	0-9999	0	rw	y	
66	4	BDC2 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	
66	5	BDC2 Offset Percent	16-bit Uinteger	0 - 100	100	rw	y	
66	6	BDC2 Auto Threshold	8-bit Uinteger	0 = Disabled, 1 = Enabled	0	rw	y	

Index	Subindex	Name	Length	Value Range	Default	Access Rights	Data Storage?	Smart Sensor Profile
68		Statistics						
68	1	Number of Samples	16-bit Uinteger			ro		
68	2	Sum	64-bit integer			ro		
68	4	Min	32-bit integer			ro		
68	5	Max	32-bit integer			ro		
68	6	BDC1 Light -> Dark Transition Count	16-bit Uinteger			ro		
68	7	BDC1 Dark-> Light Transition Count	16-bit Uinteger			ro		
68	8	BDC2 Light -> Dark Transition Count	16-bit integer			ro		
68	9	BDC2 Dark -> Light Transition Count	16-bit integer			ro		
69		All-Time Run Time	32-bit Uinteger			ro		
70		Resetable Run Time	32-bit Uinteger			rw		
71		BDC1 Status						
71	1	Lower Hysteresis	16-bit Uinteger			ro		
71	2	Lower Threshold	16-bit Uinteger			ro		
71	3	Reference	16-bit Uinteger			ro		
71	4	Upper Threshold	16-bit Uinteger			ro		
71	5	Upper Hysteresis	16-bit Uinteger			ro		
71	6	Output State	8-bit Uinteger	0 = Inactive, 1 = Active		ro		
71	7	Alarm State	8-bit Uinteger	0 = No alarm present 1 = Threshold Warning 2 = Threshold Error		ro		
72		BDC2 Status						
72	1	Lower Hysteresis	16-bit Uinteger			ro		
72	2	Lower Threshold	16-bit Uinteger			ro		
72	3	Reference	16-bit Uinteger			ro		
72	4	Upper Threshold	16-bit Uinteger			ro		
72	5	Upper Hysteresis	16-bit Uinteger			ro		
72	6	Output State	8-bit Uinteger	0 = Inactive, 1 = Active		ro		
72	7	Alarm State	8-bit Uinteger	0 = No alarm present 1 = Threshold Warning 2 = Threshold Error		ro		

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