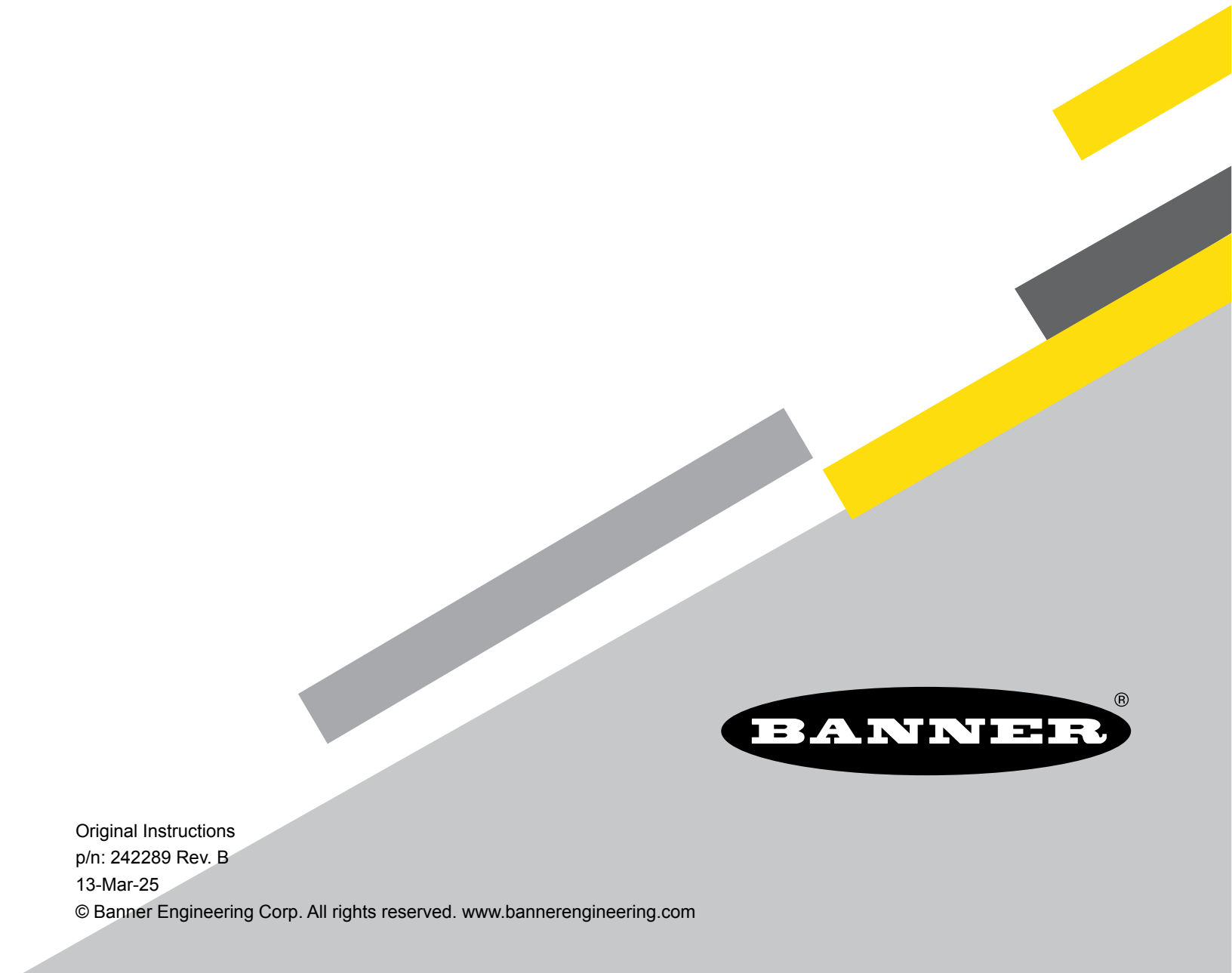
S15S IO-Link Temperature, Humidity, and Dew Point Sensor - IO-Link Data Reference Guide



Original Instructions
p/n: 242289 Rev. B
13-Mar-25

Contents

Chapter Contents

Chapter 1 IO-Link Data Map

This document refers to the following IODD file: Banner_Engineering-S15S-TH-KQ-20240615-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	120 bits	SIO mode	No
Process Data Out length	N/A	Smart Sensor Profile	Yes
Bit Rate	38400 bps	Block parameterization	Yes
Minimum cycle time	4 ms	Data Storage	Yes
Device ID	663553 (0x0a2001)		

Chapter Contents

Chapter 2 IO-Link Process Data In (Device to Master)

Process Data Mode (1): Smart Sensor Fahrenheit

Subindex	Name	Number of Bits
1	Temperature Value	16
2	Temperature Scale	8
3	Temperature Over Threshold	1
4	Temperature Under Threshold	1
5	Relative Humidity Value	16
6	Relative Humidity Scale	8
7	Relative Humidity Over Threshold	1
8	Relative Humidity Under Threshold	1
9	Dew Point Value	16
10	Dew Point Scale	8
11	Dew Point Over Threshold	1
12	Dew Point Under Threshold	1

Octet 0								
Subindex	-	-	-	-	-	-	-	-
Bit offset	111	110	109	108	107	106	105	104
Value	1	1	1	1	1	1	0	1

Octet 1								
Subindex	-	-	-	-	-	-	-	-
Bit offset	103	102	101	100	99	98	97	96
Value	1	1	1	1	1	1	1	0

Octet 2								
Subindex	1	1	1	1	1	1	1	1
Bit offset	95	94	93	92	91	90	89	88
Value	0	0	0	0	1	1	1	1

Octet 3								
Subindex	1	1	1	1	1	1	1	1
Bit offset	87	86	85	84	83	82	81	80
Value	1	1	1	1	1	1	1	1

Octet 4								
Subindex	2	2	2	2	2	2	2	2
Bit offset	79	78	77	76	75	74	73	72
Value	1	1	1	1	1	1	1	0

Octet 5								
Subindex	-	-	-	-	-	-	3	4
Bit offset	71	70	69	68	67	66	65	64
Value	1	1	1	1	1	1	1	0

Octet 6								
Subindex	5	5	5	5	5	5	5	5
Bit offset	63	62	61	60	59	58	57	56
Value	0	0	0	1	0	0	1	1

Octet 7								
Subindex	5	5	5	5	5	5	5	5
Bit offset	55	54	53	52	51	50	49	48
Value	1	1	1	0	1	1	0	0

Octet 8								
Subindex	6	6	6	6	6	6	6	6
Bit offset	47	46	45	44	43	42	41	40
Value	1	1	1	1	1	1	1	0

Octet 9								
Subindex	-	-	-	-	-	-	7	8
Bit offset	39	38	37	36	35	34	33	32
Value	1	1	1	1	1	1	0	0

Octet 10								
Subindex	9	9	9	9	9	9	9	9
Bit offset	31	30	29	28	27	26	25	24
Value	1	1	1	1	1	1	1	0

Octet 11								
Subindex	9	9	9	9	9	9	9	9
Bit offset	23	22	21	20	19	18	17	16
Value	1	1	0	1	0	0	0	0

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

Octet 13								
Subindex	-	-	-	-	-	-	11	12
Bit offset	7	6	5	4	3	2	1	0
Value	1	1	1	1	1	1	0	0

Examples Based Upon The Values Above

Temperature

Temperature Value = 4095
Temperature Scale = -3
Scaled Temperature Value = 4.095 °F
Temperature Over Threshold = True
Temperature Under Threshold = False

Relative Humidity

Relative Humidity Value = 65232
Relative Humidity Scale = -3
Scaled Relative Humidity Value = 65.232%
Relative Humidity Over Threshold = False
Relative Humidity Under Threshold = False

Dew Point

Dew Point Value = 5100
Dew Point Scale = -3
Scaled Dew Point Value = 5.1 °F
Dew Point Over Threshold = False
Dew Point Under Threshold = False

Process Data Mode (2): Smart Sensor Celsius

Subindex	Name	Number of Bits
1	Temperature Value	16
2	Temperature Scale	8
3	Temperature Over Threshold	1
4	Temperature Under Threshold	1
5	Relative Humidity Value	16
6	Relative Humidity Scale	8
7	Relative Humidity Over Threshold	1
8	Relative Humidity Under Threshold	1
9	Dew Point Value	16
10	Dew Point Scale	8
11	Dew Point Over Threshold	1
12	Dew Point Under Threshold	1

Octet 0								
Subindex	-	-	-	-	-	-	-	-
Bit offset	111	110	109	108	107	106	105	104
Value	1	1	1	1	1	1	0	1

Octet 1								
Subindex	-	-	-	-	-	-	-	-
Bit offset	103	102	101	100	99	98	97	96
Value	1	1	1	1	1	1	1	0

Octet 2								
Subindex	1	1	1	1	1	1	1	1
Bit offset	95	94	93	92	91	90	89	88
Value	1	1	0	0	0	0	1	1

Octet 3								
Subindex	1	1	1	1	1	1	1	1
Bit offset	87	86	85	84	83	82	81	80
Value	0	1	1	1	0	0	1	0

Octet 4								
Subindex	2	2	2	2	2	2	2	2
Bit offset	79	78	77	76	75	74	73	72
Value	1	1	1	1	1	1	1	0

Octet 5								
Subindex	-	-	-	-	-	-	3	4
Bit offset	71	70	69	68	67	66	65	64
Value	1	1	1	1	1	1	1	0

Octet 6								
Subindex	5	5	5	5	5	5	5	5
Bit offset	63	62	61	60	59	58	57	56
Value	1	0	1	0	1	1	1	1

Octet 7								
Subindex	5	5	5	5	5	5	5	5
Bit offset	55	54	53	52	51	50	49	48
Value	1	0	0	0	0	1	0	0

Octet 8								
Subindex	6	6	6	6	6	6	6	6
Bit offset	47	46	45	44	43	42	41	40
Value	1	1	1	1	1	1	1	0

Octet 9								
Subindex	-	-	-	-	-	-	7	8
Bit offset	39	38	37	36	35	34	33	32
Value	1	1	1	1	1	1	0	0

Octet 10								
Subindex	9	9	9	9	9	9	9	9
Bit offset	31	30	29	28	27	26	25	24
Value	1	1	1	1	1	1	1	0

Octet 11								
Subindex	9	9	9	9	9	9	9	9
Bit offset	23	22	21	20	19	18	17	16
Value	1	1	0	1	0	0	0	0

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

Octet 13								
Subindex	-	-	-	-	-	-	11	12
Bit offset	7	6	5	4	3	2	1	0
Value	1	1	1	1	1	1	0	0

Examples Based Upon The Values Above

Temperature

Temperature Value = -15502
Temperature Scale = -3
Scaled Temperature Value = -15.502 °C
Temperature Over Threshold = True
Temperature Under Threshold = False

Relative Humidity

Relative Humidity Value = 65232
Relative Humidity Scale = -3
Scaled Relative Humidity Value = 65.232%
Relative Humidity Over Threshold = False
Relative Humidity Under Threshold = False

Dew Point

Dew Point Value = -20600
Dew Point Scale = -3
Scaled Dew Point Value = -20.6 °C
Dew Point Over Threshold = False
Dew Point Under Threshold = False

Process Data Mode (3): Floating Point Fahrenheit

Subindex	Name	Number of Bits
1	Temperature Value	32
2	Relative Humidity Value	32
3	Dew Point Value	32
4	Temperature Under Threshold	1
5	Temperature Over Threshold	1
6	Relative Humidity Under Threshold	1
7	Relative Humidity Over Threshold	1
8	Dew Point Under Threshold	1
9	Dew Point Over Threshold	1

Octet 0								
Subindex	-	-	-	-	-	-	-	-
Bit offset	111	110	109	108	107	106	105	104

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Value	1	0	0	0	0	0	1	1

Octet 1								
Subindex	-	-	9	8	7	6	5	4
Bit offset	103	102	101	100	99	98	97	96
Value	0	0	0	0	1	0	1	0

Octet 2								
Subindex	3	3	3	3	3	3	3	3
Bit offset	95	94	93	92	91	90	89	88
Value	0	0	1	1	1	1	0	1

Octet 3								
Subindex	3	3	3	3	3	3	3	3
Bit offset	87	86	85	84	83	82	81	80
Value	0	0	0	0	0	0	0	1

Octet 4								
Subindex	3	3	3	3	3	3	3	3
Bit offset	79	78	77	76	75	74	73	72
Value	0	1	0	0	0	0	0	0

Octet 5								
Subindex	3	3	3	3	3	3	3	3
Bit offset	71	70	69	68	67	66	65	64
Value	1	0	1	0	0	0	1	1

Octet 6								
Subindex	2	2	2	2	2	2	2	2
Bit offset	63	62	61	60	59	58	57	56
Value	0	0	1	1	0	0	1	1

Octet 7								
Subindex	2	2	2	2	2	2	2	2
Bit offset	55	54	53	52	51	50	49	48
Value	0	0	1	1	0	0	1	1

Octet 8								
Subindex	2	2	2	2	2	2	2	2
Bit offset	47	46	45	44	43	42	41	40
Value	1	1	1	1	1	1	0	1

Octet 9								
Subindex	2	2	2	2	2	2	2	2
Bit offset	39	38	37	36	35	34	33	32

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Value	0	1	0	0	0	0	1	0

Octet 10								
Subindex	1	1	1	1	1	1	1	1
Bit offset	31	30	29	28	27	26	25	24
Value	1	0	0	0	0	0	1	0

Octet 11								
Subindex	1	1	1	1	1	1	1	1
Bit offset	23	22	21	20	19	18	17	16
Value	0	1	1	1	0	1	1	0

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

Octet 13								
Subindex	1	1	1	1	1	1	1	1
Bit offset	7	6	5	4	3	2	1	0
Value	1	1	1	1	1	1	1	0

Examples Based Upon The Values Above

Temperature

Temperature Value = 4.095 °F
Temperature Over Threshold = True
Temperature Under Threshold = False

Relative Humidity

Relative Humidity Value = 65.232%
Relative Humidity Over Threshold = False
Relative Humidity Under Threshold = False

Dew Point

Dew Point Value = 5.1 °F
Dew Point Over Threshold = False
Dew Point Under Threshold = False

Process Data Mode (4): Floating Point Celsius

Subindex	Name	Number of Bits
1	Temperature Value	32
2	Relative Humidity Value	32
3	Dew Point value	32
4	Temperature Under Threshold	1
5	Temperature Over Threshold	1
6	Relative Humidity Over Threshold	1
7	Relative Humidity Under Threshold	1
8	Dew Point Over Threshold	1
9	Dew Point Under Threshold	1

Octet 0								
Subindex	-	-	-	-	-	-	-	-
Bit offset	111	110	109	108	107	106	105	104
Value	0	1	1	1	1	0	0	0

Octet 1								
Subindex	-	-	9	8	7	6	5	4
Bit offset	103	102	101	100	99	98	97	96
Value	0	0	0	0	1	0	0	0

Octet 2								
Subindex	3	3	3	3	3	3	3	3
Bit offset	95	94	93	92	91	90	89	88
Value	0	0	1	1	0	0	0	1

Octet 3								
Subindex	3	3	3	3	3	3	3	3
Bit offset	87	86	85	84	83	82	81	80
Value	0	0	0	0	0	0	0	1

Octet 4								
Subindex	3	3	3	3	3	3	3	3
Bit offset	79	78	77	76	75	74	73	72
Value	1	1	0	0	0	0	0	1

Octet 5								
Subindex	3	3	3	3	3	3	3	3
Bit offset	71	70	69	68	67	66	65	64
Value	1	0	1	0	0	1	0	0

Octet 6								
Subindex	2	2	2	2	2	2	2	2
Bit offset	63	62	61	60	59	58	57	56
Value	1	1	0	0	1	1	0	0

Octet 7								
Subindex	2	2	2	2	2	2	2	2
Bit offset	55	54	53	52	51	50	49	48
Value	1	1	0	0	1	1	0	1

Octet 8								
Subindex	2	2	2	2	2	2	2	2
Bit offset	47	46	45	44	43	42	41	40
Value	1	1	1	1	1	1	0	1

Octet 9								
Subindex	2	2	2	2	2	2	2	2
Bit offset	39	38	37	36	35	34	33	32
Value	0	1	0	0	0	0	1	0

Octet 10								
Subindex	1	1	1	1	1	1	1	1
Bit offset	31	30	29	28	27	26	25	24
Value	1	0	0	0	0	0	1	0

Octet 11								
Subindex	1	1	1	1	1	1	1	1
Bit offset	23	22	21	20	19	18	17	16
Value	0	1	1	1	0	1	1	0

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

Octet 13								
Subindex	1	1	1	1	1	1	1	1
Bit offset	7	6	5	4	3	2	1	0
Value	1	1	1	1	1	1	1	0

Examples Based Upon The Values Above

Temperature

Temperature Value = -15.502 °C
Temperature Over Threshold = True
Temperature Under Threshold = False

Relative Humidity

Relative Humidity Value = 65.232%
Relative Humidity Over Threshold = False
Relative Humidity Under Threshold = False

Dew Point

Dew Point Value = -20.6 °C
Dew Point Over Threshold = False
Dew Point Under Threshold = False

Chapter Contents

Chapter 3 IO-Link Process Data Out (Master to Device)

Not applicable.

Chapter Contents

Chapter 4 Parameters Set Using IO-Link

These parameters can be read from and/or written to an S15S-TH-KQ 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	1-16	Direct Parameter Page 1 (incl. Vendor ID & Device ID)				RO		
2		System Command		129 = Application Reset 131 = Back to Box		WO		Y
16		Vendor Name string		Banner Engineering Corporation		RO		
17		Vendor Text string		More Sensors. More Solutions.		RO		
18		Product Name string		S15S-TH-KQ		RO		
19		Product ID string		S15S-TH-KQ		RO		
20		Product Text string		S15S-TH-KQ		RO		Y
21		Serial Number				RO		
22		Hardware Version				RO		
23		Firmware Version		V1.1		RO		Y
24		App Specific Tag (user defined)		More Sensors. More Solutions.		RW	Y	Y
25		Function Tag		More Sensors. More Solutions.		RW	Y	Y
26		Location Tag		More Sensors. More Solutions.		RW	Y	Y
32		Error Count	16-bit Uinteger			RO		
36		Device Status	8-bit integer	0 = Device is OK 1 = Maintainance required 2 = Out of specification 3 = Functional check 4 = Failure 5..255 Reserved		RO		
37		Detailed Device Status	Array[4] of 3-octet			RO		
69		**All-Time Run Time**						
69	1	Run counter (0.25hr)	32-bit Uinteger	0..2147483647		RO	Y	
70		**Resettable Run Time**						
70	1	Run counter (0.25hr)	32-bit Uinteger	0..2147483647	0	RW		
71		**Alarm Configuration**						
71	1	Temperature Low Threshold	Float32		32	RW	Y	
71	2	Temperature High Threshold	Float32		120	RW	Y	

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Index	Subindex	Name	Length	Value Range	Default	Access Rights	Data Storage?	Smart Sensor Profile
71	3	Relative Humidity Low Threshold	Float32		0	RW	Y	
71	4	Relative Humidity High Threshold	Float32		100	RW	Y	
71	5	Dew Point Low Threshold	Float32		32	RW	Y	
71	6	Dew Point High Threshold	Float32		120	RW	Y	
71	7	Temperature On Delay	Float32		0	RW	Y	
71	8	Temperature Off Delay	Float32		0	RW	Y	
71	9	Relative Humidity On Delay	Float32		0	RW	Y	
71	10	Relative Humidity Off Delay	Float32		0	RW	Y	
71	11	Dew Point On Delay	Float32		0	RW	Y	
71	12	Dew Point Off Delay	Float32		0	RW	Y	
72		**Alarm Counter**						
72	1	Temperature Low Counter	16-bit UInteger		0	RW	Y	
72	2	Temperature High Counter	16-bit UInteger		0	RW	Y	
72	3	Relative Humidity Low Counter	16-bit UInteger		0	RW	Y	
72	4	Relative Humidity High Counter	16-bit UInteger		0	RW	Y	
72	5	Dew Point Low Counter	16-bit UInteger		0	RW	Y	
72	6	Dew Point High Counter	16-bit UInteger		0	RW	Y	
80		**Process Data Mode**						
80	1	Defines the formatting of the Process Data	8-bit Uinteger	1 = Smart Sensor Profile, Fahrenheit 2 = Smart Sensor Profile, Celsius 3 = Floating Point, Fahrenheit 4 = Floating Point, Celsius	1	RW	Y	
81		**Wire Mode**						
81	1	Output Configuration	8-bit Uinteger	0 = BannerBus, 1 = Discrete Output	0	RW	Y	

Chapter Contents

Chapter 5 IO-Link Events

Events are acyclic transmissions from the IO-Link device to the IO-Link master. Events can be error messages and/or warning or maintenance data.

Code	Type	Name	Description
0 (0x0000)	Notification	No Malfunction	-
20480 (0x5000)	Error	Device hardware fault	Device Exchange

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S15S-TH-KQ