

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



Original Instructions

p/n: 242289 Rev. A

13-Aug-24

© Banner Engineering Corp. All rights reserved.

Contents

- Chapter 1 IO-Link Data Map**
 - Communication Parameters 3
- Chapter 2 IO-Link Process Data In (Device to Master)**
 - Process Data Mode (1): Smart Sensor Fahrenheit 4
 - Examples Based Upon The Values Above 6
 - Process Data Mode (2): Smart Sensor Celsius 6
 - Examples Based Upon The Values Above 8
 - Process Data Mode (3): Floating Point Fahrenheit 8
 - Examples Based Upon The Values Above 10
 - Process Data Mode (4): Floating Point Celsius 11
 - Examples Based Upon The Values Above 12
- Chapter 3 IO-Link Process Data Out (Master to Device) 14**
- Chapter 4 Parameters Set Using IO-Link 15**
- Chapter 5 IO-Link Events..... 17**

Chapter Contents

Communication Parameters 3

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

Process Data Mode (1): Smart Sensor Fahrenheit	4
Process Data Mode (2): Smart Sensor Celsius.....	6
Process Data Mode (3): Floating Point Fahrenheit	8
Process Data Mode (4): Floating Point Celsius.....	11

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	Dew Point Value	16
6	Dew Point Scale	8
7	Dew Point Over Threshold	1
8	Dew Point Under Threshold	1
9	Relative Humidity Value	16
10	Relative Humidity Scale	8
11	Relative Humidity Over Threshold	1
12	Relative Humidity Under Threshold	1

Octet 0								
Subindex	-	-	-	-	-	-	-	-
Bit offset	119	118	117	116	115	114	113	112
Value	0	0	0	0	0	0	0	1

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

Octet 2								
Subindex	-	-	-	-	-	-	-	-
Bit offset	103	102	101	100	99	98	97	96
Value	1	1	1	1	1	1	1	0

Octet 3								
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 4								
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 5								
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 6								
Subindex	-	-	-	-	-	-	3	4
Bit offset	71	70	69	68	67	66	65	64
Value	1	1	1	1	1	1	1	0

Octet 7								
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 8								
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 9								
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 10								
Subindex	-	-	-	-	-	-	7	8
Bit offset	39	38	37	36	35	34	33	32
Value	1	1	1	1	1	1	0	0

Octet 11								
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 12								
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 13								
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 14								
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 = -2
 Scaled Temperature Value = 40.95 °F
 Temperature Over Threshold = True
 Temperature Under Threshold = False

Dew Point

Dew Point Value = 5100
 Dew Point Scale = -2
 Scaled Dew Point Value = 51.00 °F
 Dew Point Over Threshold = False
 Dew Point Under Threshold = False

Relative Humidity

Relative Humidity Value = 6523
 Relative Humidity Scale = -2
 Scaled Relative Humidity Value = 65.23%
 Relative Humidity Over Threshold = False
 Relative Humidity 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	Dew Point Value						16	
6	Dew Point Scale						8	
7	Dew Point Over Threshold						1	
8	Dew Point Under Threshold						1	
9	Relative Humidity Value						16	
10	Relative Humidity Scale						8	
11	Relative Humidity Over Threshold						1	
12	Relative Humidity Under Threshold						1	

Octet 0								
Subindex	-	-	-	-	-	-	-	-
Bit offset	119	118	117	116	115	114	113	112
Value	0	0	0	0	0	0	0	1

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

Octet 2								
Subindex	-	-	-	-	-	-	-	-
Bit offset	103	102	101	100	99	98	97	96
Value	1	1	1	1	1	1	1	0

Octet 3								
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 4								
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 5								
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 6								
Subindex	-	-	-	-	-	-	3	4
Bit offset	71	70	69	68	67	66	65	64
Value	1	1	1	1	1	1	1	0

Octet 7								
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 8								
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 9								
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 10								
Subindex	-	-	-	-	-	-	7	8
Bit offset	39	38	37	36	35	34	33	32
Value	1	1	1	1	1	1	0	0

Octet 11								
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 12								
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 13								
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 14								
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 = -1552
 Temperature Scale = -2
 Scaled Temperature Value = -15.52 °C
 Temperature Over Threshold = True
 Temperature Under Threshold = False

Dew Point

Dew Point Value = 913
 Dew Point Scale = -2
 Scaled Dew Point Value = 9.13 °C
 Dew Point Over Threshold = False
 Dew Point Under Threshold = False

Relative Humidity

Relative Humidity Value = 3513
 Relative Humidity Scale = -2
 Scaled Relative Humidity Value = 35.13%
 Relative Humidity Over Threshold = False
 Relative Humidity Under Threshold = False

Process Data Mode (3): Floating Point Fahrenheit

Subindex	Name	Number of Bits
1	Temperature Value	32
2	Temperature Over Threshold	1
3	Temperature Under Threshold	1

Continued on page 9

Continued from page 8

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

Octet 0								
Subindex	1	1	1	1	1	1	1	1
Bit offset	119	118	117	116	115	114	113	112
Value	0	1	0	0	0	0	0	0

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

Octet 2								
Subindex	1	1	1	1	1	1	1	1
Bit offset	103	102	101	100	99	98	97	96
Value	0	0	0	0	1	0	1	0

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

Octet 4								
Subindex	-	-	-	-	-	-	2	3
Bit offset	87	86	85	84	83	82	81	80
Value	0	0	0	0	0	0	0	1

Octet 5								
Subindex	4	4	4	4	4	4	4	4
Bit offset	79	78	77	76	75	74	73	72
Value	0	1	0	0	0	0	0	0

Octet 6								
Subindex	4	4	4	4	4	4	4	4
Bit offset	71	70	69	68	67	66	65	64
Value	1	0	1	0	0	0	1	1

Octet 7								
Subindex	4	4	4	4	4	4	4	4

Continued on page 10

Continued from page 9

Bit offset	63	62	61	60	59	58	57	56
Value	0	0	1	1	0	0	1	1

Octet 8								
Subindex	4	4	4	4	4	4	4	4
Bit offset	55	54	53	52	51	50	49	48
Value	0	0	1	1	0	0	1	1

Octet 9								
Subindex	-	-	-	-	-	-	5	6
Bit offset	47	46	45	44	43	42	41	40
Value	1	1	1	1	1	1	0	1

Octet 10								
Subindex	7	7	7	7	7	7	7	7
Bit offset	39	38	37	36	35	34	33	32
Value	0	1	0	0	0	0	1	0

Octet 11								
Subindex	7	7	7	7	7	7	7	7
Bit offset	31	30	29	28	27	26	25	24
Value	1	0	0	0	0	0	1	0

Octet 12								
Subindex	7	7	7	7	7	7	7	7
Bit offset	23	22	21	20	19	18	17	16
Value	0	1	1	1	0	1	1	0

Octet 13								
Subindex	7	7	7	7	7	7	7	7
Bit offset	15	14	13	12	11	10	9	8
Value	1	1	0	0	1	0	0	1

Octet 14								
Subindex	-	-	-	-	-	-	8	9
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 = 40.95 °F
Temperature Over Threshold = True
Temperature Under Threshold = False

Dew Point

Dew Point Value = 51.00 °F
Dew Point Over Threshold = False
Dew Point Under Threshold = False

Relative Humidity

Relative Humidity Value = 65.23%
 Relative Humidity Over Threshold = False
 Relative Humidity Under Threshold = False

Process Data Mode (4): Floating Point Celsius

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

Octet 0								
Subindex	1	1	1	1	1	1	1	1
Bit offset	119	118	117	116	115	114	113	112
Value	1	1	0	0	0	0	0	1

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

Octet 2								
Subindex	1	1	1	1	1	1	1	1
Bit offset	103	102	101	100	99	98	97	96
Value	0	0	0	0	1	0	0	0

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

Octet 4								
Subindex	-	-	-	-	-	-	2	3
Bit offset	87	86	85	84	83	82	81	80
Value	0	0	0	0	0	0	0	1

Octet 5								
Subindex	4	4	4	4	4	4	4	4
Bit offset	79	78	77	76	75	74	73	72
Value	1	1	0	0	0	0	0	1

Octet 6								
Subindex	4	4	4	4	4	4	4	4
Bit offset	71	70	69	68	67	66	65	64
Value	1	0	1	0	0	1	0	0

Octet 7								
Subindex	4	4	4	4	4	4	4	4
Bit offset	63	62	61	60	59	58	57	56
Value	1	1	0	0	1	1	0	0

Octet 8								
Subindex	4	4	4	4	4	4	4	4
Bit offset	55	54	53	52	51	50	49	48
Value	1	1	0	0	1	1	0	1

Octet 9								
Subindex	-	-	-	-	-	-	5	6
Bit offset	47	46	45	44	43	42	41	40
Value	1	1	1	1	1	1	0	1

Octet 10								
Subindex	7	7	7	7	7	7	7	7
Bit offset	39	38	37	36	35	34	33	32
Value	0	1	0	0	0	0	1	0

Octet 11								
Subindex	7	7	7	7	7	7	7	7
Bit offset	31	30	29	28	27	26	25	24
Value	1	0	0	0	0	0	1	0

Octet 12								
Subindex	7	7	7	7	7	7	7	7
Bit offset	23	22	21	20	19	18	17	16
Value	0	1	1	1	0	1	1	0

Octet 13								
Subindex	7	7	7	7	7	7	7	7
Bit offset	15	14	13	12	11	10	9	8
Value	1	1	0	0	1	0	0	1

Octet 14								
Subindex	-	-	-	-	-	-	8	9
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 = -15.52 °C
Temperature Over Threshold = True
Temperature Under Threshold = False

Dew Point

Dew Point Value = 9.13 °C
Dew Point Over Threshold = False
Dew Point Under Threshold = False

Relative Humidity

Relative Humidity Value = 35.13%
Relative Humidity Over Threshold = False
Relative Humidity 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		
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 = Maintenance 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	
71	3	Relative Humidity Low Threshold	Float32		0	RW	Y	

Continued on page 16

Continued from page 15

Index	Subindex	Name	Length	Value Range	Default	Access Rights	Data Storage?	Smart Sensor Profile
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	Float32		0	RW	Y	
72	2	Temperature High Counter	Float32		0	RW	Y	
72	3	Relative Humidity Low Counter	Float32		0	RW	Y	
72	4	Relative Humidity High Counter	Float32		0	RW	Y	
72	5	Dew Point Low Counter	Float32		0	RW	Y	
72	6	Dew Point High Counter	Float32		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



[LinkedIn](#)



[X \(formerly Twitter\)](#)



[Facebook](#)

