S15C Modbus Converter (Ultrasonic) - IO-Link Data Reference Guide

IO-Link Data Map

This document refers to the following IODD file: Banner_Engineering-S15C-MUL-KQ-20200715-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
IO-Link revision	V1.1
Process Data In length	64 bits
Process Data Out length	N/A
Bit Rate	38400 bps
Minimum cycle time	5 ms
Device ID	659460

Parameter	Value
Port class	A
SIO mode	No
Smart Sensor Profile	No
Block parameterization	Yes
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 read register values match the raw values of the sensor. For information on converting raw values, see Banner P/N 195214 *Sure Cross® U-GAGE K50U Ultrasonic Sensor*.

Subindex	Name	Number of Bits	Data Values	Modbus Register Address	Description
1	Distance (mm)	16-Uinteger	0..65535	45201	Distance in millimeters. The distance = (value).
2	Distance (in)	16-Uinteger	0..65535	45202	Distance in inches. The distance = (value) ÷ 100.
3	Temperature (°F)	16-integer	-32768..32767	45203	Temperature (°F) = (value) ÷ 100.
4	Temperature (°C)	16-integer	-32768..32767	45204	Temperature (°C) = (value) ÷ 100.

Example Process Data In

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

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

Octet 2								
Subindex	3	3	3	3	3	3	3	3
Bit offset	47	46	45	44	43	42	41	40

Octet 3								
Subindex	3	3	3	3	3	3	3	3
Bit offset	39	38	37	36	35	34	33	32

Octet 4								
Subindex	2	2	2	2	2	2	2	2
Bit offset	31	30	29	28	27	26	25	24

Original Document
217179 Rev. A

24 August 2020

217179

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Octet 5								
Subindex	2	2	2	2	2	2	2	2
Bit offset	23	22	21	20	19	18	17	16

Octet 6								
Subindex	1	1	1	1	1	1	1	1
Bit offset	15	14	13	12	11	10	9	8

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

Parameters Set Using IO-Link

These parameters can be read from and/or written to the S15C-MUL-KQ converter. 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	Sub-index	Name	Length	Value Range	Default	Access Rights	Data Storage?
0	1-15	Direct Parameter Page 1 (incl. Vendor ID & Device ID)				ro	
0	16	Standard Command		130 = Restore Factory Settings 162 = Start discovery 163 = Stop discovery		wo	
1	1-16	Direct Parameters Page 2				rw	
2		Standard Command	8-bit uinteger	130 = Restore Factory Settings 162 = Start discovery 163 = Stop discovery		wo	
3		Data Storage Index (device-specific list of parameters to be stored)					
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
13-15		*unused*				ro	
16		Vendor Name string		Banner Engineering Corporation		ro	
17		Vendor Text string		More Sensors. More Solutions		ro	
18		Product Name string				ro	
19		Product ID string				ro	
20		Product Text string		S15C-MUL-KQ		ro	
21		Serial Number				ro	
22		*unused*				ro	
23		Firmware Version				ro	
24		App Specific Tag (user defined)				rw	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	Sub-index	Name	Length	Value Range	Default	Access Rights	Data Storage?
37		Detailed Device Status	Array[6] of 3-octet			ro	
80		**ModBus Setting**					
80	1	ModBus Address	16-bit uinteger	0..255	1	rw	y
80	2	ModBus Baud Rate	16-bit uinteger	24 = 2400 96 = 9600 192 = 19200 384 = 38400 576 = 57600 1152 = 115200	192	rw	y
80	3	ModBus Parity	16-bit uinteger	0 = None 1 = Odd 2 = Even	0	rw	y
80	4	ModBus Stop Bits	16-bit uinteger	0,1,2	1	rw	y
80	5	ModBus Compliance Mode	16-bit uinteger	0..4 0=Compliant 1=Point-To-Point Compliant 2=Point-To-Point Extended 3=Extended	0	rw	

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.

Events

Code	Type	Description
0 (0x0000)	Notification	No malfunction
20480 (0x5000)	Error	Device hardware fault

ErrorTypes

Code	Additional Code	Description
128 (0x80)	0 (0x00)	Service has been refused by the device application and not detailed information of the incident is available
128 (0x80)	17 (0x11)	Access occurs to a not existing index
128 (0x80)	18 (0x12)	Access occurs to a not existing subindex
128 (0x80)	32 (0x20)	Parameter is not accessible due to the current state of the device application
128 (0x80)	35 (0x23)	Write access on a read-only parameter
128 (0x80)	48 (0x30)	Written parameter value is outside its permitted value range
128 (0x80)	49 (0x31)	Written parameter value is above its specified value range
128 (0x80)	51 (0x33)	Written parameter length is above it predefined length
128 (0x80)	52 (0x34)	Written parameter length is below its predefined length
128 (0x80)	53 (0x35)	Written command is not supported by the device application
128 (0x80)	54 (0x36)	Written command is not available due to the current state of the device application
128 (0x80)	65 (0x41)	Parameter inconsistencies were found at the end of block parameter transfer, device plausibility check failed

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