S15C Modbus Converter (EZ-ARRAY) - IO-Link Data Reference Guide

IO-Link Data Map

This document refers to the following IODD file: Banner_Engineering-S15C-MEZ-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	256 bits
Process Data Out length	8 bits
Bit Rate	38400 bps
Minimum cycle time	14 ms
Device ID	659462

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 126701 *A-GAGE® EZ-ARRAY™ System Quick Start Guide* and 130426 *A-GAGE® EZ-ARRAY™ System Instruction Manual*.

RegSet = 0

Subindex	Name	Number of Bits	Data Values	Modbus Register Address	Description
1	Register Set To Read	4-bit Uinteger	0..2		Register Set To Read - Value set via Process Data Out
2	Register Read Successful	Boolean	0=false, 1=true		Register Read Successful
5	Counter Value	8-bit Uinteger	0..255		Counter increments upon the completion of Reg Set ModBus request/response cycle
6	Read Set Register 01 Value	16-bit Uinteger	0..65535	30003	Channel 1-16
7	Read Set Register 02 Value	16-bit Uinteger	0..65535	30004	Channel 17-32 (150 mm stick = 30/4 bytes, 2 registers)
8	Read Set Register 03 Value	16-bit Uinteger	0..65535	30005	Channel 33-48
9	Read Set Register 04 Value	16-bit Uinteger	0..65535	30006	Channel 49-64 (300 mm = 60/8 bytes, 4 registers)
10	Read Set Register 05 Value	16-bit Uinteger	0..65535	30007	Channel 65-80
11	Read Set Register 06 Value	16-bit Uinteger	0..65535	30008	Channel 81-96 (450 mm = 90/12 bytes, 6 registers)
12	Read Set Register 07 Value	16-bit Uinteger	0..65535	30009	Channel 97-112
13	Read Set Register 08 Value	16-bit Uinteger	0..65535	30010	Channel 113-128 (600 mm = 120/16 bytes, 8 registers)
14	Read Set Register 09 Value	16-bit Uinteger	0..65535	30011	Channel 129-144
15	Read Set Register 10 Value	16-bit Uinteger	0..65535	30012	Channel 145-160 (750 mm = 150/20 bytes, 10 registers)
16	Read Set Register 11 Value	16-bit Uinteger	0..65535	30013	Channel 161-176
17	Read Set Register 12 Value	16-bit Uinteger	0..65535	30014	Channel 177-192 (900 mm = 180/24 bytes, 12 registers)
18	Read Set Register 13 Value	16-bit Uinteger	0..65535	30015	Channel 193-208
19	Read Set Register 14 Value	16-bit Uinteger	0..65535	30016	Channel 209-224 (1050 mm = 210/28 bytes, 14 registers)

Original Document
217181 Rev. A

24 August 2020

217181

ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

Subindex	Name	Number of Bits	Data Values	Modbus Register Address	Description
20	Read Set Register 15 Value	16-bit Uinteger	0..65535	30017	Channel 225-240 (1200 mm = 240/30 bytes, 15 registers)

RegSet = 1

Subindex	Name	Number of Bits	Data Values	Modbus Register Address	Description
1	Register Set To Read	4-bit Uinteger	0..2		Register Set To Read - Value set via Process Data Out
2	Register Read Successful	Boolean	0=false, 1=true		Register Read Successful
5	Counter Value	8-bit Uinteger	0..255		Counter increments upon the completion of Reg Set ModBus request/response cycle
6	Read Set Register 01 Value	16-bit Uinteger	0..65535	30500	FBB
7	Read Set Register 02 Value	16-bit Uinteger	0..65535	30501	LBB
8	Read Set Register 03 Value	16-bit Uinteger	0..65535	30502	TBB
9	Read Set Register 04 Value	16-bit Uinteger	0..65535	30503	TRN
10	Read Set Register 05 Value	16-bit Uinteger	0..65535	30504	CBB
11	Read Set Register 06 Value	16-bit Uinteger	0..65535	30505	FBM
12	Read Set Register 07 Value	16-bit Uinteger	0..65535	30506	LBM
13	Read Set Register 08 Value	16-bit Uinteger	0..65535	30507	TBM
14	Read Set Register 09 Value	16-bit Uinteger	0..65535	30508	CBM
15	Read Set Register 10 Value	16-bit Uinteger	0..65535	30509	MBB
16	Read Set Register 11 Value	16-bit Uinteger	0..65535	40046	Emitter Power, Gain Method
17	Read Set Register 12 Value	16-bit Uinteger	0..65535	40047	Low sensitivity, HW Flags
18	Read Set Register 13 Value	16-bit Uinteger	0..65535	40050	Number dirty channels,
19	Read Set Register 14 Value	16-bit Uinteger	0..65535	40051	time of service 1/2
20	Read Set Register 15 Value	16-bit Uinteger	0..65535	40052	time of service 2/2

RegSet = 2

Subindex	Name	Number of Bits	Data Values	Modbus Register Address	Description
1	Register Set To Read	4-bit Uinteger	0..2		Register Set To Read - Value set via Process Data Out
2	Register Read Successful	Boolean	0=false, 1=true		Register Read Successful
5	Counter Value	8-bit Uinteger	0..255		Counter increments upon the completion of Reg Set ModBus request/response cycle
6	Read Set Register 01 Value	16-bit Uinteger	0..65535	30018	Channel 241-256
7	Read Set Register 02 Value	16-bit Uinteger	0..65535	30019	Channel 257-272
8	Read Set Register 03 Value	16-bit Uinteger	0..65535	30020	Channel 273-288
9	Read Set Register 04 Value	16-bit Uinteger	0..65535	30021	Channel 289-304 (1500 mm = 300/38 bytes, 19 registers)
10	Read Set Register 05 Value	16-bit Uinteger	0..65535	30022	Channel 305-320
11	Read Set Register 06 Value	16-bit Uinteger	0..65535	30023	Channel 321-336
12	Read Set Register 07 Value	16-bit Uinteger	0..65535	30024	Channel 337-352
13	Read Set Register 08 Value	16-bit Uinteger	0..65535	30025	Channel 353-360
14	Read Set Register 09 Value	16-bit Uinteger	0..65535	30026	Channel 369-384 (1800 mm = 360/46 bytes, 23 registers)
15	Read Set Register 10 Value	16-bit Uinteger	0..65535	30027	Channel 385-400
16	Read Set Register 11 Value	16-bit Uinteger	0..65535	30028	Channel 401-416
17	Read Set Register 12 Value	16-bit Uinteger	0..65535	30029	Channel 417-432 (2100 mm = 420/54 bytes, 27 registers)

Subindex	Name	Number of Bits	Data Values	Modbus Register Address	Description
18	Read Set Register 13 Value	16-bit Uinteger	0..65535	30030	Channel 433-448
19	Read Set Register 14 Value	16-bit Uinteger	0..65535	30031	Channel 449-464
20	Read Set Register 15 Value	16-bit Uinteger	0..65535	30032	Channel 465-480 (2400 mm = 480/60 bytes, 30 registers)

Example Process Data In

Octet 0								
Subindex	20	20	20	20	20	20	20	20
Bit offset	255	254	253	252	251	250	249	248

Octet 1								
Subindex	20	20	20	20	20	20	20	20
Bit offset	247	246	245	244	243	242	241	240

Octet 2								
Subindex	19	19	19	19	19	19	19	19
Bit offset	239	238	237	236	235	234	233	232

Octet 3								
Subindex	19	19	19	19	19	19	19	19
Bit offset	231	230	229	228	227	226	225	224

Octet 4								
Subindex	18	18	18	18	18	18	18	18
Bit offset	223	222	221	220	219	218	217	216

Octet 5								
Subindex	18	18	18	18	18	18	18	18
Bit offset	215	214	213	212	211	210	209	208

Octet 6								
Subindex	17	17	17	17	17	17	17	17
Bit offset	207	206	205	204	203	202	201	200

Octet 7								
Subindex	17	17	17	17	17	17	17	17
Bit offset	199	198	197	196	195	194	193	192

Octet 8								
Subindex	16	16	16	16	16	16	16	16
Bit offset	191	190	189	188	187	186	185	184

Octet 9								
Subindex	16	16	16	16	16	16	16	16
Bit offset	183	182	181	180	179	178	177	176

Octet 10								
Subindex	15	15	15	15	15	15	15	15
Bit offset	175	174	173	172	171	170	169	168

Octet 11								
Subindex	15	15	15	15	15	15	15	15

Octet 11								
Bit offset	167	166	165	164	163	162	161	160

Octet 12								
Subindex	14	14	14	14	14	14	14	14
Bit offset	159	158	157	156	155	154	153	152

Octet 13								
Subindex	14	14	14	14	14	14	14	14
Bit offset	151	150	149	148	147	146	145	144

Octet 14								
Subindex	13	13	13	13	13	13	13	13
Bit offset	143	142	141	140	139	138	137	136

Octet 15								
Subindex	13	13	13	13	13	13	13	13
Bit offset	135	134	133	132	131	130	126	128

Octet 16								
Subindex	12	12	12	12	12	12	12	12
Bit offset	127	126	125	124	123	122	121	120

Octet 17								
Subindex	12	12	12	12	12	12	12	12
Bit offset	119	118	117	116	115	114	113	112

Octet 18								
Subindex	11	11	11	11	11	11	11	11
Bit offset	111	110	109	108	107	106	105	104

Octet 19								
Subindex	11	11	11	11	11	11	11	11
Bit offset	103	102	101	100	99	98	97	96

Octet 20								
Subindex	10	10	10	10	10	10	10	10
Bit offset	95	94	93	92	91	90	89	88

Octet 21								
Subindex	10	10	10	10	10	10	10	10
Bit offset	87	86	85	84	83	82	81	80

Octet 22								
Subindex	9	9	9	9	9	9	9	9
Bit offset	79	78	77	76	75	74	73	72

Octet 23								
Subindex	9	9	9	9	9	9	9	9
Bit offset	71	70	69	68	67	66	65	64

Octet 24								
Subindex	8	8	8	8	8	8	8	8
Bit offset	63	62	61	60	59	58	57	56

Octet 25								
Subindex	8	8	8	8	8	8	8	8
Bit offset	55	54	53	52	51	50	49	48

Octet 26								
Subindex	7	7	7	7	7	7	7	7
Bit offset	47	46	45	44	43	42	41	40

Octet 27								
Subindex	7	7	7	7	7	7	7	7
Bit offset	39	38	37	36	35	34	33	32

Octet 28								
Subindex	6	6	6	6	6	6	6	6
Bit offset	31	30	29	28	27	26	25	24

Octet 29								
Subindex	6	6	6	6	6	6	6	6
Bit offset	23	22	21	20	19	18	17	16

Octet 30								
Subindex	5	5	5	5	5	5	5	5
Bit offset	15	14	13	12	11	10	9	8

Octet 31								
Subindex	///	///	///	2	1	1	1	1
Bit offset	7	6	5	4	3	2	1	0

IO-Link Process Data Out (Master to Device)

Subindex	Name	Number of Bits	Data Values
1	Register Set To Read	8	0..2

Example Process Data Out

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

Example Based Upon the Value Above

Register Set To Read = 1

Parameters Set Using IO-Link

These parameters can be read from and/or written to the S15C-MEZ-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	

Index	Sub-index	Name	Length	Value Range	Default	Access Rights	Data Storage?
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
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-MEZ-KQ		ro	
21		Serial Number				ro	
22		Hardware Version				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	
37		Detailed Device Status	Array[6] of 3-octet			ro	
80		**ModBus Setting**					
80	1	ModBus Address	16-bit uinteger	1..247	65	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	2	rw	y
80	4	ModBus Stop Bits	16-bit uinteger	1 = 1 2 = 2 3 = 1.5	1	rw	y

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

© Banner Engineering Corp. All rights reserved