



S3N-Cx3

IO-Link® parameters
v1.9

PHYSICAL LAYER

Description	
IO-Link Revision	1.1
SIO Modus	YES
Min Cycle Time	2.3 ms
Transmission Rate	38,4 kbit/s (COM2)
Process Data Length	PDInput: 8 Bit configurable
M-Sequence Capability	PREOPERATE: TYPE_0 OPERATE: TYPE_2_1 ISDU: supported

FEATURES

Description	
Block Parameter	YES
Data Storage	YES
Supported Access Locks	Data Storage
Profile Characteristic	Device Profile: Smart Sensor Function Class: Device Identification Function Class: Switching Signal Channel Function Class: Process Data Variable Function Class: Device Diagnosis Function Class: Teach Channel Function Class: Teach-in Single Value

DEVICE VARIANT COLLECTION

Product name	Product ID	Product text	Device ID
S3N-PR-5-C03-OZ	10790	Diffuse proximity Narrow Beam	19
S3N-PR-5-C13-OZ	10800	Diffuse proximity	

SERVICE DATA

The following ISDUs will not be saved via Data Storage: Device Access Locks (index 0xC), TISelect (index 0x3A)

System Parameters							
Index (dec)	Parameter Object Name	Length	Subindex (offset)	Value/Range	Description	Data Type	Access*
0x000C (12)	Device Access Locks	2 octets		Bit 1: Data Storage (0=unlocked, 1=locked)	Standardized Device locking functions: Bit 0: Parameter (write) access (Not used) Bit 1: Data Storage Bit 2: Local parameterization (Not used) Bit 3: Local user interface (Not used) Bit 4-15: Reserved	RecordT	R/W
0x000D (13)	Profile Characteristic	2 octets 2 octets 2 octets 2 octets 2 octets 2 octets		0x0001 0x8000 0x8001 0x8002 0x8003 0x8004 0x8007	Smart Sensor Profile Device Identification Switching Signal Channel (SSC) Process Data Variable (PDV) Device Diagnosis Teach Channel Teach-in single value	ArrayT of UIntegerT16	RO
0x000E (14)	Process Data Input Descriptor	3 octets 3 octets 3 octets 3 octets 3 octets		0x01.0x01.0x00 0x01.0x01.0x01 0x01.0x01.0x02 0x01.0x01.0x03 0x01.0x01.0x04 0x01.0x01.0x05	SSC1 (OUT0, C/Q pin) SSC2 (OUT1, DO pin) PDV1 (STABILITY) PDV2 (NOISE LEVEL) PDV3 (COUNTER EXCEDEED THRESHOLD) PDV4 (TIME STAMP BIT)	ArrayT of OctetStringT3	RO

Identification Parameters								
Index (dec)	Parameter Object Name	Length	Subindex (offset)	Value/Range	Description	Data Type	Access*	Remark
0x0010 (16)	Vendor Name	18 octets		Datasensing S.r.l.	Informative	StringT	RO	
0x0011 (17)	Vendor Text	28 octets		Easing automation challenges	Informative	StringT	RO	
0x0012 (18)	Product Name	15 octets		S3N-PR-5-C03-OZ (C03 Narrow Beam) S3N-PR-5-C13-OZ (C13)	Detailed product name	StringT	RO	
0x0013 (19)	Product ID	5 octets		10790 (C03 Narrow Beam) 10800 (C13)	Product identification	StringT	RO	
0x0014 (20)	Product Text	29 octets 17 octets		Diffuse proximity Narrow Beam (C03 Narrow Beam) Diffuse proximity(C13)	Optical function	StringT	RO	
0x0015 (21)	Serial Number	9 octets			Unique serial number	StringT	RO	
0x0016 (22)	Hardware Version	5 octets		RevAE		StringT	RO	
0x0017 (23)	Firmware Version	5 octets		e.g. 1.1.0		StringT	RO	
0x0018 (24)	Application Specific Tag	32 octets		*** (default)	Tag application defined by user	StringT	RW	Saved in non-volatile memory
0x0019 (25)	Function Tag	32 octets		*** (default)	Additional tag for device function identification	StringT	RW	Saved in non-volatile memory
0x001A (26)	Location Tag	32 octets		*** (default)	Additional tag for device function identification	StringT	RW	Saved in non-volatile memory

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Observation/Diagnostic								
Index (dec)	Parameter Object Name	Length	Subindex (offset)	Value/Range	Description	Data Type	Access*	Remark
0x0024 (36)	Device Status	1 octet		0x00 → Device is ok 0x01 → Maintenance Required 0x02 → Out of specification 0x03 → Functional Check 0x04 → Failure	Contains current status of device	UIntegerT	RO	
0x0025 (37)	Detailed Device Status	3 octets			Information about currently pending Event. Implemented as dynamic list	ArrayT	RO	
0x0028(40)	Process Data (configurable)	1 octet			Read last valid Process Data Input from PDin channel	Device specific	RO	
0x0041(65)	Light Received	2 octets		0-4095	Normalized value of received light	UIntegerT	RO	
0x0043(67)	Active teach	1 octet		0x01: Standard Teach active 0x02: Maximum Sensitivity Teach active		UIntegerT	RO	
0x0051(81)	Emission Status	1 octet		0x00: Emission OFF 0x01: Emission ON	Read emission status	Boolean	RO	
0x0052 (82)	Device Temperature	2 octets	1(64)	[°C]	Temperature actual	IntegerT	RO	Max and min temperature during lifetime are saved in non-volatile memory every hour.
		2 octets	2(48)	[°C]	Temperature minimum Power Up	IntegerT	RO	
		2 octets	3(32)	[°C]	Temperature maximum Power Up	IntegerT	RO	
		2 octets	4(16)	[°C]	Temperature minimum during lifetime	IntegerT	RO	
		2 octets	5(0)	[°C]	Temperature maximum during lifetime	IntegerT	RO	
0x0053 (83)	Device Temperature Threshold	2 octets	1(16)	-40 [°C] (default)	Temperature minimum threshold	IntegerT	RW	Saved in non-volatile memory every hour. Events are generated if the device temperature exceeds the thresholds
		2 octets	2(0)	130 [°C] (default)	Temperature maximum threshold	IntegerT	RW	
0x0057 (87)	Operating Hours counter	4 octets	1(64)	0...(2^32)-1	Operating Hours: device operating hours. Not resettable by user.	UIntegerT	RO	Saved in non-volatile memory
		4 octets	2(32)		Operating Hours Maintenance: device operating hours, reset on system command "Confirm Maintenance".	UIntegerT	RO	
		4 octets	3(0)		Operating Hours Power Up: Time in hours since power up.	UIntegerT	RO	
0x00BE (190)	Excess gain	2 octets		100..900	Excess gain (EG) = 0 if signal is under threshold	UIntegerT	RO	

Teach-in Parameters								
Index (dec)	Parameter Object Name	Length	Subindex (offset)	Value/Range	Description	Data Type	Access*	Remark
0x003A (58)	TI Select	1 octet		0x00 = SSC1 (default, C/Q pin and DO pin)	Selection for Teach-in channel (volatile)	UIntegerT	R/W	C/Q and DO outputs are antivalent. Teach SSC1 equals to teach SSC2
0x003B (59)	TI Result	1 octet	1(0) 2(4)	Teach-in State Teach-in Flags SP	See IO-Link Smart Sensor Profile	UIntegerT4 BooleanT	RO	
0x003C(60)	SSC1 Param	2 octets	1 (16)	113-3983	Sensitivity, default value 3983.	UIntegerT	R/W	Saved in non-volatile memory.
		2 octets	2(0)	Not Used		UIntegerT	R/W	
0x003D(61)	SSC1 Config	1 octet	1(24)	0x00: High Active (default)	C/Q pin configuration	UIntegerT	R/W	Saved in non-volatile memory.
		1 octet	2(16)	0x01: Low Active		UIntegerT		
		2 octets	3(0)	0x01: Single Point (default) 0x00: Hysteresis min (default)		UIntegerT		
0x003E (62)	SSC2 Param	2 octets	1 (16)	113-3983	Sensitivity, default value 3983.	UIntegerT	R/W	Saved in non-volatile memory
		2 octets	2(0)	Not Used		UIntegerT	R/W	
0x003F (63)	SSC2 Config	1 octet	1(24)	0x00: High Active (default)	DO pin configuration	UIntegerT	R/W	Saved in non-volatile memory.
		1 octet	2(16)	0x01: Low Active (default)		UIntegerT		
		2 octets	3(0)	0x01: Single Point (default) 0x00: Hysteresis min (default)		UIntegerT		

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Device Specific Parameters								
Index (dec)	Parameter Object Name	Length	Subindex (offset)	Value/Range	Description	Data Type	Access*	Remark
0x0048 (72)	Delay Settings	1 octet	1 (32)	0x0 = no delay (default) 0x2= Delay ON 0x3 = One Shot 0x4= Delay OFF	Select Delay mode (ON / OFF/ ONE SHOT)	UIntegerT	R/W	Saved in non-volatile memory
		4 octets	2(0)	0...(2^32)-1	Delay value [ms] ¹	UIntegerT	R/W	
0x0049(73)	PDInput configuration	1 octet	1(24)	0x00: disabled (default) 0x01: enabled	STABILITY bit	UIntegerT	R/W	Saved in non-volatile memory
		1 octet	2(16)		NOISE LEVEL bit	UIntegerT		
		1 octet	3(8)		COUNTER bit	UIntegerT		
		1 octet	4(0)		TIME STAMP bit	UIntegerT		
0x0058 (88)	Keylock	1 octet		0x00: Inactive (default) 0x01: Active	Enable/disable push button	UIntegerT	R/W	Saved in non-volatile memory
0x00B4 (180)	Output type	1 octet	1 (8)	0x1 = PNP (default) 0x3= Push Pull	Output type of C/Q pin when in SIO mode	UIntegerT	R/W	Saved in non-volatile memory
		1 octet	2(0)	0x1 = PNP (default) 0x2 = NPN 0x3= Push Pull	Output type of DO pin	UIntegerT	R/W	

¹Temporal accuracy is higher for delay values <60s.

Standard Command					
Index (dec)	Command Name	Length	Value (dec)	Description	Access*
0x0002 (2)	Standard Teach	1 octet	0x41 (65)	Teach Set Point with maximum sensitivity	WO
0x0002 (2)	Fine Teach	1 octet	0x4B (75)	Teach to detect small object	WO
0x0002 (2)	Teach CANCEL	1 octet	0x4F (79)	Exit from FAIL condition	WO
0x0002 (2)	Restore Factory Settings	1 octet	0x82 (130)	Restore factory settings (Device Access Locks, Application Specific Tag, Function Tag, Location Tag, Active teach, Device Temperature Threshold, TI Result, SSC1 Param, SSC2 Param, SSC1 Config, SSC2 Config, Delay Settings, Output Type, Keylock, Process Data configuration, Switch counter settings, Switch counter value, Time stamp trigger, Time stamp List, Time Stamp Synch Value)	WO
0x0002 (2)	Confirm Maintenance	1 octet	0xA5 (165)	Reset Maintenance parameters (Operating Hours Maintenance, Minimum device temperature since power up, Maximum device temperature since power up, Device Status, Detailed Device Status)	WO
0x0002 (2)	Start / Stop Ping	1 octet	0xAF (175)	Feature to identify the sensor by yellow led blinking	WO
0x0002 (2)	Emission Toggle	1 octet	0xB0(176)	Toggle emission (see Emitter Status parameter to check the current status)	WO

Events					
Event code (dec)	Event name	Event mode	Event type	Device status	Remarks
0x4220 (16928)	Temperature underrun	Appears / Disappears	Warning	Out of specification	
0x4210 (16912)	Temperature overrun	Appears / Disappears	Warning	Out of specification	
0x5100 (20736)	General power supply fault	Appears / Disappears	Error	Failure	
0x7710 (30480)	Short circuit - Check installation	Appears / Disappears	Error	Failure	

PROCESS DATA INPUT

Bit 7	Bit 6	Bit 5 TIME STAMP EVENT	Bit 4 COUNTER EXCEED THRESHOLDS	Bit 3 NOISE LEVEL	Bit 2 STABILITY	Bit 1 SSC2 (DO Pin)	Bit 0 SSC1 (C/Q Pin)
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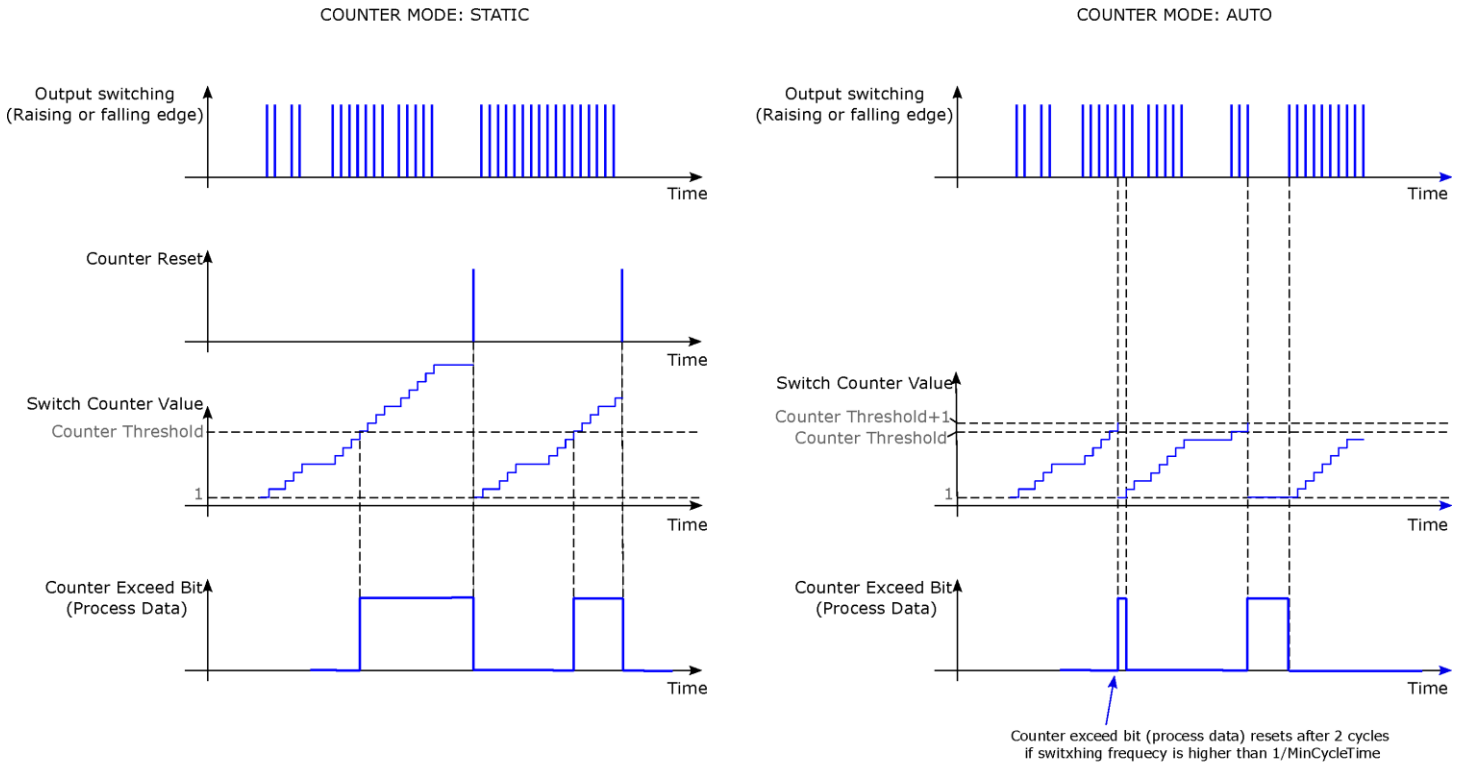
EXTENDED PARAMETERS (ADVANCED FUNCTIONS)

COUNTER								
Index (dec)	Parameter Object Name	Length	Subindex (offset)	Value/Range	Description	Data Type	Access	Remark
0x00B6 (182)	Switch counter settings	1 octet	1(24)	0: Counter OFF (default) 1: Counter STATIC 2: Counter AUTO	Mode	UIntegerT	RW	Saved in non-volatile memory. Stop or reset the running counter before change configuration and then re-enable the counter with Set counter commands. *Rising and falling edge are referred to DO pin
		1 octet	2(16)	0: Output Rising edge 1: Output Falling edge	Trigger counter	UIntegerT	RW	
		2 octets	3(0)	0-32767	Threshold counter	UIntegerT	RW	
0x00B7 (183)	Switch counter value	1 octet	1(16)	0: counting UP 1: counting DOWN 2: counting INACTIVE	Counting direction	UIntegerT	RO	
		2 octets	2(0)	-32768 ... 32767	Value of switch counter	IntegerT	RO	

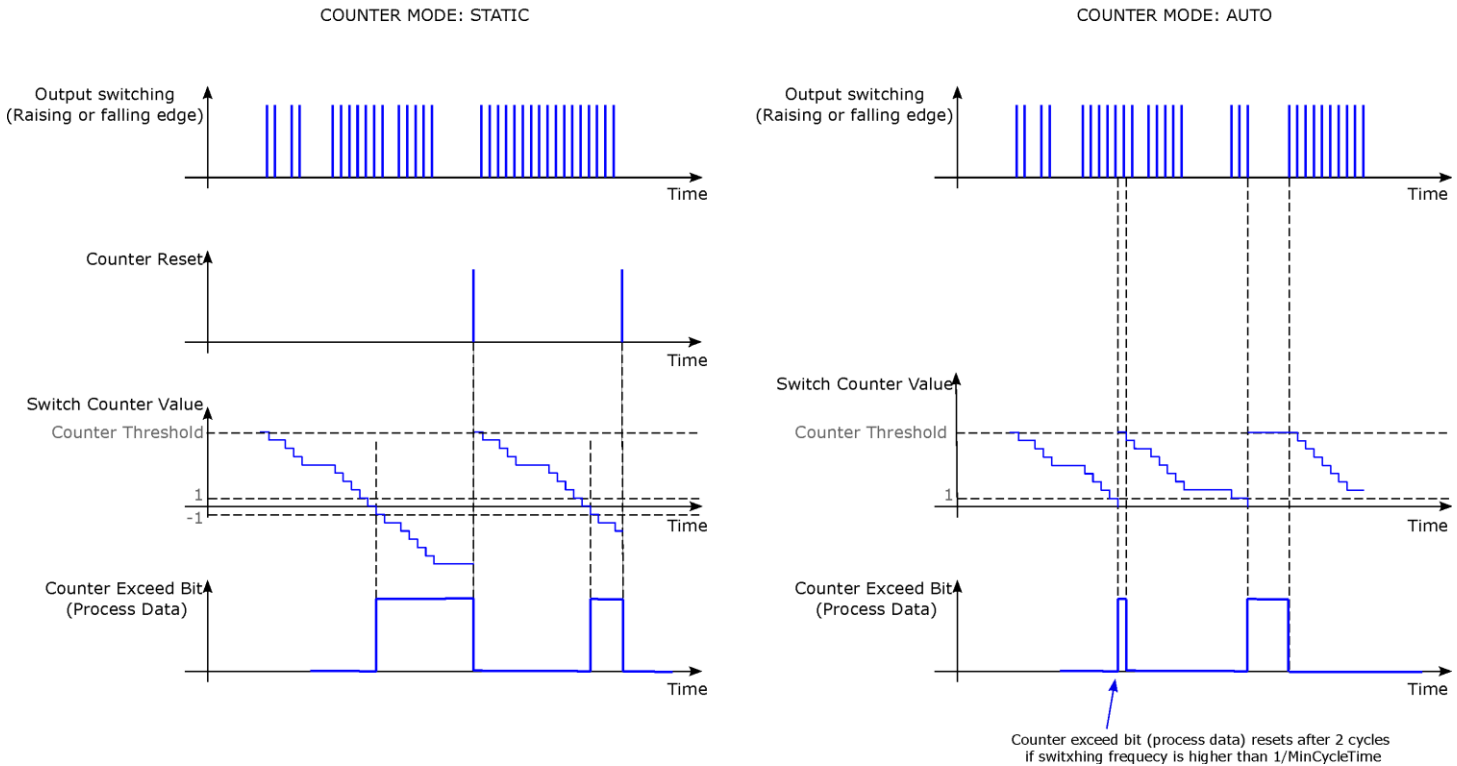
Standard Command					
Index (dec)	Command Name	Length	Value (dec)	Description	Access
0x0002 (2)	Reset Counter	1 octet	0xA0(160)	Reset counter value (only if STATIC counter mode is selected) and PD bit	WO
0x0002 (2)	Set Counter Direction UP	1 octet	0xA1(161)	Enable counter and start count UP (counter value is reset unless if Stop Counter command is sent)*	WO
0x0002 (2)	Set Counter Direction DOWN	1 octet	0xA2(162)	Enable counter and start count DOWN (counter value is not reset unless if Stop Counter command is sent)*	WO
0x0002 (2)	Stop Counter	1 octet	0xA3(163)	Freeze the counting functions (all commutations are neglected, counting INACTIVE). Enable counter to restart the counting function from the last value before freezing.*	WO

* It is recommended not to switch between Counter UP and counter DOWN. It is not possible to switch from Counter UP to DOWN keeping the value of the switch counter and maintain PD bit consistency.

COUNTING DIRECTION: UP



COUNTING DIRECTION: DOWN



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TIMESTAMP								
Index (dec)	Parameter Object Name	Length	Subindex (offset)	Value/Range	Description	Data Type	Access	Remark
0x00B8 (184)	Time stamp trigger	1 octet	1(32)	0x00: disabled (default) 0x01: enabled	EVENT_1 (ID=0x01):Counter Threshold Exceeded	UIntegerT	RW	Event that generates a time stamp
		1 octet	2(24)		EVENT_2 (ID=0x02): Temperature underrun (Event mode APPEARS)	UIntegerT		
		1 octet	3(16)		EVENT_3 (ID=0x03): Temperature overrun (Event mode APPEARS)	UIntegerT		
		1 octet	4(8)		EVENT_4 (ID=0x04): Short circuit	UIntegerT		
		1 octet	5(0)		EVENT_5 (ID=5): Power fault	UIntegerT		
0x00B9 (185)	Time Stamp settings	1 octet	1(8)	3 [ms]	Maximum time stamp latency time	UIntegerT	RO	Latency between event and time stamp (hardware dependent). Typically 3ms.
		1 octet	2(0)	1 [ms]	Time stamp resolution	UIntegerT	RO	
0x00BA (186)	Time Stamp List	70 octets		*see format in Time Stamp Table		UIntegerT	RO	Last time stamp trigger starts counting from Power Up, from Time Stamp Synch Value or from 0 (after Restore Factory Settings)
0x00BB (187)	Time Stamp Synch Value	2 octets	1(32)	0...999	milliseconds	UIntegerT	RW	Reset value for time stamp synchronization
		1 octet	2(24)	0..59	seconds			
		1 octet	3(16)	0...59	minutes			
		1 octet	4(8)	0..23	hours			
		1 octet	5(0)	0...255	days			
Index (dec)	Command Name	Length	Value (dec)	Description				Access
0x0002 (2)	Reset Time Stamp Application	1 octet	0xB1(177)	Reset Time Stamp application (Time Stamp trigger, Time Stamp List and Time Stamp PD bit)				WO
0x0002 (2)	Reset Time Stamp	1 octet	0xB2(178)	Reset clock counter				WO
0x0002 (2)	Time Stamp Synchronization	1 octet	0xB3(179)	Start counting from the Time Stamp Synch Value (index 187). This command clear the Time Stamp List and reset the Time Stamp PD bit.				WO
0x0002 (2)	Reset Time Stamp PD bit	1 octet	0xB4(180)	Reset the Time Stamp PD bit				WO

Time Stamp Table

		ID event	day	hours	minutes	seconds	milliseconds
Last EVENT_X occurred	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
	Byte8	Byte9	Byte10	Byte11	Byte12	Byte13	Byte14
	Byte15	Byte16	Byte17	Byte18	Byte19	Byte20	Byte21

First EVENT_X occurred	Byte64	Byte65	Byte66	Byte67	Byte68	Byte69	Byte70

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