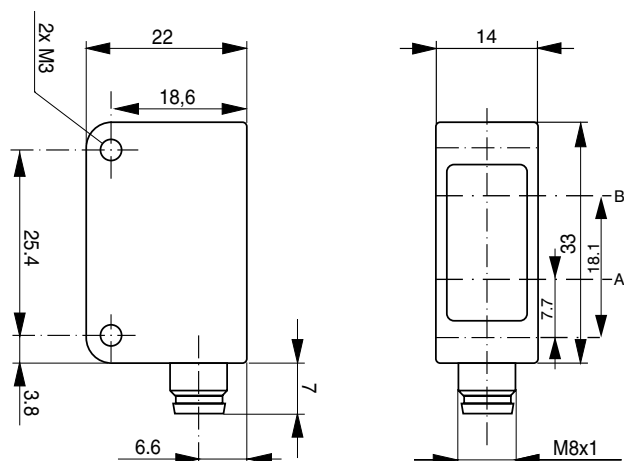
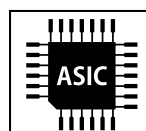
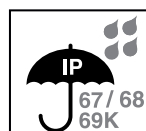


300 mm

- ✓ C23 Metal housing
- ✓ IO-Link
- ✓ Excellent black/white behavior

- ✓ Immunity to mutual interferences



A: emitter axis B: receiver axis

OPTICAL DATA

Sensing distance	110% S_d
Operating distance (S_d)	10 ... 300 mm ¹
Sensitivity adjustment	30 ... 300 mm
Light source	Pinpoint LED, red 640 nm
Light spot size (distance)	Ø 6 mm (100 mm) / Ø 10 (300 mm)
Temperature drift (0 ... 0.8 S_d)	≤ % S_d

¹ Object with 90% reflectance (standard white paper)

INTERFACE

Output on pin 4	SIO Selectable / IO-Link
Output on pin 2	SIO Selectable
Output Polarity	PNP
IO-Link	✓

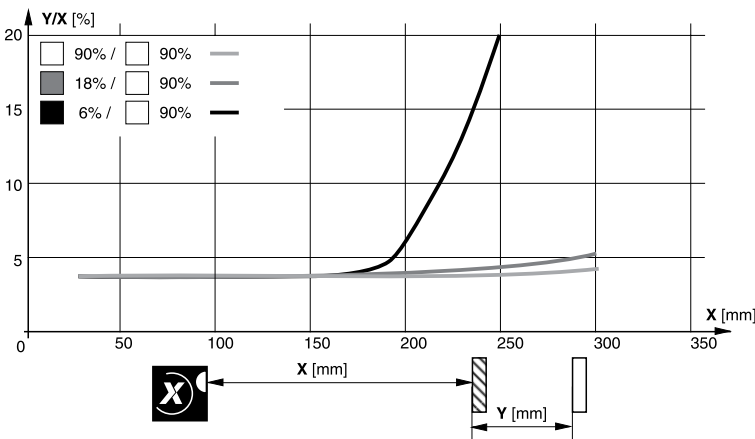
ELECTRICAL DATA

Supply voltage range (U_B)	10 ... 30 VDC
Residual ripple	≤ 10% V_{pp}
Output current	≤ 100 mA
Signal PNP high/low	≤ (U_B - 2.0 V) / approx. 0 V
Power consumption (no load)	≤ 25 mA
Response time	≤ 1 ms
SIO Switching frequency	≤ 500 Hz
Short circuit protection	✓
Voltage reversal protection	✓
Cable length max.	≤ 20 m (IO-Link) / ≤ 300 m (SIO)

MECHANICAL DATA

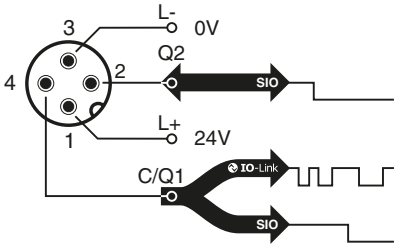
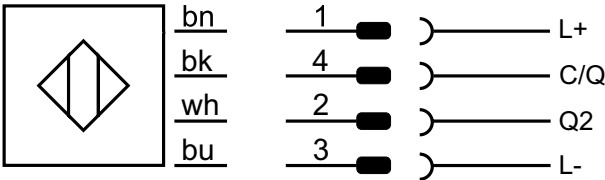
Enclosure rating	IP67 / 68 / 69K
Ambient temperature operation	-25 ... +65°C
Shock and vibration	IEC 60947-5-2
Weight (connector version)	20 g
Housing material	Stainless steel V2A
Window material	PMMA
Connector type	M8 4-pin
Max tightening torque	2Nm

BACKGROUND SHIFT



WIRING DIAGRAM

PIN ASSIGNMENT



IO-LINK CHARACTERISTICS	VALUE FOR ISHR-M18MP-NMS-A0
Vendor ID	0156 _n
Device ID	A0501 _n
IO-Link Protocol	1.1
SIO-Mode	Supported
Process data	1 byte input / 1 byte output
Baudrate	COM2 (38.4 kBaud)
Minimum cycle time	4 ms



IODD files may be downloaded from
<https://www.contrinex.com/en-ch/collections/smart-photoelectric-basic>
Select the product name to display the product page with corresponding downloads.
Alternatively, just click/scan the QR code on the left.

AVAILABLE TYPES

Part number	Part reference	Operating range	Switching Frequency SIO	
620-600-617	ISHR-C23MP-NMS-A0	10...300mm	≤ 500 Hz	

Note: additional suffix can appear to indicate a revision version or a special version.

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CONFIGURATION PARAMETER (IO-LINK / SIO MODE)						
Index	Sub Hex	Name	Access	Data Type	Value	Default
SYSTEM						
02 _h	00 _h	System Command ⁽¹⁾	W	uint8	80 _h = Device Reset 81 _h = Application Reset 83 _h = Back-To-Box 7E _h = Locator Start 7F _h = Locator Stop 05 _h = ParamDownloadStore 40 _h = Teach Apply 41 _h = Single Value Teach SP1 42 _h = Single Value Teach SP2 43 _h = Two Value Teach SP1 TP1 44 _h = Two Value Teach SP1 TP2 45 _h = Two Value Teach SP2 TP1 46 _h = Two Value Teach SP2 TP2 47 _h = Dynamic Teach SP1 Start 48 _h = Dynamic Teach SP1 Stop 49 _h = Dynamic Teach SP2 Start 4A _h = Dynamic Teach SP2 Stop 4F _h = Teach Cancel Abort	N/A
DATA STORAGE						
03 _h	01 _h	DS_Command ⁽¹⁾	R/W	uint8	00 _h : Reserved 01 _h : DS_UploadStart 02 _h : DS_UploadEnd 03 _h : DS_DownloadStart 04 _h : DS_DownloadEnd 05 _h : DS_Break 06 _h – FF _h : Reserved	N/A
	02 _h	State_Property ⁽¹⁾	R	uint8	Bit 0: Reserved Bit 1 and 2: State of Data Storage (00 _h : Inactive, 01 _h : Upload, 02 _h : Download, 03 _h : Data Storage Locked) Bit 3 to 6: Reserved Bit 7: DS_UPLOAD_FLAG (00 _h : no DS_UPLOAD_ FLAG, 01 _h : DS_UPLOAD_REQ pending)	N/A
	03 _h	Data_Storage_Size	R	uint32	–	N/A
	04 _h	Parameter_Checksum	R	uint32	–	N/A
	05 _h	Index_List	R	array of byte	–	N/A
PROFILE PARAMETER						
0D _h	–	Profile Characteristic	R	array	<ProfileID1>, <ProfileID2>, .. <FCID> (Type 2.7) (AdSS), 0x000E, 0x4000, 0x800C, 0x8011, 0x8012, 0x8101	–
PD DESCRIPTOR						
0E _h	–	PD Input Descriptor	R	array	(Type 2.7) (AdSS) <DataType> <TypeLength> <Bit offset> – [01] _h [08] _h [00] _h	–
0F _h	–	PD Output Descriptor	R	array	(Type 2.7) (AdSS) <DataType> <TypeLength> <Bit offset> [01] _h [01] _h [00] _h [02] _h [07] _h [01] _h	–
FUNCTION CLASS – IDENTIFICATION (8000 _h)						
10 _h	–	Vendor Name	R	char [16]	“Contrinex AG”	–
11 _h	–	Vendor Text	R	char [32]	“www.contrinex.com”	–
12 _h	–	Product Name	R	char [32]	ISHR-C23MP-NMS-A0	–
13 _h	–	Product ID	R	char [16]	620-600-617	–
14 _h	–	Product Text	R	char [32]	AdSS photoelectric sensor	–
15 _h	–	Serial Number	R	char [16]	123456	–
16 _h	–	Hardware Revision	R	char [16]	1.0.0	–
17 _h	–	Firmware Revision	R	char [16]	1.0.0	–
18 _h	–	Application Specific Tag	R/W	char [32]	<user string, 32 bytes (variable length)>	<vendor specific>

⁽¹⁾ This parameter is stored in a volatile memory

FUNCTION & LOCATION TAG						
19 _h	–	Function Tag	R/W	char [32]	<user string, 32 bytes (variable length)>	***
1A _h	–	Location Tag	R/W	char [32]	<user string, 32 bytes (variable length)>	***
FUNCTION CLASS – DIAGNOSIS (8003 _h)						
24 _h	00 _h	Device Status ⁽¹⁾	R	uint8	0 = Device is OK, 1 = Maintenance required, 2 = Out of specification, 3 = Functional check, 4 = Failure, 5 ... 255 Reserved	–
25 _h	00 _h	Detailed Device Status ⁽¹⁾	R	array	1800 _h / EMC disturbance 1801 _h / Under IOL voltage 1803 _h / Short circuit 1804 _h / Under voltage 1805 _h / Disturbances on receiver 1806 _h / LED regulation limit 180C _h / Temperature limit	–
FUNCTION CLASS – TEACH-IN CHANNEL SELECT (8004 _h)						
3A _h	–	Teach Select ⁽¹⁾	R/W	uint8	00 _h : Default (SSC1) 01 _h : SSC1 02 _h : SSC2 FF _h : ALL	00 _h
FUNCTION CLASS – TEACH STATUS (8007 _h TO 8009 _h)						
3B _h	01 _h	Teach State ⁽¹⁾	R	bool[4]	0 _h = IDLE 1 _h = SP1 SUCCESS 2 _h = SP2 SUCCESS 3 _h = SP12 SUCCESS 4 _h = WAIT FOR COMMAND 5 _h = BUSY 6 _h = Reserved 7 _h = ERROR 8 _h ...11 _h = Reserved 12 _h ...15 _h = Vendor specific	00 _h
	02 _h	Flag SP1 → TP1 ⁽¹⁾	R	bool	00 _h : Teach point not taught or not successful 01 _h : Teach point successfully taught	00 _h
	03 _h	Flag SP1 → TP2 ⁽¹⁾	R	bool	00 _h : Teach point not taught or not successful 01 _h : Teach point successfully taught	00 _h
	04 _h	Flag SP2 → TP1 ⁽¹⁾	R	bool	00 _h : Teach point not taught or not successful 01 _h : Teach point successfully taught	00 _h
	05 _h	Flag SP2 → TP2 ⁽¹⁾	R	bool	00 _h : Teach point not taught or not successful 01 _h : Teach point successfully taught	00 _h
SCU – SENSOR CONFIGURATION UNIT						
40 _h	01 _h	Sensor Startup Time	R/W	uint16	0 ... 65535 ms	0000 _h
	02 _h	Sensor Mode	R/W	uint8	00 _h : Fast 02 _h : Medium 24 _h : Fine	00 _h
SSC1 PARAMETER						
3C _h	01 _h	Setpoint 1	R/W	uint32	Recommended value: (2234 ... 14894 = 15% S _d to 100% S _d)	100% S _d
	02 _h	Setpoint 2	R/W	uint32	Recommended value: (2234...14894 = 15% S _d to 100% S _d), but must be lower than Setpoint 1. N/A if Single-Point mode is selected.	0% S _d
SSC1 CONFIGURATION						
3D _h	01 _h	Logic	R/W	uint8	00 _h : High active 01 _h : Low active	00 _h
	02 _h	Mode	R/W	uint8	00 _h : Deactivated 01 _h : Single Point 02 _h : Window Mode 03 _h : Two Points	01 _h
	03 _h	Hysteresis Width	R/W	uint32	0 ... 16383 (e.g. If SSC1 Configuration Mode = Single Point, SP1 = 50% S _d = 7447, Hysteresis Width = 10% of SP = 745)	8% of S _d
	04 _h	Hysteresis Selection	R/W	uint8	0 = User Hysteresis 1 = Internal Hysteresis	

⁽¹⁾ This parameter is stored in a volatile memory

SSC2 PARAMETER						
3E _h	01 _h	Setpoint 1	R/W	uint32	Recommended value: (2234 ... 14894 = 15% S _d to 100% S _d)	80% S _d
	02 _h	Setpoint 2	R/W	uint32	Recommended value: (2234 ... 14894 = 15% S _d to 100% S _d), but must be lower than Setpoint 1. N/A if Single-Point mode is selected.	0% S _d
SSC2 CONFIGURATION						
3F _h	01 _h	Logic	R/W	uint8	00 _h : High active 01 _h : Low active	00 _h
	02 _h	Mode	R/W	uint8	00 _h : Deactivated 01 _h : Single Point 02 _h : Window Mode 03 _h : Two Points	01 _h
	03 _h	Hysteresis Width	R/W	uint32	0 ... 16383 (e.g. If SSC1 Configuration Mode = Single Point, SP1 = 50% S _d = 7447, Hysteresis Width = 10% of SP = 745)	8% of S _d
	04 _h	Hysteresis Selection	R/W	uint8	0 = User Hysteresis 1 = Internal Hysteresis	
HYSTERESIS WIDTH RECOMMENDED BY CONTRINEX						
Hysteresis Width [% of SP] Not recommended area to set SSC1 and SSC2 setpoints (SP1, SP2) — max — typ. — min If Single-Point Mode hysteresis width = x % of SP1 If Window Mode hysteresis width = x % of mean [SP1, SP2] If Two-Point Mode hysteresis width is not applicable SP Value 15% S_d 2234 90% S_d 13405 100% S_d 14894 110% S_d 16384						
OSS CONFIGURATION						
42 _h	01 _h	OSS1 Logic – Sensor Physical Output 1 Logic (PIN4) when used in SIO mode	R/W	uint8	0 = OUTPUT: High active (NO) 1 = OUTPUT: Low active (NC) 2 = OUTPUT: ON 3 = OUTPUT: OFF	00 _h
	02 _h	OSS2 Logic – Sensor Physical Output 2 Logic (PIN2) when used in SIO mode	R/W	uint8	0 = OUTPUT: High active (NO) 1 = OUTPUT: Low active (NC) 2 = OUTPUT: ON 3 = OUTPUT: OFF 4 = INPUT 5 = INPUT-TRIGGER Single Value Teach	00 _h
	03 _h	OSS1 Condition – Sensor Physical Output 1 Condition (PIN4) when used in SIO mode	R/W	uint8	0 = OSS1_A1 1 = OSS1_A1 AND OSS1_A2 2 = OSS1_A1 OR OSS1_A2 3 = OSS1_A1 XOR OSS1_A2	00 _h
	04 _h	OSS2 Condition – Sensor Physical Output 2 Condition (PIN2) when used in SIO mode	R/W	uint8	0 = OSS2_A1 1 = OSS2_A1 AND OSS2_A2 2 = OSS2_A1 OR OSS2_A2 3 = OSS2_A1 XOR OSS2_A2	00 _h
	05 _h	OSS1 Source A1 – Sensor Physical Output 1 Source A1 (PIN4) when used in SIO mode	R/W	uint8	0 = SSC1 1 = SSC2 2 = TSSP 3 = ALR1 4 = ALR2 5 = ALR3 6 = INPUT ⁽¹⁾ 7 = Not INPUT ⁽¹⁾	00 _h

⁽¹⁾ Only available if OSS2 Logic = 4 = INPUT

	06 _h	OSS1 Source A2 – Sensor Physical Output 1 Source A2 (PIN4) when used in SIO mode	R/W	uint8	0 = SSC1 1 = SSC2 2 = TSSP 3 = ALR1 4 = ALR2 5 = ALR3 6 = INPUT ⁽¹⁾ 7 = Not INPUT ⁽¹⁾	00 _h
	07 _h	OSS2 Source A1 – Sensor Physical Output 2 Source A2 (PIN2) when used in SIO mode	R/W	uint8	0 = SSC1 1 = SSC2 2 = TSSP 3 = ALR1 4 = ALR2 5 = ALR3	00 _h
	08 _h	OSS2 Source A2 – Sensor Physical Output 2 Source A2 (PIN2) when used in SIO mode	R/W	uint8	0 = SSC1 1 = SSC2 2 = TSSP 3 = ALR1 4 = ALR2 5 = ALR3	00 _h
TMU – SENSOR TIMER UNIT						
43 _h	01 _h	Timer Mode	R/W	uint8	0 = No Timer 1 = Stretch ON 2 = Delay ON 3 = Delay and Stretch ON 4 = One Shot	00 _h
	02 _h	Timer Value	R/W	uint16	0 ... 65535 ms	0000 _h
	03 _h	Timer Source	R/W	uint8	0 = SSC1 1 = SSC2 2 = ALR1 3 = ALR2 4 = ALR3	00 _h
CTU – SENSOR COUNTER UNIT						
44 _h	01 _h	Counter Mode	R/W	uint8	0 = Falling Edge 1 = Rising Edge 2 = Both	00 _h
	02 _h	Counter Value ⁽²⁾	R/W	uint16	0 ... 65535	0000 _h
	03 _h	Counter Source	R/W	uint8	0 = SSC1 1 = SSC2 2 = TSSP 3 = ALR1 4 = ALR2 5 = ALR3	00 _h
	04 _h	Counter Reset Source	R/W	uint8	0 = ALR1 1 = ALR2 2 = ALR3	01 _h
SMU – SENSOR MONITOR UNIT						
46 _h	01 _h	Current Temperature ⁽¹⁾	R	uint16	–	0000 _h
	02 _h	Max. Lifetime Temperature	R	uint16	–	0000 _h
	03 _h	Min. Lifetime Temperature	R	uint16	–	0000 _h
	04 _h	Lifetime Temperature Cycle Count	R	uint8	–	00 _h
	05 _h	Lifetime Operating Hours	R	uint32	–	00000000 _h
	06 _h	Lifetime Power-On Cycles	R	uint32	–	00000000 _h
	07 _h	Lifetime EMC Disturbances	R	uint32	–	00000000 _h
	08 _h	EVENT FLAG ⁽²⁾⁽³⁾	R	uint8	B1 Short circuit on output B2 EMC disturbances B3 Disturbances on receiver B4 LED regulation limit B5 Under voltage B6 Over temperature B7 Under temperature	00 _h

⁽¹⁾ Only available if OSS2 Logic = 4 = INPUT

⁽²⁾ This parameter is stored in a volatile memory

⁽³⁾ A read on this subindex clears all flags

SMAU – SENSOR MEASUREMENT ALARM UNIT						
47 _h	01 _h	Sensor Alarm 1 Threshold	R/W	uint16	0 ... 110% S _d	10% S _d
	02 _h	Sensor Alarm 1 Hysteresis	R/W	uint16	–	5%
	03 _h	Sensor Alarm 1 Configuration	R/W	uint8	0 = Always OFF 1 = High Active 2 = High Active / IO-Link event generation	00 _h
	04 _h	Sensor Alarm 1 Source	R/W	uint8	0 = Distance 1 = Counter 2 = Temperature	00 _h
	05 _h	Sensor Alarm 2 Threshold	R/W	uint16	0 ... 65535	100
	06 _h	Sensor Alarm 2 Hysteresis	R/W	uint16	–	0000 _h
	07 _h	Sensor Alarm 2 Configuration	R/W	uint8	0 = Always OFF 1 = High Active 2 = High Active / IO-Link event generation	00 _h
	08 _h	Sensor Alarm 2 Source	R/W	uint8	0 = Distance 1 = Counter 2 = Temperature	01 _h
	09 _h	Sensor Alarm 3 Threshold	R/W	uint16	–25 ... 65°C	65°C
	10 _h	Sensor Alarm 3 Hysteresis	R/W	uint16	–	0000 _h
	11 _h	Sensor Alarm 3 Configuration	R/W	uint8	0 = Always OFF 1 = High Active 2 = High Active / IO-Link event generation	00 _h
	12 _h	Sensor Alarm 3 Source	R/W	uint8	0 = Distance 1 = Counter 2 = Temperature	02 _h
DEVICE CHARACTERISTIC						
49 _h	01 _h	Profile Compatibility	R	char []	SSP 2.7 AdSS	–
	02 _h	Detection Range Max.	R	char []	Depends on sensor type	–
	03 _h	Supply Voltage Range (U _b)	R	char []	“10 ... 30 VDC”	–
	04 _h	Max. Output Current	R	char []	“≤ 200 mA”	–
	05 _h	Ambient Temperature Range (T _A)	R	char []	“–25 ... +65°C”	–
	06 _h	Storage Temperature Range (T _S)	R	char []	“–25 ... +65°C”	–
	07 _h	Enclosure Rating	R	char []	IP67/IP68/IP69K	–
LEDC - LED CONFIGURATION						
4B _h	01 _h	Yellow ON - SIO	R/W	uint8	0 = OSS1 1 = OSS2 2 = OSS1 or OSS2 3 = OFF	0
	02 _h	Green ON - SIO	R/W	uint8	0 = POWER 1 = OFF	0
	03 _h	Blinking Alarm - SIO	R/W	uint8	0 = ALR1 or ALR2 or ALR3 1 = OFF	0
	04 _h	LED IO-Link	R/W	uint8	0 = Green STD IO-Link 1Hz 1 = Id mode Green 5Hz 2 = Same as SIO	0
		Blinking Alarm Short-circuit				
SEM - SENSOR ECO MODE						
4C _h	01 _h	SEM - selection	R/W	uint8	0 = Always OFF 1 = Active - state LED	1
	02 _h	SEM - yellow LED	R/W	uint8	0 = Disabled 1 = Enabled	1
	03 _h	SEM - green LED	R/W	uint8	0 = Disabled 1 = Enabled	1
	04 _h	SEM - Emission Frequency	R/W	uint8	0 = Normal 1 = Middle 2 = Low	0

FUNCTION CLASS – MDC DESCRIPTION PARAMETER (8005 _h)						
4080 _h	01 _h	Lower Limit	R	int32	Lower value measurement range, see range definition in table A.5. According to SSP ⁽¹⁾ , Table D.14 page 78.	0
	02 _h	Upper Limit	R	int32	Upper value measurement range, see range definition in table A.5. According to SSP ⁽¹⁾ , Table D.14 page 78.	0
	03 _h	Unit Code	R	uint16	See Unit table defined in table A.7. According to SSP ⁽¹⁾ , Table D.14 page 78.	0
	04 _h	Scale	R	int8	See Table B.2. According to SSP ⁽¹⁾ , Table D.14 page 78.	0

⁽¹⁾ https://io-link.com/share/Downloads/Smart-Sensor-Profile/IOL-Smart-Sensor-Profile-2ndEd_V1.1_Sep2021.zip

PROCESS DATA REPRESENTATION

PROCESS DATA STRUCTURE

PROCESS DATA INPUT

Bitoffset

Byte	7	6	5	4	3	2	1	0
0	ALR3	ALR2	ALR1	OSSC2	OSSC1	TSSP	SSC2	SSC1

Name	Value	Description
ALR3	0	Alarm 3 is OFF
	1	Alarm 3 is ON
ALR2	0	Alarm 2 is OFF
	1	Alarm 2 is ON
ALR1	0	Alarm 1 is OFF
	1	Alarm 1 is ON
OSS2	0	Output switching signal 2 is OFF
	1	Output switching signal 2 is ON
OSS1	0	Output switching signal 1 is OFF
	1	Output switching signal 1 is ON
TSSP	0	Timered selected signal is OFF
	1	Timered selected signal is ON
SSC2	0	Switching signal 2 is OFF
	1	Switching signal 2 is ON
SSC1	0	Switching signal 1 is OFF
	1	Switching signal 1 is ON

PROCESS DATA OUTPUT

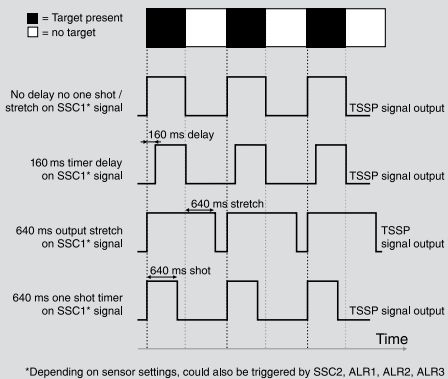
Bitoffset

Byte	7	6	5	4	3	2	1	0
0	RFU							DIS

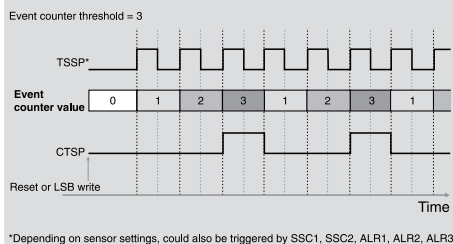
Name	Value	Description
DIS	0	Sensor is enabled
	1	Sensor is disabled

SMART SENSOR SIGNAL FLOWS

Sensor timer unit (TMU) parameter examples



Event counter (pulse divider) example



*Depending on sensor settings, could also be triggered by SSC1, SSC2, ALR1, ALR2, ALR3

ERROR TYPES			
Code	Additional code	Name	Description
80 _h	11 _h	Index Not Available	Access occurs to a not existing index
80 _h	12 _h	Subindex Not Available	Access occurs to a not existing subindex
80 _h	20 _h	Service Temporarily Not Available	Parameter is not accessible due to the current state of the device application
80 _h	21 _h	Service Temporarily Not Available – Local Control	Parameter is not accessible due to an ongoing local operation at the device
80 _h	22 _h	Service Temporarily Not Available – Device Control	Parameter is not accessible due to a remote triggered state of the device application
80 _h	23 _h	Access Denied	Write access on a read-only parameter
80 _h	30 _h	Parameter Value Out Of Range	Written parameter value is outside its permitted value range
80 _h	31 _h	Parameter Value Above Limit	Written parameter value is above its specified value range
80 _h	32 _h	Parameter Value Below Limit	Written parameter value is below its specified value range
80 _h	33 _h	Parameter Length Overrun	Written parameter length is above its predefined length
80 _h	34 _h	Parameter Length Underrun	Written parameter length is below its predefined length
80 _h	35 _h	Function Not Available	Written command is not supported by the device application
80 _h	36 _h	Function temporarily Not Available	Written command is not available due to the current state of the device
80 _h	40 _h	Invalid Parameter Set	Written single parameter collides with other actual parameter settings
80 _h	41 _h	Inconsistent Parameter Set	Parameter inconsistencies were found at the end of the block parameter transfer, device plausibility check failed
81 _h	02 _h	OSS1 source not available	First select OSS2 Logic = INPUT

EVENTS			
Code	Type	Name	Description
1800 _h	Warning	EMC Disturbances	EMC Disturbances detected by sensor
1801 _h	Warning	Under IOL Voltage	Under IOL Voltage detected by sensor
1803 _h	Warning	Short Circuit	Short Circuit detected by sensor
1804 _h	Error	Under Voltage	Under Voltage detected by sensor
1805 _h	Warning	Disturbances on Receiver	Disturbances on Receiver detected by sensor
1806 _h	Warning	LED Regulation Limit	LED Regulation Limit detected by sensor
1808 _h	Notification	Alarm 1	Alarm 1 Threshold reached
1809 _h	Notification	Alarm 2	Alarm 2 Threshold reached
180A _h	Notification	Alarm 3	Alarm 3 Threshold reached
180B _h	Notification	Trigger Teach	New SSC value is taught
180C _h	Warning	Temperature Limit	Temperature limit reached

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