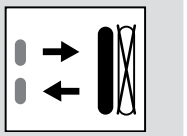
CONTRINEX

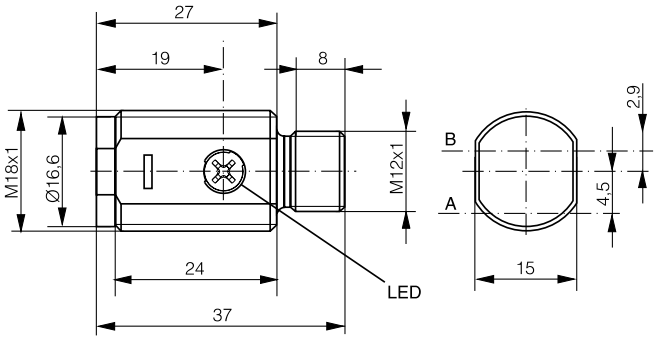
PHOTOELECTRIC SENSOR
SMART
ISHR-M18MP-NMS-A0



250 mm

- ✓ M18 short housing
- ✓ IO-Link
- ✓ Excellent black/white behavior
- ✓ Immunity to mutual interferences





A: emitter axis B: receiver axis

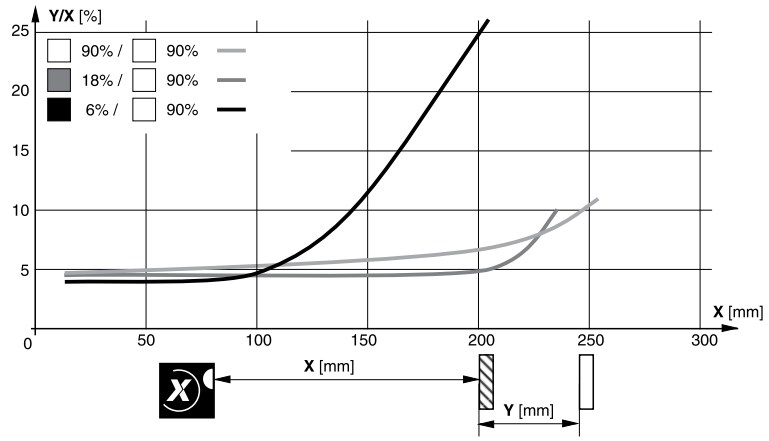
OPTICAL DATA		INTERFACE	
Sensing distance	110% S_d	Output on pin 4	SIO Selectable / IO-Link
Operating distance (S_d)	10…250 mm[1]	Output on pin 2	SIO Selectable
Sensitivity adjustment	20…250 mm	Output Polarity	PNP
Light source	Pinpoint LED, red 640 nm	IO-Link	✓
Light spot size (distance)	Ø 6 mm (100 mm)	MTTF (@40°C)	TBD

[1]Object with 90% reflectance (standard white paper)

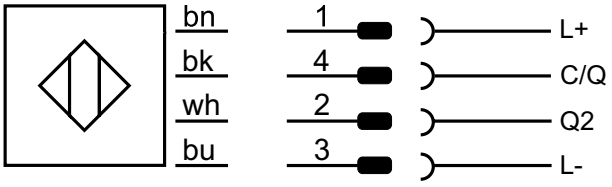
ELECTRICAL DATA		MECHANICAL DATA	
Supply voltage range (U_B)	10…30 VDC	Enclosure rating	IP67
Residual ripple	≤ 10% Vpp	Ambient temperature operation	-25…+65°C
Output current	≤ 200 mA	Shock and vibration	IEC 60947-5-2
Signal PNP high/low	≤ (U_B-2.0 V)/approx. 0 V	Weight (connector version)	14 g
Power consumption (no load)	≤ 25 mA	Housing material	Stainless steel V2A
Response time	≤ 1 ms	Window material	PMMA
SIO Switching frequency	≤ 500 Hz	Connector type	M12 4-pin
Short circuit protection	✓	Max tightening torque	20 Nm
Voltage reversal protection	✓		
Cable length max.	≤ 20 m (IO-Link) / ≤ 300 m (SIO)		

CONTRINEX AG Industrial Electronics
Route du Pâquier 3 – P.O. Box – CH 1720 Corminboeuf – Switzerland – **Tel:** +41 26 460 46 46
Fax: +41 26 460 46 40 – **Internet:** www.contrinex.com – **E-mail:** info@contrinex.com

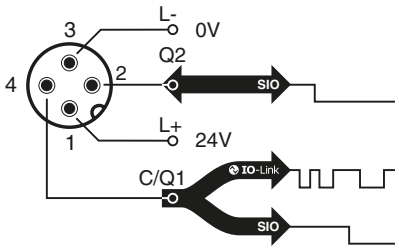
BACKGROUND SHIFT



WIRING DIAGRAM



PIN ASSIGNMENT



IO-LINK CHARACTERISTICS	VALUE FOR ISHR-M18MP-NMS-A0
Vendor ID	0156_h
Device ID	$A0501_h$
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	
620-600-483	ISHR-M18MP-NMS-A0	10...250mm	≤ 500 Hz	

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

Operators of the products we supply are responsible for compliance with measures for the protection of persons. The use of our equipment in applications where the safety of persons might be at risk is only authorized if the operator observes and implements separate, appropriate and necessary measures for the protection of persons and machines. Terms of delivery and rights to change design reserved.

CONTRINEX AG Industrial Electronics

Route du Pâqui 3 – P.O. Box – CH 1720 Corminboeuf – Switzerland – **Tel:** +41 26 460 46 46
Fax: +41 26 460 46 40 – **Internet:** www.contrinex.com – **E-mail:** info@contrinex.com

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, 02h: 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-M18MP-NMS-A0	–
13_h	–	Product ID	R	char [16]	620-600-483	–
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>

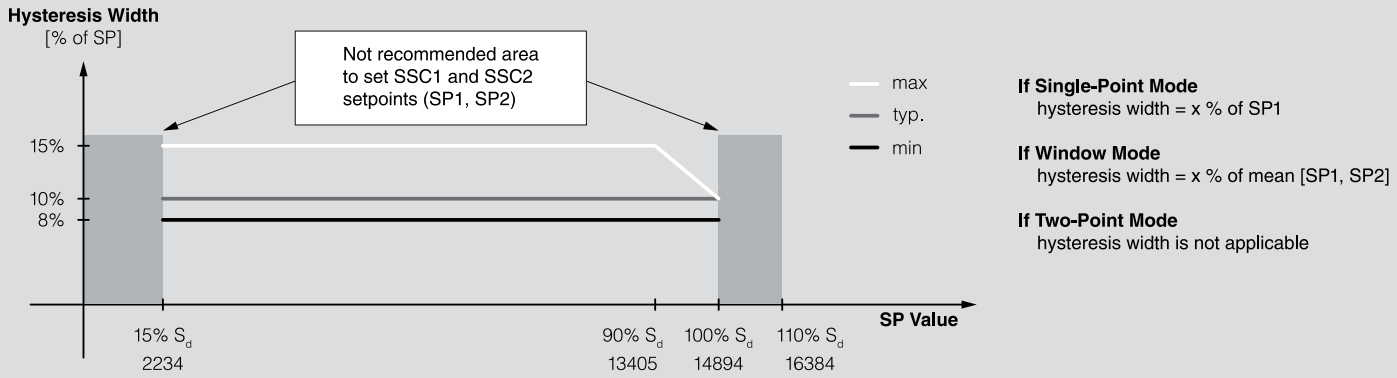
[1] This parameter is stored in a volatile memory

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



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

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 Souce 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	01h
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	–
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

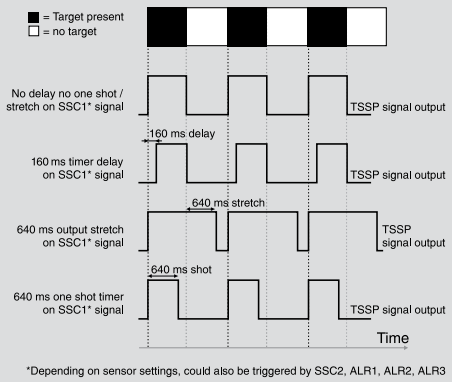
Bitoffset

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

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

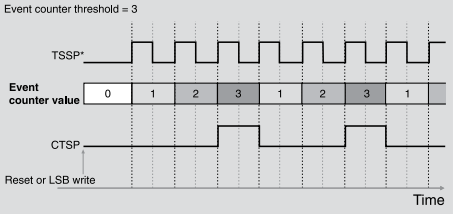
SMART SENSOR SIGNAL FLOWS

Sensor timer unit (TMU) parameter examples



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

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