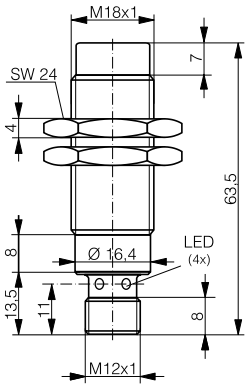
CONTRINEX

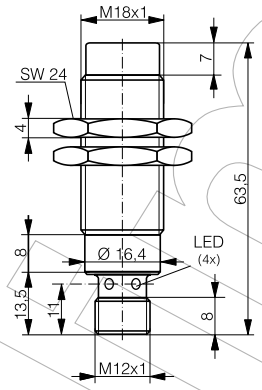
INDUCTIVE SENSOR
SMART
IDSN-M18MM-NMS-A0

HOUSING	OPERATING DISTANCE	MOUNTING
M18	1 to 10 mm	Non-Embeddable

- ✓ Contact less double sheet detection
- ✓ Configurable for multiple material and thicknesses
- ✓ One-Piece housing in stainless steel V2A



IDSN-M18MM-NMS-A0



IDSN-M18AA-NMS-A0

DETECTION DATA		INTERFACE	
Operating distance (S_d)	1 .. 10 mm (See doc. “IDSN-MxxMM-NMS-A0 Operating manual”)	Output on pin 4	SIO Selectable / IO-Link
Sensing range	0 … 100 % S_d	Output/Input on pin 2	SIO Selectable
Temperature drift (0 … 0.9 S_d)	≤ 10 % S_d	Output Polarity	PNP
Sheet materials	See doc. “IDSN-MxxMM-NMS-A0 Operating manual”	IO-Link	Digital Measuring Sensor(SSP 4.1.1)
Sheet Thicknesses	See doc. “IDSN-MxxMM-NMS-A0 Operating manual”	MTTF (@40˚C)	380 y

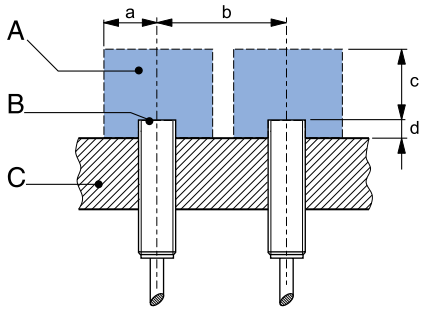
ELECTRICAL DATA		MECHANICAL DATA	
Supply voltage range (U_B)	18…30 VDC	Mounting	See “Installation conditions” (p. 2)
Residual ripple	≤ 20 % U_B	Housing material	Stainless Steel V2A
Output current	≤ 200 mA	Sensing face material	Stainless Steel V2A
Output voltage drop	≤ 2.0 VDC	Max. tightening torque	See “Installation conditions” (p. 2)
Power consumption (no-load)	≤ 20 mA	Ambient operating temperature	+10 .. +60°C
Residual current	≤ 0.1 mA	Enclosure rating	IP68/IP69K
SIO Switching Frequency	≤ 3 Hz	Shock and vibration	IEC 60947-5-2
Short-circuit protection	✓	Weight	33.60 g
Voltage reversal protection	✓		
Cable length max.	≤ 20 m (IO-Link) / ≤ 300 m (SIO)		

Note: all data measured according to IEC 60947-5-2 standard with U_B = 20…30 VDC, T_A = 23°C ± 5°C.

[1] Maximum temperature according to UL: 70°C.

Contrinex AG terms and conditions apply (https://cdn.shopify.com/s/files/1/0530/8196/4695/files/180430-Contrinex-General-Terms-and-Conditions_of_Sales_and_Delivery.pdf?v=1617256360)

INSTALLATION CONDITIONS / MAXIMUM TIGHTENING TORQUE



A : metal free zone
B : sensing face
C : support

	a	b	c	d	Mounting	Maximum Tightening Torque
IDSN-M18MM-NMS-A0	60 mm	400 mm	40 mm	10 mm	Non- Embeddable	150 Nm

The Figure above shows a typical arrangement for mounting one or more Smart Double-Sheet Sensors (Type IDSN, non-embeddable) in a stainless-steel support (C).

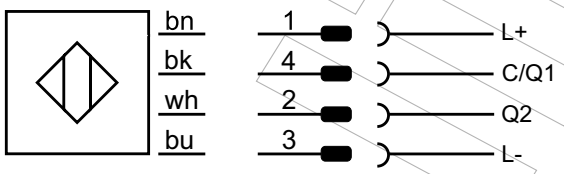
Do not position any metallic object (other than the target) inside the envelope of the metal-free zone (A). The presence of metallic object(s) in the metal-free zone risks reducing the measurement sensitivity of the IDSN sensor and may compromise its detection.

The distance “d” is a typical value for an IDSN sensor mounted in a stainless-steel support (C) and used to detect a steel target.

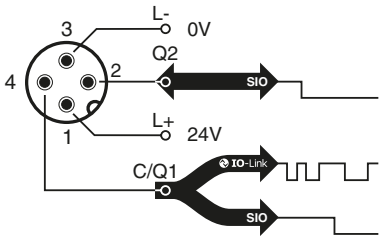
For reliable detection, distance “d” may have to be increased when (i) using a support made from other materials; or (ii) detecting a non-steel target; or (iii) detecting a target of a different thickness. Refer to document “IDSN-MxxMM-NMS-A0 Operating Manual” for guidance.

Recommendation: Use a non-metallic sensor support (C) for reliable detection and to avoid environmental interference.

WIRING DIAGRAM



PIN ASSIGNMENT



IO-LINK CHARACTERISTICS	VALUE FOR IDSN-M30MM-NMS-A0
Vendor ID	0156_h
Device ID	$97031F_h$
IO-Link Protocol	1.1.3
SIO-Mode	Supported
Process data	4 bytes input / 1 bytes output
Baudrate	COM2 (38.4 kBaud)
Minimum cycle time	64ms

IODD files may be downloaded from www.contrinex.com

Part number	Part reference	Operating distance S_d	Weight	Output 1 (Pin 4)	Output 2 (Pin2)
330-320-206	IDSN-M18MM-NMS-A0	1…10mm	33.60 g	PNP SIO/IO-link	PNP SIO
330-720-717	IDSN-M18AA-NMS-A0	1…10mm	33.60 g	PNP SIO/IO-link	PNP SIO

Note: part reference may include additional suffix to indicate a revision version or special version. Further information is available on request.

CONFIGURATION AND CALIBRATION RESTRICTIONS

Contrinex AG and PocketCodr SA developed the PocketCodr and its companion app as digital tools for configuring IO-Link-enabled Smart Sensors. The PocketCodr is a rechargeable hand-held device that acts as an interface between the sensor (which is connected via a cable) and the app (which communicates with the PocketCodr via Bluetooth®).

The free PocketCodr app can be downloaded from Google Play or the Apple App Store and installed on Bluetooth®-enabled mobile devices running Android or iOS. It features several standard routines for IO-Link configuration; these are accessed using software controls called Action Widgets. The Home screen of the PocketCodr app features multiple Action Widgets, each of which has a dedicated function, guiding the user through a specific part of the configuration process.

Use of the PocketCodr device and app is MANDATORY for configuration and set-up of Smart Double-Sheet (IDSN) Sensors. IDSN sensors reject IO-link configurations that have not been validated by the PocketCodr app's dedicated "double sheet teach" action widget.

The dedicated "double sheet teach" action widget is only enabled for PocketCodr user accounts with the "Application" plan subscribed. This subscription can be ordered directly from Contrinex SA.

Part number	Part reference	Description
600-100-203	POC-CDR-M12	PocketCodr Device only
605-004-007	SOFT-POC-APL-1-CRD	1 year Application plan (Contrinex application specific action widgets)

IO-Link configurations contain multiple critical parameters that optimize an IDSN sensor's measurement capability **for a specific target material and thickness**. PocketCodr's 'Double Sheet Teach' routine enables users to determine and upload parametric values empirically, creating customized configuration profiles for their own unique applications.

Contrinex AG maintains a library of predetermined double-sheet-detection configuration profiles for various target materials and sheet thicknesses. A list of library profiles is available in the document "IDSN-MxxMM-NMS-A0 Operating Manual".

OUTPUT SIGNALS AND FAILSAFE

The double-sheet sensor uses two IO-Link Switching Signal Channels (SSCs) to identify its detection status. SSC1 confirms a single-sheet detection, while SSC2 confirms a double-sheet detection **(see IO-Link Configuration Parameters – PROCESS DATA REPRESENTATION on p.8 below)**.

PocketCodr reserves dedicated IO-Link indexes for double-sheet-specific purposes **(see Critical parameters in table IO-Link Configuration Parameters on p.5-8 below)**. If a user modifies any double-sheet-specific IO-Link parameter by any means other than using the PocketCodr "double-sheet teach" action widget (for example, but not limited to, using a third-party configuration tool or a proprietary IO-Link Master), the smart Double-Sheet Sensors reject the non-approved configuration that results.

In this event, an IDSN sensor responds to the non-approved configuration by setting the double-sheet-detection output (SSC2) permanently to ON (signified by a value of "TRUE" or "1"). This ensures a failsafe condition that inhibits operation of the equipment being protected by the IDSN sensor until the fault condition is rectified by using PocketCodr to reinstall a valid configuration.

However, Contrinex AG does not accept any liability for any loss or damage caused by misuse, in particular (but not limited to) using a third-party configuration tool or a proprietary IO-Link Master.

RE-TEACH

Over time, mechanical degradation, long-term measurement drift and other external factors may influence the operation of a Smart-Sensor system. In order to pre-empt the impact of such factors, **Contrinex AG recommends that PocketCodr is used to re-teach the sensors switching points on a 3 month basis (and certainly at intervals of no more than 1000 operating hours).**

In these circumstances (and as noted above), **use of the PocketCodr device and app is MANDATORY for reconfiguration and set-up of Smart Double-Sheet (IDSN) Sensors.**

SAFETY CONSIDERATIONS

Smart Double-Sheet (IDSN) Sensors must ONLY be used for their intended purpose. In particular, they are not certified for safety-related applications, and they must NOT be used for ensuring personnel safety or safeguarding. Using any type of Smart Sensor for any safety-related application may result in hazardous situations that could lead to serious injury or death.

Neither Contrinex AG nor PocketCodr SA accepts any liability for any loss or damage caused by misuse of the IDSN product family or the PocketCodr device and app, in particular non-compliance with the instructions and restrictions set forth in this data sheet and related manuals.

CONFIGURATION PARAMETER (IO-LINK / SIO MODE)

Index	Sub Hex	Name	Access	Data Type	Value	Default	Critical param.
SYSTEM							
02_h	00_h	System Command(1)	W	uint8	0x80 Device Reset 0x83 Back-To-Box (Restore with default values) 0x05 ParamDownloadStore 0x40 Teach Apply 0x41 Single Value Teach SP1 0x42 Single Value Teach SP2 0x43 Two Value Teach SP1 TP1 0x44 Two Value Teach SP1 TP2 0x45 Two Value Teach SP2 TP1 0x46 Two Value Teach SP2 TP2 47h = Dynamic Start SP1, 48h = Dynamic Stop SP1, 49h = Dynamic Start SP2, 4Ah = Dynamic Stop SP2, 0x4F Teach Cancel Abort 0x7E Locator Start 0x7F Locator Stop	N/A	
DATA STORAGE							
03_h	01_h	DS_Command(1)	R/W	uint8	0x00: Reserved 0x01: DS_UploadStart 0x02: DS_UploadEnd 0x03: DS_DownloadStart 0x04: DS_DownloadEnd 0x05: DS_Break 0x06 to 0xFF: 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	FF_h	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	uint16	<ProfileID1>, <ProfileID2>, .. <FCID> 0x0010, 0x4000, 0x800C, 0x8011, 0x8012, 0x8101 (Type 4.1.1) (DMSS)	–	
PD DESCRIPTOR							
$0E_h$	–	PD Input Descriptor	R	array	<DataType><TypeLength><BitOffset> $[82]_h$ $[20]_h$ $[00]_h$	–	
$0F_h$	–	PD Output Descriptor	R	array	<DataType><TypeLength><BitOffset> – $[01]_h$ $[01]_h$ $[00]_h$ $[02]_h$ $[07]_h$ $[01]_h$	–	
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]	"IDSN-MxxMM-NMS-A0"	–	
13_h	–	Product ID	R	char [16]	330-320-20x	–	
14_h	–	Product Text	R	char [32]	Double sheet inductive sensor	–	
15_h	–	Serial Number	R	char [16]	<PlantNr>_<BatchNr>_<IDNr>	–	
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>	
FUNCTION CLASS IDENTIFICATION							
19_h	–	Function Tag	R/W	char []	<user string, 32 bytes (variable length)>	"***"	
$1A_h$	–	Location Tag	R/W	char []	<user string, 32 bytes (variable length)>	"***"	

(1) This parameter is stored in a volatile memory

Index	Sub Hex	Name	Access	Data Type	Value	Default	Critical param.
FUNCTION CLASS DIAGNOSIS							
24_h	–	Device Status	R	uint8	0= device is OK, 1= Maintenance required, 2= out of specification, 3= Functional check, 4= Failure, 5…255 reserved	–	
25_h	–	Detailed Device Status	R	Array of byte	–	–	
FUNCTION CLASS – TEACH-IN CHANNEL SELECT							
$3A_h$	–	Teach Select(1)	R/W	uint8	00h: Default (SSC1) 01_h: SSC1 02_h: SSC2 FFh: ALL SSC	00_h	
FUNCTION CLASS – TEACH STATUS							
$3B_h$	01_h	Teach State(1)	R	bool[4]	00_h: Idle 01_h: SP1 Success 02_h: SP2 Success 03_h: SP12 Success 04_h: Wait for command 05_h: Busy 06_h: Reserved 07_h: Error 08_h … 12_h: Reserved	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 Value Source	R/W	uint8	00_h: Distance (VTARGET)	00_h	
	03_h	Measurement value filter	R/W	uint8	00_h: Fast 10_h: Medium 20_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	X
	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	X
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	X
	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)	10% of SP	X
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	X
	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	X
SSC2 CONFIGURATION							
$3F_h$	01_h	Logic	R/W	uint8	00_h: High active 01_h: Low active	00_h	

(1) This parameter is stored in a volatile memory

Index	Sub Hex	Name	Access	Data Type	Value	Default	Critical param.
	02_h	Mode	R/W	uint8	00_h: Deactivated 01_h: Single Point 02_h: Window Mode 03_h: Two Points	01_h	X
	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)	10% of SP	X
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	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 = INPUT(1) 4 = Not INPUT(1)	00_h	
	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 = INPUT(1) 4 = 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	01_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	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	00_h	
SMU – SENSOR MONITOR UNIT							
46_h	01_h	Current Temperature(2)	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 Cy-cle Count	R	uint8	–	00_h	
	05_h	Lifetime Operating Hours	R	uint32	–	00000000_h	

(1) Only available if OSS2 Logic = 4 = INPUT (2) This parameter is stored in a volatile memory

Index	Sub Hex	Name	Access	Data Type	Value	Default	Critical param.
	06_h	Lifetime Power-On Cycles	R	uint32	–	00000000_h	
	07_h	Lifetime EMC Disturbances	R	uint32	–	00000000_h	
	08_h	EVENT FLAG(1)(2)	R	uint8	1 = B1 (Short circuit on output) 2 = B2 (EMC disturbances) 3 = B3 (Collision on output) 4 = B4 (Under voltage) 5 = B5 (Over temperature)	00_h	
DOUBLE SHEET DETECTION SPECIFIC							
50_h	-	These indexes shall only be written by the dedicated widget in the PocketCodr app. In the case one of those indexes is modified by any other IO-link master the Sensor rejects its configuration and the double sheet detection is constant.					X
51_h	-						
52_h	-						
53_h	-						
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(3), table C.8 page 39.	0	
	02_h	Upper Limit	R	int32	Upper value measurement range, see range definition in table A.5. According to SSP(3), table C.8 page 39.	0	
	03_h	Unit Code	R	uint16	See Unit table defined in table A.7. According to SSP(3), table C.8 page 39.	0	
	04_h	Scale	R	int8	See Table B.2. According to SSP(3), table C.8 page 39.	0	

(1) This parameter is stored in a volatile memory (1) A read on this subindex clear all flags (3) https://io-link.com/share/Downloads/Smart-Sensor-Profile/IOL-Smart-Sensor-Profile-2ndEd_V10_Mar2017.pdf

PROCESS DATA REPRESENTATION

PROCESS DATA STRUCTURE

PROCESS DATA INPUT

Bitoffset

Byte	7	6	5	4	3	2	1	0
0	-	-	CFG	OSS2	OSS1	TSSP	SSC2	SSC1
1	Scale Value							
2	Measurement value (LSB)							
3	Measurement value (MSB)							

Name	Value	Description	Comment
SSC1	0	SSC1 is OFF	Signal for Single sheet detection
	1	SSC1 is ON	
SSC2	0	SSC2 is OFF	Signal for double sheet detection.
	1	SSC2 is ON	
TSSP	0	Timer Signal is OFF	Deactivated by default
	1	Timer Signal is ON	
OSS1	0	Output Switching signal 1 is OFF	Source signals selectable in OSS configuration. Default source set to SSC1 (Single-sheet detection)
	1	Output Switching signal 1 is ON	
OSS2	0	Output Switching signal 2 is OFF	Source signals selectable in OSS configuration. Default source set to SSC2 (double-sheet detection)
	1	Output Switching signal 2 is ON	
CFG	0	Sensor Config has been approved	Approval of Sensor config cannot be deactivated. By default, CFG = "1" (True) sets SSC2 = "1" (True)
	1	Sensor Config has not been approved	

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

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

EVENTS

Code	Type	Name	Description
1800_h	Warning	EMC Disturbances	EMC Disturbances detected by sensor
1803_h	Warning	Short Circuit	Short Circuit detected by sensor