 **IO-Link**

# SENSOR HUB

SHC 071 | IO-Link parameters

## GENERAL INFORMATION

### DESCRIPTION

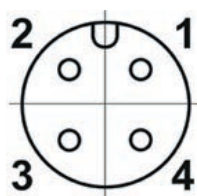
The IO-Link sensor hub can record measurement data at the process level from up to four external sensors (e.g. temperature/ambient humidity combi sensors) and transmit this data to a higher-level control and monitoring level (PLC system, cloud) via an IO-Link master.

### GENERAL DATA

Manufacturer name	STEGO Elektrotechnik GmbH
Manufacturer ID	0x04C6 / 1222d
Manufacturer URL	www.stego.de
Product ID	SHC 07100.2-00
Device ID	0x000064 / 100d
IO-Link version	V 1.1
Bit rate	COM2
Minimum cycle time	30.0 ms
SIO mode	No
Data storage	Yes

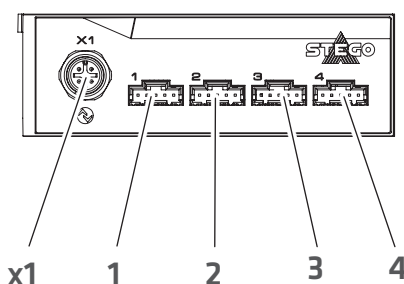


### IO-LINK INTERFACE PIN ASSIGNMENT



Pin	Description
1	+24 V DC
2	n/a
3	GND
4	IO-Link communication

### TERMINAL ASSIGNMENT



Pin	Description
x1	IO-Link
1	Sensor 1 (Channel 1)
2	Sensor 2 (Channel 2)
3	Sensor 3 (Channel 3)
4	Sensor 4 (Channel 4)

## IDENTIFICATION

Parameter name	Description	Index	Subindex	Data type	Standard value
Vendor Name	Manufacturer name	0x10	0x00	StringT [ 64 ]	STEGO Elektrotechnik GmbH
Vendor Text	Manufacturer text	0x11	0x00	StringT [ 64 ]	STEGO CONNECT Intelligent Condition Management
Product Name	Device name	0x12	0x00	StringT [ 64 ]	SHC 071
Product ID	ID number of the device	0x13	0x00	StringT [ 64 ]	SHC 07100.2-00
Product Text	Device description	0x14	0x00	StringT [ 64 ]	SHC 071 sensor hub
Serial Number		0x13	0x00	StringT [ 16 ]	xxxxxxxxxxxx
Hardware Version	Hardware version	0x16	0x00	StringT [ 64 ]	IOL_SH_02
Firmware Version	Firmware version	0x17	0x00	StringT [ 64 ]	01.00.00

The device information is the electronic nameplate of the sensor hub. It can only be read and not changed. The IO-Link master port performs the set validation of the identification data of the IO-Link device when the IO-Link device is reconnected or every time the communication restarts.

## NAMES AND TERMINOLOGY

The device has 4 connections for a selection of sensors (see „Sensoren“ auf Seite 12). The connections are referred to as channels; abbreviated to CH1 to CH4, etc. These sensors each have one or two values which can be queried. For example, the temperature/humidity sensor has two sensor values; the sensor for ambient light has one. These values are generally referred to as sensor values; abbreviated as SV1, SV2, etc.

To define the alarm and range limits, four switching points can be entered for each of these sensor values, which each have a SET and RESET value.

Name (abbreviation)	Description	Value
CHw	Channel	w = 1-4
SVx	Sensor value (e.g. temperature and relative humidity at the temperature/humidity sensor)	x = 1-2
Py.z	Switching point	y = 1-4 z = 0-1 (0 = RESET value, 1 = SET value)

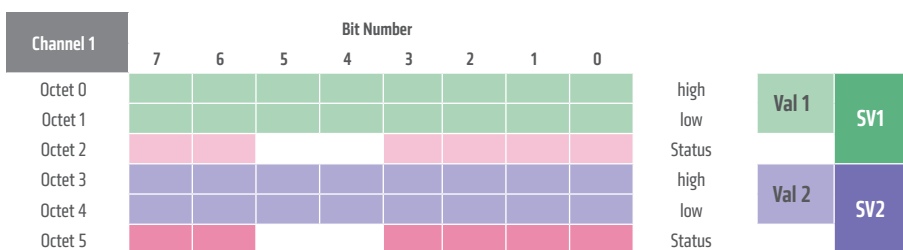
## PROCESS DATA

6 bytes (octets) are used for each channel in the Process Data Input. The device does not use any Process Data Outputs. All four channels are structured the same. Depending on the sensor type, there are one or two sensor values. If there is only one sensor value, the content of the SV2 is always 0, or SV1 might be put in a different format (than SV2). The octets are sent in a sequence of 0-23. Channel 4 has the bitOffset 0 and occupies the octets 18-23.

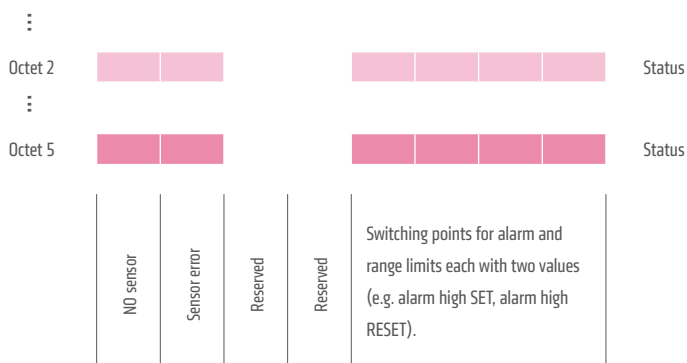
Information regarding the recalculation of the process data into physical values can be found in the section „Parameters (Sensors)“ on page 5.

### CHANNEL 1

Octet	0	1	2								3	4	5										
Name	Value 1		status / events								Value 2		status / events										
Data Type	IntegerT		B	B	B	B	B	B	B	B	B	B	IntegerT	B	B	B	B	B	B	B	B	B	B
Byte Order	high	low									high	low											
bitOffset	xBF	xB0	xAF	xAE	xAD	xAC	xAB	xAA	xA9	xA8	xA7	x98	x97	x96	x95	x94	x93	x92	x91	x90			
bitLength	16		1	1	1	1	1	1	1	1	16	1	1	1	1	1	1	1	1	1			
subindex	x01	x09	x08	x07	x06	x05	x04	x03	x02	x0A	x12	x11	x10	x0F	x0E	x0D	x0C	x0B					



### ASSIGNMENT OF THE STATUS BITS (BIT NUMBER 0-7) USING CHANNEL 1 AS AN EXAMPLE



## CHANNEL 2

Octet	6	7	8								9	10	11							
	Sensor Value 1 (SV1)										Sensor Value 2 (SV2)									
Name	Value 1		status / events								Value 2		status / events							
Data Type	IntegerT	B	B	B	B	B	B	B	B	B	IntegerT	B	B	B	B	B	B	B	B	B
Byte Order	high	low									high	low								
bitOffset	x8F	x80	x7F	x7E	x7D	x7C	x7B	x7A	79	78	x77	x68	x67	x66	x65	x64	x63	x62	x61	x60
bitLength	16	1	1	1	1	1	1	1	1	1	16	1	1	1	1	1	1	1	1	1
subindex	x14	x1C	x1B<	x1A	x19	x18	x17	x16	x15		x1E	x26	x25	x24	x23	x22	x21	x20	x1F	

## CHANNEL 3

Octet	12	13	14								15	16	17							
	Sensor Value 1 (SV1)										Sensor Value 2 (SV2)									
Name	Value 1		status / events								Value 2		status / events							
Data Type	IntegerT	B	B	B	B	B	B	B	B	B	IntegerT	B	B	B	B	B	B	B	B	B
Byte Order	high	low									high	low								
bitOffset	x5F	x50	x4F	x4E	x4D	x4C	x4B	x4A	x49	x48	x47	x38	x37	x36	x35	x34	x33	x32	x31	x30
bitLength	16	1	1	1	1	1	1	1	1	1	16	1	1	1	1	1	1	1	1	1
subindex	x28	x30	x2F	x2E	x2D	x2C	x2B	x2A	x29		x32	x3A	x39	x38	x37	x36	x35	x34	x33	

## CHANNEL 4

Octet	18	19	20								21	22	23							
	Sensor Value 1 (SV1)										Sensor Value 2 (SV2)									
Name	Value 1		status / events								Value 2		status / events							
Data Type	IntegerT	B	B	B	B	B	B	B	B	B	IntegerT	B	B	B	B	B	B	B	B	B
Byte Order	high	low									high	low								
bitOffset	x2F	x20	x1F	x1E	x1D	x1C	x1B	x1A	x19	x18	x17	x08	x07	x06	x05	x04	x03	x02	x01	x00
bitLength			1	1	1	1	1	1	1	1	16	1	1	1	1	1	1	1	1	1
subindex	x3C	x44	x43	x42	x41	x40	x3F	x3E	x3D		x46	x4E	x4D	x4C	x4B	x4A	x49	x48	x47	

NOTE: The process data is shown from the device's perspective. Siemens control systems swap the high and low byte of a 16-bit word for bitwise addressing.

## PARAMETERS

### PARAMETERS (GENERAL)

Parameter name	Description	Index	Subindex	Bit offset	Data type	Value	Factory setting
Device Access Locks		0x0C	0x00		RecordT	0, 1	0
Parameter (write) Access Lock	If this bit is set, write access is blocked to all device parameters through the SDCI communication interface for all read/write parameters of the device. Exception: Parameter Device Access Lock.	0x0C	0x01	0x00	BooleanT	false, true	
Data Storage Lock	If this bit is set in the device, the data saving mechanism is deactivated.	0x0C	0x02	0x01	BooleanT	false, true	

### PARAMETERS (SENSORS)

The measurement values of the sensors for temperature [°C, °F], pressure [hPa], illumination level [lx] and the current status are depicted in the process data. These values can only be read (ro). For each sensor value (sensor value x), there are 4 switching points each with two values (SET/RESET). The actual value range (and the unit) depends on the sensor type.

With the current firmware, four different sensor types are available for selection:

**Sensor type 1:** Temperature [°C] and relative humidity [%]

**Sensor type 2:** Temperature [°F] and relative humidity [%]

**Sensor type 3:** Pressure [hPa] and temperature [°C]

**Sensor type 4:** Ambient light [lx]

Parameter name	Description	Index CH1	Index CH2	Index CH3	Index CH4	Subindex	Data type	Value range	Individual values	Unit
Channel 1: Sensor Type	<b>Sensor type selection</b>	<b>0x50</b>	<b>0x78</b>	<b>0xA0</b>	<b>0xC8</b>	<b>0x00</b>	<b>UInteger_8</b>			
NO sensor (0)	- No sensor								0	-
Sensor: Temperature [°C] and relative Humidity	- Sensor type 1								1	°C / %
Sensor: Temperature [°F] and relative humidity	- Sensor type 2								2	°F / %
Sensor: Pressure and Temperature [°C]	- Sensor type 3								3	hPa / °C
Sensor: Ambient Light	- Sensor type 4								4	lx
Sensor Value 1 Point 1.1 Alarm High SET		0x54	0x7C	0xA4	0xCC	0x00	IntegerT_16	-450 to 32000		
Sensor Value 1 Point 1.0 Alarm High RESET		0x55	0x7D	0xA5	0xCD	0x00	IntegerT_16	-450 to 32000		
Sensor Value 1 Point 2.1 Range High SET		0x56	0x7E	0xA6	0xCE	0x00	IntegerT_16	-450 to 32000		
Sensor Value 1 Point 2.0 Range High RESET		0x57	0x7F	0xA7	0xCF	0x00	IntegerT_16	-450 to 32000		
Sensor Value 1 Point 3.0 Range Low RESET		0x58	0x80	0xA8	0xD0	0x00	IntegerT_16	-450 to 32000		
Sensor Value 1 Point 3.1 Range Low SET		0x59	0x81	0xA9	0xD1	0x00	IntegerT_16	-450 to 32000		
Sensor Value 1 Point 4.0 Alarm Low RESET		0x5A	0x82	0xAA	0xD2	0x00	IntegerT_16	-450 to 32000		
Sensor Value 1 Point 4.1 Alarm Low SET		0x5B	0x83	0xAB	0xD3	0x00	IntegerT_16	-450 to 32000		
Sensor Value 2 Point 1.1 Alarm High SET		0x66	0x8E	0xB6	0xDE	0x00	IntegerT_16	-450 to 32000		
Sensor Value 2 Point 1.0 Alarm High RESET		0x67	0x8F	0xB7	0xDF	0x00	IntegerT_16	-450 to 32000		
Sensor Value 2 Point 2.1 Range High SET		0x68	0x90	0xB8	0xE0	0x00	IntegerT_16	-450 to 32000		
Sensor Value 2 Point 2.0 Range High RESET		0x69	0x91	0xB9	0xE1	0x00	IntegerT_16	-450 to 32000		
Sensor Value 2 Point 3.0 Range Low RESET		0x6A	0x92	0xBA	0xE2	0x00	IntegerT_16	-450 to 32000		
Sensor Value 2 Point 3.1 Range Low SET		0x6B	0x93	0xBB	0xE3	0x00	IntegerT_16	-450 to 32000		
Sensor Value 2 Point 4.0 Alarm Low RESET		0x6C	0x94	0xBC	0xE4	0x00	IntegerT_16	-450 to 32000		
Sensor Value 2 Point 4.1 Alarm Low SET		0x6D	0x95	0xBD	0xE5	0x00	IntegerT_16	-450 to 32000		

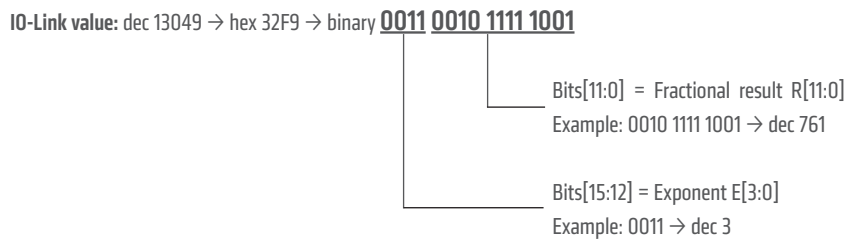
To calculate the display value for temperature, pressure and humidity, the IO-Link values (raw values) of the sensors are multiplied by the factor 0.1 in the TMG IO-Link Device Tool:

>  $\text{Temperature [}^\circ\text{C, }^\circ\text{F], pressure [hPa], humidity [\%]} = \text{IO-Link value} \times 0.1$

For sensor type 4, the brightness is output directly in lux via Sensor Value 1. Sensor Value 2 displays the raw value in parallel. For measurement values over 32,000 lux, the raw values will only be output through Sensor Value 2 and must be converted into lux.

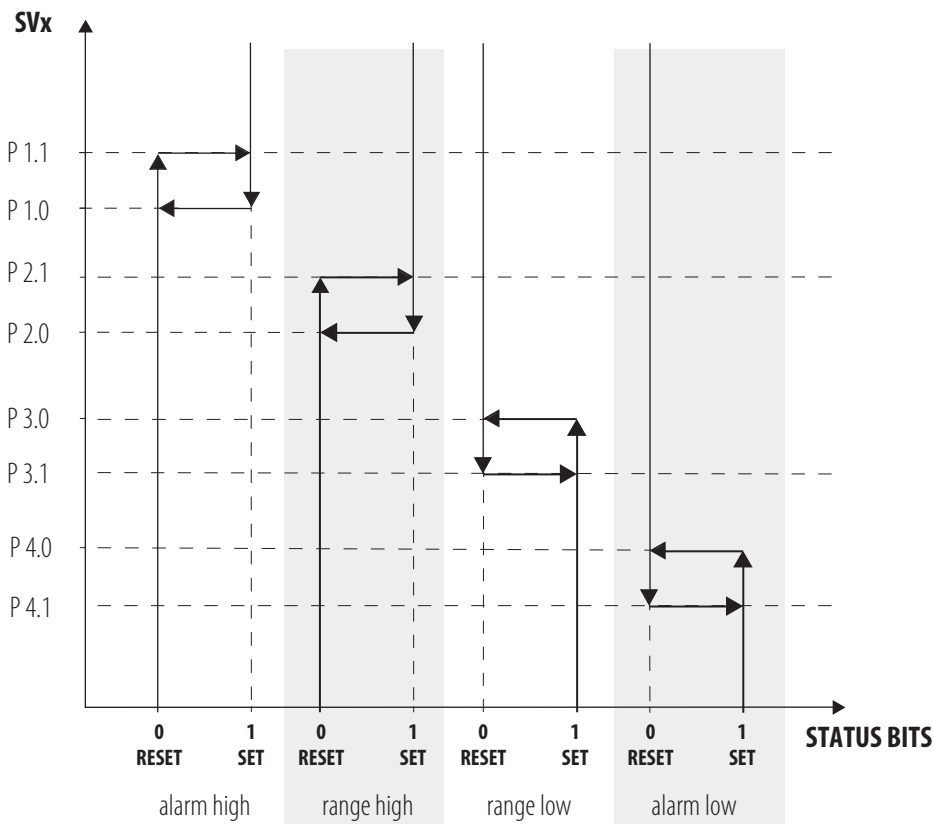
>  $\text{Brightness [lx]} = 0.01 \times (2^{E[3:0]}) \times R[11:0]$

Example for the calculation of E[3:0] and R[11:0] from the IO-Link value:



Result:  $\text{Brightness} = 0.01 \times 2^3 \times 761 = 60.88 \text{ lx}$

Relationship between the parameter points (Px,y) and the status bits (SET, RESET):



- The bit "Alarm high" is set if P1.1 is reached or exceeded ( $\geq$ ). It is reset if P1.0 is reached or undershot ( $\leq$ ).
- The bit "Range high" is set if P2.1 is reached or exceeded ( $\geq$ ). It is reset if P2.0 is reached or undershot ( $\leq$ ).
- The bit "Range low" is set if P3.1 is reached or undershot ( $\leq$ ). It is reset if P3.0 is reached or exceeded ( $\geq$ ).
- The bit "Alarm low" is set if P4.1 is reached or undershot ( $\leq$ ). It is reset if P4.0 is reached or exceeded ( $\geq$ ).

## DIAGNOSTICS DATA

### DIAGNOSTICS DATA OF THE DEVICE

Parameter name	Description	Index	Subindex	Data type	Individual values
<b>Device Status</b>	<b>Device status</b>	<b>0024</b>	<b>0x00</b>	<b>UIntegerT_8</b>	
Device is OK					0
Maintenance required					1
Out of specification					2
Functional check					3
Failure					4
<b>Detailed Device Status</b>	<b>Additional device-dependent information (errors/warnings/messages)</b>	<b>0x25</b>	<b>0x00</b>	<b>ArrayT</b>	
Detailed Device Status [1]	Output of errors/warnings/messages		0x01	OctetStringT [ 3 ]	See „Events and Messages“ on page 10
Detailed Device Status [2]	Different events can be active here at the same time. For this reason, there are 18 possible entries in <b>Detailed Device Status</b> .		0x02	OctetStringT [ 3 ]	
Detailed Device Status [3]			0x03	OctetStringT [ 3 ]	
Detailed Device Status [4]			0x04	OctetStringT [ 3 ]	
Detailed Device Status [5]			0x05	OctetStringT [ 3 ]	
Detailed Device Status [6]			0x06	OctetStringT [ 3 ]	
Detailed Device Status [7]			0x07	OctetStringT [ 3 ]	
Detailed Device Status [8]			0x08	OctetStringT [ 3 ]	
Detailed Device Status [9]			0x09	OctetStringT [ 3 ]	
Detailed Device Status [10]			0x0A	OctetStringT [ 3 ]	
Detailed Device Status [11]			0x0B	OctetStringT [ 3 ]	
Detailed Device Status [12]			0x0C	OctetStringT [ 3 ]	
Detailed Device Status [13]			0x0D	OctetStringT [ 3 ]	
Detailed Device Status [14]			0x0E	OctetStringT [ 3 ]	
Detailed Device Status [15]			0x0F	OctetStringT [ 3 ]	
Detailed Device Status [16]			0x10	OctetStringT [ 3 ]	
Detailed Device Status [17]			0x11	OctetStringT [ 3 ]	
Detailed Device Status [18]			0x12	OctetStringT [ 3 ]	
Error Count		Error counter	0x20	0x00	UIntegerT_16
Operating Hours	Operating hours counter (base unit 0.001 h)	0x4B	0x00	UIntegerT_32	
Power-On Counter	Activation counter	0x4C	0x00	UIntegerT_32	

### DIAGNOSTICS DATA OF THE INDIVIDUAL CHANNELS (CHANNEL x)

#### CHANNEL 1 DIAGNOSTICS DATA

Parameter name	Description	Index	Subindex	Index	Subindex	Data type
<b>Channel 1 Diagnosis</b>		<b>Sensor Value 1</b>		<b>Sensor Value 2</b>		<b>Sensor Value x</b>
Alarm High Count	Event counter for alarm temperature exceeded quantity	0x5D	0x00	0x6F	0x00	UIntegerT_32
Range High Count	Event counter for temperature range exceeded quantity	0x5E	0x00	0x70	0x00	UIntegerT_32
Range Low Count	Event counter for temperature range undershot quantity	0x5F	0x00	0x71	0x00	UIntegerT_32
Alarm Low Count	Event counter for alarm temperature undershot quantity	0x60	0x00	0x72	0x00	UIntegerT_32
Sensor Value x Maximum (raw)	Maximum value sensor value x across the entire activation period (raw value)	0x61	0x00	0x73	0x00	IntegerT_16
Sensor Value x Minimum (raw)	Minimum value sensor value x across the entire activation period (raw value)	0x62	0x00	0x74	0x00	IntegerT_16

#### CHANNEL 2 DIAGNOSTICS DATA

Parameter name	Description	Index	Subindex	Index	Subindex	Data type
<b>Channel2 Diagnosis</b>		<b>Sensor Value 1</b>		<b>Sensor Value 2</b>		
Alarm High Count	Event counter for alarm temperature exceeded quantity	0x85	0x00	0x97	0x00	UIntegerT_32
Range High Count	Event counter for temperature range exceeded quantity	0x86	0x00	0x98	0x00	UIntegerT_32
Range Low Count	Event counter for temperature range undershot quantity	0x87	0x00	0x99	0x00	UIntegerT_32
Alarm Low Count	Event counter for alarm temperature undershot quantity	0x88	0x00	0x9A	0x00	UIntegerT_32
Sensor Value x Maximum (raw)	Maximum value sensor value x across the entire activation period (raw value)	0x89	0x00	0x9B	0x00	IntegerT_16
Sensor Value x Minimum (raw)	Minimum value sensor value x across the entire activation period (raw value)	0x8A	0x00	0x9C	0x00	IntegerT_16

## CHANNEL 3 DIAGNOSTICS DATA

Parameter name	Description	Index	Subindex	Index	Subindex	Data type
<b>Channel 3 Diagnosis</b>		<b>Sensor Value 1</b>		<b>Sensor Value 2</b>		
Alarm High Count	Event counter for alarm temperature exceeded quantity	0xAD	0x00	0xBF	0x00	UIntegerT_32
Range High Count	Event counter for temperature range exceeded quantity	0xAE	0x00	0xC0	0x00	UIntegerT_32
Range Low Count	Event counter for temperature range undershot quantity	0xAF	0x00	0xC1	0x00	UIntegerT_32
Alarm Low Count	Event counter for alarm temperature undershot quantity	0xB0	0x00	0xC2	0x00	UIntegerT_32
Sensor Value x Maximum (raw)	Maximum value sensor value x across the entire activation period (raw value)	0xB1	0x00	0xC3	0x00	IntegerT_16
Sensor Value x Minimum (raw)	Minimum value sensor value x across the entire activation period (raw value)	0xB2	0x00	0xC4	0x00	IntegerT_16

## CHANNEL 4 DIAGNOSTICS DATA

Parameter name	Description	Index	Subindex	Index	Subindex	Data type
<b>Channel 3 Diagnosis</b>		<b>Sensor Value 1</b>		<b>Sensor Value 2</b>		
Alarm High Count	Event counter for alarm temperature exceeded quantity	0xD5	0x00	0xE7	0x00	UIntegerT_32
Range High Count	Event counter for temperature range exceeded quantity	0xD6	0x00	0xE8	0x00	UIntegerT_32
Range Low Count	Event counter for temperature range undershot quantity	0xD7	0x00	0xE9	0x00	UIntegerT_32
Alarm Low Count	Event counter for alarm temperature undershot quantity	0xD8	0x00	0xEA	0x00	UIntegerT_32
Sensor Value x Maximum (raw)	Maximum value sensor value x across the entire activation period (raw value)	0xD9	0x00	0xEB	0x00	IntegerT_16
Sensor Value x Minimum (raw)	Minimum value sensor value x across the entire activation period (raw value)	0xDA	0x00	0xEC	0x00	IntegerT_16

## DIAGNOSTICS DATA OF THE SENSOR VALUE (SENSOR VALUE x), HISTOGRAM

For every sensor value (SV<sub>x</sub>) there are 25 histogram cells [0–24] which have a particular value range based on the sensor type. How long (unit: [h]) a measurement value has moved within the respective value range (since the last reset of the diagnostics data) is displayed in the individual histogram cells (see example).

E.g. sensor type 1 (°C/%):

Sensor Value 1 histogram cell [10] – temperature range 10 to 15°C: value 0.30 h

## SENSOR TYPE 1, SENSOR TYPE 2

Parameter name	Index	Subindex	Bit offset	Data type	Sensor type 1 (°C/%)				Sensor type 2 (°F/%)			
					Sensor Value 1		Sensor Value 2		Sensor Value 1		Sensor Value 2	
Sensor Value x Histogram	0x63	0x00		RecordT	Min. [0.1°C]	Max. [0.1°C]	Min. [0.1%]	Max. [0.1%]	Min. [0.1°F]	Max. [0.1°F]	Min. [0.1%]	Max. [0.1%]
[0]		0x01	0x240	UIntegerT_24	-400	-351	0	49	-400	-311	0	49
[1]		0x02	0x228	UIntegerT_24	-350	-301	50	99	-310	-221	50	99
[2]		0x03	0x210	UIntegerT_24	-300	-251	100	149	-220	-131	100	149
[3]		0x04	0x1F8	UIntegerT_24	-250	-201	150	199	-130	-41	150	199
[4]		0x05	0x1E0	UIntegerT_24	-200	-151	200	249	-40	49	200	249
[5]		0x06	0x1C8	UIntegerT_24	-150	-101	250	299	50	139	250	299
[6]		0x07	0x1B0	UIntegerT_24	-100	-51	300	349	140	229	300	349
[7]		0x08	0x198	UIntegerT_24	-50	-1	350	399	230	319	350	399
[8]		0x09	0x180	UIntegerT_24	0	49	400	449	320	409	400	449
[9]		0x0A	0x168	UIntegerT_24	50	99	450	499	410	499	450	499
[10]		0x0B	0x150	UIntegerT_24	100	149	500	549	500	589	500	549
[11]		0x0C	0x138	UIntegerT_24	150	199	550	599	590	679	550	599
[12]		0x0D	0x120	UIntegerT_24	200	249	600	649	680	769	600	649
[13]		0x0E	0x108	UIntegerT_24	250	299	650	699	770	859	650	699
[14]		0x0F	0x0F0	UIntegerT_24	300	349	700	749	860	949	700	749
[15]		0x10	0x0D8	UIntegerT_24	350	399	750	799	950	1,039	750	799
[16]		0x11	0x0C0	UIntegerT_24	400	449	800	849	1,040	1,129	800	849
[17]		0x12	0x0A8	UIntegerT_24	450	499	850	899	1,130	1,219	850	899
[18]		0x13	0x090	UIntegerT_24	500	549	900	949	1,220	1,309	900	949
[19]		0x14	0x078	UIntegerT_24	550	599	950	1,000	1,310	1,399	950	1,000
[20]		0x15	0x060	UIntegerT_24	600	649			1,400	1,489		
[21]		0x16	0x048	UIntegerT_24	650	699			1,490	1,579		
[22]		0x17	0x030	UIntegerT_24	700	749			1,580	1,669		
[23]		0x18	0x018	UIntegerT_24	750	800			1,670	1,760		
[24]		0x19	0x000	UIntegerT_24								



## SENSOR TYPE 3, SENSOR TYPE 4

Parameter name	Index	Subindex	Bit offset	Data type	Sensor type 3 (hPa/°C)				Sensor type 4 (lux)			
					Sensor Value 1		Sensor Value 2		Sensor Value 1		Sensor Value 2	
Sensor Value x	0x63	0x00		RecordT	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Histogram					[0.1hPa]	[0.1hPa]	[0.1%]	[0.1%]	[lux]	[lux]	[lux]	[lux]
[0]		0x01	0x240	UIntegerT_24	3,000	3,399	-400	-351	0	999		
[1]		0x02	0x228	UIntegerT_24	3,400	3,799	-350	-301	1,000	1,999		
[2]		0x03	0x210	UIntegerT_24	3,800	4,199	-300	-251	2,000	2,999		
[3]		0x04	0x1F8	UIntegerT_24	4,200	4,599	-250	-201	3,000	3,999		
[4]		0x05	0x1E0	UIntegerT_24	4,600	4,999	-200	-151	4,000	4,999		
[5]		0x06	0x1C8	UIntegerT_24	5,000	5,399	-150	-101	5,000	5,999		
[6]		0x07	0x1B0	UIntegerT_24	5,400	5,799	-100	-51	6,000	6,999		
[7]		0x08	0x198	UIntegerT_24	5,800	6,199	-50	-1	7,000	7,999		
[8]		0x09	0x180	UIntegerT_24	6,200	6,599	0	49	8,000	8,999		
[9]		0x0A	0x168	UIntegerT_24	6,600	6,999	50	99	9,000	9,999		
[10]		0x0B	0x150	UIntegerT_24	7,000	7,399	100	149	10,000	10,999		
[11]		0x0C	0x138	UIntegerT_24	7,400	7,799	150	199	11,000	11,999		
[12]		0x0D	0x120	UIntegerT_24	7,800	8,199	200	249	12,000	12,999		
[13]		0x0E	0x108	UIntegerT_24	8,200	8,599	250	299	13,000	13,999		
[14]		0x0F	0x0F0	UIntegerT_24	8,600	8,999	300	349	14,000	14,999		
[15]		0x10	0x0D8	UIntegerT_24	9,000	9,399	350	399	15,000	15,999		
[16]		0x11	0x0C0	UIntegerT_24	9,400	9,799	400	449	16,000	16,999		
[17]		0x12	0x0A8	UIntegerT_24	9,800	10,199	450	499	17,000	17,999		
[18]		0x13	0x090	UIntegerT_24	10,200	10,599	500	549	18,000	18,999		
[19]		0x14	0x078	UIntegerT_24	10,600	11,000	550	599	19,000	19,999		
[20]		0x15	0x060	UIntegerT_24			600	649	20,000	20,999		
[21]		0x16	0x048	UIntegerT_24			650	699	21,000	21,999		
[22]		0x17	0x030	UIntegerT_24			700	749	22,000	22,999		
[23]		0x18	0x018	UIntegerT_24			750	800	23,000	23,999		
[24]		0x19	0x000	UIntegerT_24					24,000	25,000		

## RESETTING THE DIAGNOSTICS DATA

The diagnostics data can be deleted with different commands („Commands“ on page 11). These commands are shown in the TMG IO-Link Device Tool under the 'Diagnostics' tab. A password is required to reset the diagnostics data.

## EVENTS AND MESSAGES

There are nine events for every channel (CH1 to CH4). The messages are output via the variable **Detailed Device Status [x]** (see „Diagnostics data of the device“ on page 7).

Name	Description	Type	Event Codes							
			Channel 1		Channel 2		Channel 3		Channel 4	
			SV1	SV2	SV1	SV2	SV1	SV2	SV1	SV2
CHw Sensor Value x P1.1 Alarm high reached	If P1.1/P2.1/SET is exceeded ( $\geq$ ), an event is triggered.	Warning	6220	6235	6250	6265	6280	6295	6310	6325
CHw Sensor Value x P2.1 Range high reached	If P1.0/P2.0/RESET is undershot ( $\leq$ ), the event is deleted.	Warning	6221	6236	6251	6266	6281	6296	6311	6326
CHw Sensor Value x P3.1 Range low reached	If P3.1/P4.1/SET is undershot ( $\leq$ ) an event is triggered.	Warning	6222	6237	6252	6267	6282	6297	6312	6327
CHw Sensor Value x P4.1 Alarm low reached	If P3.0/P4.0/RESET is exceeded ( $\geq$ ), the event is deleted.	Warning	6223	6238	6253	6268	6283	6298	6313	6328
CHw Sensor Value x Histogram overflow	Maximum time in a histogram range reached	Warning	6224	6239	6254	6269	6284	6299	6314	6329
CHw Sensor Value x Sensor raw data too low	The raw data of the sensor is too small to calculate a valid measurement value from it	Error	6225	6240	6255	6270	6285	6300	6315	6330
CHw Sensor Value x Sensor raw data too high	The raw data of the sensor is too large to calculate a valid measurement value from it	Error	6226	6241	6256	6271	6286	6301	6316	6331
CHw Sensor Value x Sensor value out of range, low	The sensor value is below the measurement range	Warning	6227	6242	6257	6272	6287	6302	6317	6332
CHw Sensor Value x Sensor value out of range, high	The sensor value is above the measurement range	Warning	6228	6243	6258	6273	6288	6303	6318	6333

# COMMANDS

Commands are only writable (wo). The resetting of all values requires the password "stego".

## RESETTING ALL VALUES

Parameter name	Description	Index	Subindex	Data type	Individual values
Password	Password for resetting (factory setting "stego")	0x0FA0	0x00	StringT [16]	

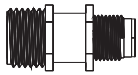


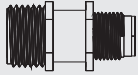
## PRODUCTION COMMANDS

Parameter name	Description	Index	Subindex	Data type	Individual values			
<b>Command</b>	<b>Production commands (password required)</b>	<b>0x0FA1</b>	<b>0x00</b>	<b>UIntegerT_8</b>				
Reset whole Diagnosis Data	Reset diagnostics data				3			
					<b>Channel 1</b>	<b>Channel 2</b>	<b>Channel 3</b>	<b>Channel 4</b>
Reset CHw all: Max/Min/Counters/Histogram	Resetting all diagnostics data for Channel 1: Minimums and maximums, all histogram data				10	20	30	40
Reset Max/Min, Sensor Value 1 and Sensor Value 2	Resetting all minimums and maximums for the sensor values 1 and 2				11	21	31	41
Reset all Counters	Resetting all alarm and range counters				12	22	32	42
Reset Sensor Value 1 Counters					13	23	33	43
Reset Sensor Value 2 Counters					14	24	34	44
Reset all Histogram	Reset all diagnostics data				15	25	35	45
Reset Sensor Value 1 histogram					16	26	36	46
Reset Sensor Value 2 histogram					17	27	37	47

## STANDARD COMMANDS

Parameter name	Description	Index	Subindex	Data type	Individual values			
<b>StandardCommand</b>	<b>Standard commands</b>	<b>0x02</b>	<b>0x00</b>	<b>UIntegerT_8</b>				
Device Reset					128			
Restore Factory Settings	Establishing factory settings; all variables/parameters are set to zero Application Specific Tag = *** Location Tag = *** Function Tag = *** The diagnostics data is retained.				130			
Standard commands Channel (CHw)	Standard commands for Channel x				<b>Channel 1</b>	<b>Channel 2</b>	<b>Channel 3</b>	<b>Channel 4</b>
Sensor Value 1 Points: Reset/Disable	Set all parameters for Sensor Value 1 to zero. They are therefore deactivated				180	190	200	210
Sensor Value 1 Points: Preset 1,	Preset 1 is loaded in Sensor Value 1 parameter				181	191	201	211
Sensor Value 1 Points: Preset 2	Preset 2 is loaded in Sensor Value 1 parameter				182	192	202	212
Sensor Value 1 Points: Preset 3	Preset 3 is loaded in Sensor Value 1 parameter				183	193	203	213
Sensor Value 1 Points: Preset 4	Preset 4 is loaded in Sensor Value 1 parameter				184	194	204	214
Sensor Value 2 Points: Reset/Disable	Set all parameters for Sensor Value 2 to zero. They are therefore deactivated				185	195	205	215
Sensor Value 2 Points: Preset 1	Preset 1 is loaded in Sensor Value 2 parameter				186	196	206	216
Sensor Value 2 Points: Preset 2	Preset 2 is loaded in Sensor Value 2 parameter				187	197	207	217
Sensor Value 2 Points: Preset 3	Preset 3 is loaded in Sensor Value 2 parameter				188	198	208	218
Sensor Value 2 Points: Preset 4	Preset 4 is loaded in Sensor Value 2 parameter				189	199	209	219

# SENSORS

Art. no.	Description	Sensor type	Illustration
07300.0-00	SEN073 (temperature / relative humidity), IP64	Type 1 / Type 2	
07300.1-00	SEN073 (temperature / relative humidity), IP20, 1 m cable	Type 1 / Type 2	
07300.1-01	SEN073 (temperature / relative humidity), IP20, 2m cable	Type 1 / Type 2	
07301.0-00	SEN073 (pressure / temperature [°C]), IP64	Type 3	
07302.0-00	SEN073 (light)	Type 4	

NOTE: In 2021 we can also offer an ambient light sensor, measuring the intensity of visible light. The spectral response of the sensor will tightly match the photopic response of the human eye. Please contact us for more information.

## DESCRIPTION OF THE SENSOR TYPES

Sensor type	Description	Parameter / technical data					
		Sensor Value	Unit	Process Data	Parameters	Range Check	Histogram
Type 1	Temperature	SV1	[°C]	-440 to 1250 [0.1°C]	-400 to 800 [0.1°C] hysteresis 3 [0.1 K]	-430 to 840 [0.1°C]	-400...880 [0,1°C] width 50 [0,1 K] slots 24 [1]
	Relative humidity	SV2	[%]	10 to 990 [0.1%]	30 to 970 [0.1%] hysteresis 3 [0.1%]	20 to 980 [0.1%]	0...1000 [0,1%] width 50 [0,1%] slots 20 [1]
Type 2	Temperature	SV1	[°F]	-472 to 2570 [0.1°F]	-400 to 1760 [0.1°F] hysteresis 4 [0.1°F]	-454 to 1832 [0.1°F]	-400...1760 [0,1°F] width 90 [0,1 K] slots 24 [1]
	Relative humidity	SV2	[%]	10 to 990 [0.1%]	30 to 970 [0.1%] hysteresis 3 [0.1%]	20 to 980 [0.1%]	0...1000 [0,1%] width 50 [0,1%] slots 20 [1]
Type 3	Pressure	SV1	[hPa]	3000 to 11000 [0.1 hPa]	3020 to 10980 [0.1 hPa] hysteresis 15 [0.1 hPa]	3010 to 10990 [0.1 hPa]	3000...11000 [0,1hPa] width 400 [0,1hPa] slots 20 [1]
	Temperature	SV2	[°C]	-450 to 850 [0.1 °C]	-400 to 800 [0.1°C] hysteresis 3 [0.1 K]	-430 to 840 [0.1°C]	-400...880 [0,1°C] width 50 [0,1 K] slots 24 [1]
Type 4	Illumination level	SV1	[lx]	0 to 32500 [lx]	0 to 32500 [lx] hysteresis 5 [lx]	0 to 32400 [lx]	0...25000 [lx] width 1000 [lx] slots 25 [1]
		SV2		0x0000 ... 0xBFFF (coded, 4+12 bit 0 to 85558.40 lx)	-	-	-