IO-Link

SMART SENSOR
CSS 014 | IO link parameters
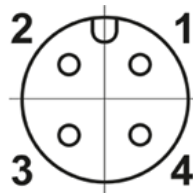
GENERAL INFORMATION

GENERAL DATA

Manufacturer name	STEGO Elektrotechnik GmbH
Manufacturer ID	0x04C6 / 1222d
Manufacturer URL	www.stego.de
Product ID	CSS 01411.2-00
Device ID	ID 0x000012 / 18d
IO link version	V 1.1
Bitrate	COM2
Minimum cycle time	10.0 ms
SIO mode	No
Data storage	Yes

PIN ASSIGNMENT

1 … +24 V DC	
2 … n/a	
3 … GND	
4 … IO link communication	

IDENTIFICATION

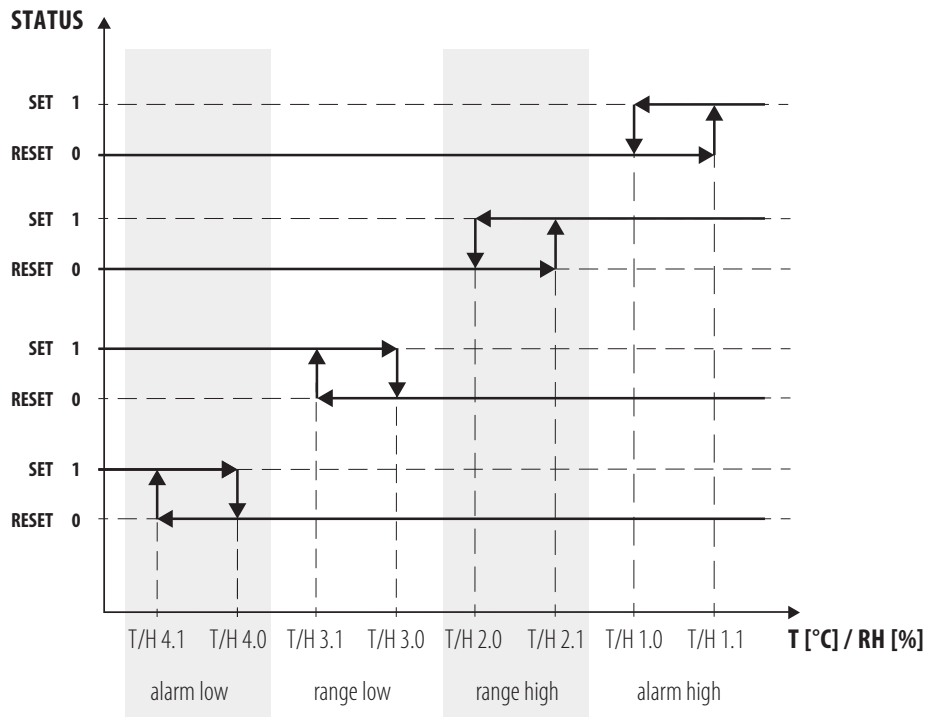| Parameter name	Description	Index	Subindex	Data type	Standard value
Vendor Name	Manufacturer name	0x10	0x00	StringT [64]	STEGO Elektrotechnik GmbH
Vendor Text	Manufacturer text	0x11	0x00	StringT [64]	www.stego.de
Product Name	Device name	0x12	0000	StringT [64]	CSS 014 IO link
Product ID	ID number of the device	0x13	0000	StringT [64]	CSS 01411.2-xx
Product Text	Device description	0x14	0000	StringT [64]	Smart Sensor for temperature and humidity
Hardware Version	Hardware version	0x16	0000	StringT [64]	
Firmware Version	Firmware version	0x17	0000	StringT [64]	

The device information is the electronic nameplate of the sensor. 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 when the IO link device is reconnected or every time the communication restarts.

PROCESS DATA

Parameter name	Description	Index	Subindex	BitOffset	Data type	Individual values	Unit
Process Data Inputs		**0x28**	**0x00**	**0x00**	**RecordT**		
Temperature	Current sensor measurement value (factor for calculating the display value: 0.1)		0x01	0x20	IntegerT_16		°C/°F
Temperature Alarm High	Temperature status, alarm T 1.x		0x02	0x18	BooleanT	false, true	
Temperature Range High	Temperature status, warning T 2.x		0x03	0x19	BooleanT	false, true	
Temperature Range Low	Temperature status, warning T 3.x		0x04	0x1A	BooleanT	false, true	
Temperature Alarm Low	Temperature status, alarm T 4.x		0x05	0x1B	BooleanT	false, true	
Humidity	Current sensor measurement value (factor for calculating the display value: 0.1)		0x0A	0x08	IntegerT_16		%
Humidity Alarm High	Humidity status, alarm H 1.x		0x0B	0x00	BooleanT	false, true	
Humidity Range High	Humidity status, warning H 2.x		0x0C	0x01	BooleanT	false, true	
Humidity Range Low	Humidity status, warning H 3.x		0x0D	0x02	BooleanT	false, true	
Humidity Alarm Low	Humidity status, alarm H 4.x		0x0E	0x03	BooleanT	false, true	

The measurement values for temperature, humidity and the current status are depicted in the process data. These values can only be read (r/o).

Alarm and warning limits graph

The bit "**Alarm high**" is set if T/H1.1 is reached / exceeded ($\geq$). It is reset if T/H1.0 is reached / undershot ($\leq$).
The bit "**Range high**" is set if T/H2.1 is reached / exceeded ($\geq$). It is reset if T/H2.0 is reached / undershot ($\leq$).
The bit "**Range low**" is set if T/H3.1 is reached / undershot ($\leq$). It is reset if T/H3.0 is reached / exceeded ($\geq$).
The bit "**Alarm low**" is set if T/H4.1 is reached / undershot ($\leq$). It is reset if T/H4.0 is reached / exceeded ($\geq$).

PARAMETERS

The parameters for the alarm and warning limits are deactivated when the device is in its delivered condition (factory setting). These parameters can be overwritten by the user. Customer-specific parameter assignment is therefore possible. The sensor outputs the data as raw data (IO link values). However, the parameters in the IO link tool are input directly as a value in °C / °F. The factor for calculating the display value for temperature and humidity is 0.1.

The parameters for temperature and humidity are checked in terms of their mutual dependency. This happens if at least one parameter of a pair (e.g. T 1.x) is not equal to zero. If both the values SET and RESET of a parameter are "0", then the function is deactivated.

The following conditions must be met when entering the temperature and humidity parameters:

> **SET high > RESET high**
> **RESET low > SET low**

> **Alarm high > Range high**
> **Alarm low < Range low**

PARAMETERS (GENERAL)

Parameter name	Description	Index	Subindex	BitOffset	Data type	Value	Factory setting
Unit for Temperature (0==°C / 1==°F)	Selection °C / °F	0x42	0x00			(0), (1)	0
(Write) access lock parameter			0x01	0x00	BooleanT	false, true	
Data Storage Lock	Blocking the IO link device from parameter writing, data storage, local parameter assignment		0x02	0x01	BooleanT	false, true	

TEMPERATURE PARAMETERS

Parameter name	Description	Index	Subindex	Value	Value range	Unit	Preset 1 [0.1°C]	Factory setting
T 1.1 Alarm High SET	**Alarm / Range HIGH**	0x64	0x00	Configur-able	-40°C to +80°C / -40°F to +176°F	°C / °F	550	0
T 1.0 Alarm High RESET	If SET is exceeded (≥), an event is triggered and a status bit is set in the process data.	0x65	0x00			°C / °F	500	0
T 2.1 Range High SET	If RESET is undershot (≤), the event is deleted and the status bit is reset.	0x66	0x00			°C / °F	450	0
T 2.0 Range High RESET		0x67	0x00			°C / °F	400	0
T 3.0 Range Low RESET	**Alarm / Range Low:**	0x68	0x00			°C / °F	80	0
T 3.1 Range Low SET	If RESET is exceeded (≥), the event is deleted and the status bit is reset.	0x69	0x00			°C / °F	60	0
T 4.0 Alarm Low RESET	If SET is undershot (≤), an event is triggered and a status bit is set in the process data.	0x6A	0x00			°C / °F	40	0
T 4.1 Alarm Low SET		0x6B	0x00			°C / °F	20	0

Calculation of the display value for the temperature

> **Temperature (T) = IO link value x 0.1 [°C, F°]**

HUMIDITY PARAMETERS

Parameter name	Description	Index	Subindex	Value	Value range	Unit	Preset 1 [0.1%]	Factory setting
H 1.1 Alarm High SET	**Alarm / Range HIGH**	0x6E	0x00	Configur-able	3.0 to 97.0	%	750	0
H 1.0 Alarm High RESET	If SET is exceeded (≥), an event is triggered and a status bit is set in the process data.	0x6F	0x00			%	700	0
H 2.1 Range High SET	If RESET is undershot (≤), the event is deleted and the status bit is reset.	0x70	0x00			%	650	0
H 2.0 Range High RESET		0x71	0x00			%	600	0
H 3.0 Range Low RESET	**Alarm / Range Low:**	0x72	0x00			%	400	0
H 3.1 Range Low SET	If RESET is exceeded (≥), the event is deleted and the status bit is reset.	0x73	0x00			%	350	0
H 4.0 Alarm Low RESET	If SET is undershot (≤), an event is triggered and a status bit is set in the process data.	0x74	0x00			%	200	0
H 4.1 Alarm Low SET		0x75	0x00			%	150	0

Calculation of the display value for the humidity

> **Humidity (RH) = IO link value x 0.1 [%]**

DIAGNOSTICS DATA

Parameter name	Description	Index	Subindex	BitOffset	Data type	Individual values
Device Status	**Device status**	**0024**	**0x00**		**UIntegerT_8**	
Device is OK						0
Maintenance required						1
Out of specification						2
Functional check						3
Failure						4
Detailed Device Status	**Additional device-dependent information (errors/warnings/messages)**	**0x25**	**0x00**		**ArrayT**	
Detailed Device Status [1]	Output of errors/warnings/messages		0x01	0x78	OctetStringT [3]	See „Events und
Detailed Device Status [2]			0x02	0x60	OctetStringT [3]	Meldungen" auf
Detailed Device Status [3]			0x03	0x48	OctetStringT [3]	Seite 8
Detailed Device Status [4]			0x04	0x30	OctetStringT [3]	
Detailed Device Status [5]			0x05	0x18	OctetStringT [3]	
Detailed Device Status [6]			0x06	0x00	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	

The diagnostics data continuously supplies information regarding the condition of the sensor and the monitored environment. In this process, events triggered by the IO link device interrupt the transmission of parameter data (prio diagnostics data).

TEMPERATURE DIAGNOSTICS DATA

Parameter name	Description	Index	Subindex	BitOffset	Data type	Factor for display value	Unit
Temperature Maximum	Maximum temperature across the entire activation period	0x5A	0x00		IntegerT_16	0.1	°C / °F
Temperature Minimum	Minimum temperature across the entire activation period	0x5B	0x00		IntegerT_16	0.1	°C / °F
Alarm High Count	Event counter for temperature exceeded alarm quantity	0x50	0x00		UIntegerT_32	1	
Range High Count	Event counter for temperature range exceeded quantity	0x51	0x00		UIntegerT_32	1	
Range Low Count	Event counter for temperature range undershot quantity	0x52	0x00		UIntegerT_32	1	
Alarm Low Count	Event counter for temperature undershot alarm quantity	0x53	0x00		UIntegerT_32	1	
Temperature Histogram		**0x79**	**0x00**	**0x000**	**RecordT**	**0.01**	**h**
-40.0 to -35.1°C / -40.0 to -31.1°F	Duration of incidences in the temperature range -40°C to 80°C in 24x 5K temperature range steps		0x01	0x228	UIntegerT_24	0.01	h
-35.0 to -30.1°C / -31.0 to -22.1°F			0x02	0x210	UIntegerT_24	0.01	h
-30.0 to -25.1°C / -22.0 to -13.1°F			0x03	0x1F8	UIntegerT_24	0.01	h
-25.0 to -20.1°C / -13.0 to -4.1°F			0x04	0x1E0	UIntegerT_24	0.01	h
-20.0 to -15.1°C / -4.0 to 4.9°F			0x05	0x1C8	UIntegerT_24	0.01	h
-15.0 to -10.1°C / 5.0 to 13.9°F			0x06	0x1B0	UIntegerT_24	0.01	h
-10.0 to -5.1°C / 14.0 to 22.9°F			0x07	0x198	UIntegerT_24	0.01	h
-5.0 to -0.1°C / 23.0 to 31.9°F			0x08	0x180	UIntegerT_24	0.01	h
0.0 to 4.9°C / 32.0 to 40.9°F			0x09	0x168	UIntegerT_24	0.01	h
5.0 to 9.9°C / 41.0 to 49.9°F			0x0A	0x150	UIntegerT_24	0.01	h
10.0 to 14.9°C / 50.0 to 58.9°F			0x0B	0x138	UIntegerT_24	0.01	h
15.0 to 19.9°C / 59.0 to 67.9°F			0x0C	0x120	UIntegerT_24	0.01	h
20.0 to 24.9°C / 68.0 to 76.9°F			0x0D	0x108	UIntegerT_24	0.01	h
25.0 to 29.9°C / 77.0 to 85.9°F			0x0E	0x0F0	UIntegerT_24	0.01	h
30.0 to 34.9°C / 86.0 to 94.9°F			0x0F	0x0D8	UIntegerT_24	0.01	h
35.0 to 39.9°C / 95.0 to 103.9°F			0x10	0x0C0	UIntegerT_24	0.01	h
40.0 to 44.9°C / 104.0 to 112.9°F			0x11	0x0A8	UIntegerT_24	0.01	h
45.0 to 49.9°C / 113.0 to 121.9°F			0x12	0x090	UIntegerT_24	0.01	h
50.0 to 54.9°C / 122.0 to 130.9°F			0x13	0x078	UIntegerT_24	0.01	h
55.0 to 59.9°C / 131.0 to 139.9°F			0x14	0x060	UIntegerT_24	0.01	h
60.0 to 64.9°C / 140.0 to 148.9°F			0x15	0x048	UIntegerT_24	0.01	h
65.0 to 69.9°C / 149.0 to 157.9°F			0x16	0x030	UIntegerT_24	0.01	h
70.0 to 74.9°C / 158.0 to 166.9°F			0x17	0x018	UIntegerT_24	0.01	h
75.0 to 80.0°C / 167.0 to 176.0°F			0x18	0x000	UIntegerT_24	0.01	h

HUMIDITY DIAGNOSTICS DATA

Parameter name	Description	Index	Subindex	BitOffset	Data type	Factor for display value	Unit
Humidity Maximum	Maximum humidity across the entire activation period	0x5C	0x00		UIntegerT_16	0.1	%
Humidity Minimum	Minimum humidity across the entire activation period	0x5D	0x00		UIntegerT_16	0.1	%
Alarm High Count	Event counter for humidity exceeded alarm quantity	0x55	0x00		UIntegerT_32	1	
Range High Count	Event counter for humidity range exceeded quantity	0x56	0x00		UIntegerT_32	1	
Range Low Count	Event counter for humidity range undershot quantity	0x57	0x00		UIntegerT_32	1	
Alarm Low Count	Event counter for humidity undershot alarm quantity	0x58	0x00		UIntegerT_32	1	
Humidity Histogram		**0x78**	**0x00**		**RecordT**	0.01	**h**
0.0 to 4.9%	Duration of incidences in the humidity range 0% to 100% in 20x 5% humidity range steps		0x01	0x1C8	UIntegerT_24	0.01	h
5.0 to 9.9%			0x02	0x1B0	UIntegerT_24	0.01	h
10.0 to 14.9%			0x03	0x198	UIntegerT_24	0.01	h
15.0 to 19.9%			0x04	0x180	UIntegerT_24	0.01	h
20.0 to 24.9%			0x05	0x168	UIntegerT_24	0.01	h
25.0 to 29.9%			0x06	0x150	UIntegerT_24	0.01	h
30.0 to 34.9%			0x07	0x138	UIntegerT_24	0.01	h
35.0 to 39.9%			0x08	0x120	UIntegerT_24	0.01	h
40.0 to 44.9%			0x09	0x108	UIntegerT_24	0.01	h
45.0 to 49.9%			0x0A	0x0F0	UIntegerT_24	0.01	h
50.0 to 54.9%			0x0B	0x0D8	UIntegerT_24	0.01	h
55.0 to 59.9%			0x0C	0x0C0	UIntegerT_24	0.01	h
60.0 to 64.9%			0x0D	0x0A8	UIntegerT_24	0.01	h
65.0 to 69.9%			0x0E	0x090	UIntegerT_24	0.01	h
70.0 to 74.9%			0x0F	0x078	UIntegerT_24	0.01	h
75.0 to 79.9%			0x10	0x060	UIntegerT_24	0.01	h
80.0 to 84.9%			0x11	0x048	UIntegerT_24	0.01	h
85.0 to 89.9%			0x12	0x030	UIntegerT_24	0.01	h
90.0 to 94.9%			0x13	0x018	UIntegerT_24	0.01	h
95.0 to 100.0%			0x14	0x000	UIntegerT_24	0.01	h

EVENTS AND MESSAGES

The messages are output via the variable **Detailed Device Status [x]** (see „Diagnosedaten" auf Seite 6).

Name	Description	Value range	Type	Event code
T 1.x Temperature Alarm High reached	If SET is exceeded (≥), an event is triggered and a status bit is set in the process data If RESET is undershot (≤), the event is deleted and the status bit is reset	false/true	Warning	6202
T 2.x Temperature Range High reached		false/true	Warning	6203
T 3.x Temperature Range Low reached	If RESET is exceeded (≥), the event is deleted and the status bit is reset If SET is undershot (≤), an event is triggered and a status bit is set in the process data	false/true	Warning	6204
T 4.x Temperature Alarm Low reached		false/true	Warning	6205
Temperature too low	The measured temperature is below the "usage limit"	false/true	Warning	6207
Temperature too high	The measured temperature is above the "usage limit"	false/true	Warning	6208
H 1.x Humidity Alarm High reached	If SET is exceeded (≥), an event is triggered and a status bit is set in the process data If RESET is undershot (≤), the event is deleted and the status bit is reset	false/true	Warning	6210
H 2.x Humidity Range High reached		false/true	Warning	6211
H 3.x Humidity Range Low reached	If RESET is exceeded (≥), the event is deleted and the status bit is reset If SET is undershot (≤), an event is triggered and a status bit is set in the process data	false/true	Warning	6212
H 4.x Humidity Alarm Low reached		false/true	Warning	6213
Sensor Humidity raw data too low	Raw data under the value for the calculation of 0.0%	false/true	Error	6214
Sensor Humidity raw data too high	Raw data above the value for the calculation of 100.0%	false/true	Error	6215
Histogram data max time reached	Maximum time in a histogram range reached	false/true	Message	6220

COMMANDS

Commands are only writeable (w/o). The resetting of all values requires the password "stego".

Parameter name	Description	Index	Subindex	Data type	Individual values
Password	Password for resetting (factory setting "stego")	0x0FA0	0x00	StrintT [16]	
Command	**Production commands (password required)**	**0x0FA1**	**0x00**	**UIntegerT_8**	
Store Production Settings	Saving production settings				1
Reset Production Settings	Resetting production settings				2
Reset all, including Histogram data	Resetting all diagnostics data: operating hours, power-on counter, all event counters, all maximums and minimums, all histogram data				3
Reset all Alarm/Range Counters	Resetting all alarm and range counters (temperature and humidity)				4
Reset Temperature Alarm/Range Counters	Resetting all event counters (alarm and range counters) only for the temperature				5
Reset Humidity Alarm/Range Counters	Resetting all event counters (alarm and range counters) only for the humidity				6
StandardCommand	**Standard commands**	**0x02**	**0x00**	**UIntegerT_8**	
Restore Factory Settings	Establishing factory settings; all variables/parameters are set to zero Application Specific Tag = *** Location Tag = *** Function Tag = ***				130
Temperature Points: Reset/Disable (Preset 0)	Setting all temperature parameters to zero. They are therefore deactivated				160
Temperature Points: Preset 1	Preset 1 is loaded to the temperature parameters				161
Humidity Points: Reset/Disable	Setting all humidity parameters to zero. They are therefore deactivated				170
Humidity Points: Preset 1	Preset 1 is loaded to the humidity parameters				171