12 S2 Brightness and Temperature 221C01

Application program usage

Product family:	Physical sensors
Product type:	Brightness and Temperature
Manufacturer:	Siemens
Name:	Dual Sensor for Brightness and Temperature AP 254
Order-No.:	5WG1 254-3EY01

Functional description

The Dual Sensor AP 254 provides ambient light level and outdoor temperature values. These values can be sent onto the bus.

Further the device controls load switches, dimmers and blinds / shutters based on threshold settings for ambient light level and outdoor temperature:

- Threshold setting for light level controls
- Threshold setting for temperature controls
- Threshold setting for shading controls (combination of light –level and temperature)

Additionally one or more thresholds can be temporarily deactivated via an interlocking object (1 Bit).

Communication objects

Phys.Addr.	Program		Order number
no.	Object name	Function	Type
01.01.001	12 S2 Brightness and Temperature 221C01	5WG1 254-3EY01	
0	Brightness value	Lux-Value (EIS 5)	2 Byte
1	Temperature	°C-Value (EIS 5)	2 Byte
3	Brightness threshold 1	On / Off	1 Bit
4	Brightness threshold 2	On / Off	1 Bit
5	Brightness threshold 3	On / Off	1 Bit
6	Temperature threshold 1	On / Off	1 Bit
7	Temperature threshold 2	On / Off	1 Bit
8	Logic function 1	On / Off	1 Bit
9	Logic function 2	On / Off	1 Bit
10	Blocking	0=normal / 1=blocked	1 Bit

Note

Your screen presentation may vary from these typical snap shots.

Obj	Object name	Function	Type	Flag
0	Brightness value	Lux-value (EIS 5)	2 Byte	KÜ
Depending on the parameters set, it sends the current value of brightness cyclically and/or upon a change of brightness.				
1	Temperature	°C-value (EIS 5)	2 Byte	KÜ
Depending on the parameters set, it sends the current temperature value cyclically and/or upon a change of temperature.				
3	Brightness threshold 1	On/Off	1 Bit	KÜ
		8-bit Value (EIS 6)	1 Byte	KÜ
4	Brightness threshold 2	On/Off	1 Bit	KÜ
5	Brightness threshold 3	On/Off	1 Bit	KÜ
The parameterized telegram is sent if the value exceeds or falls below the set threshold value. Important: Threshold 1 (Object 3) can also be parameterized as an **automatic brightness control**: Dimming telegrams are sent until the brightness measured has reached the setpoint value. Constant light level control is performed within the parameterized hysteresis.				
6	Temperature threshold 1	On/Off	1 Bit	KÜ
7	Temperature threshold 2	On/Off	1 Bit	KÜ
The parameterized telegram is sent if the value exceeds or falls below the set threshold value.				
8	Logic function 1	On/Off	1 Bit	KÜ
9	Logic function 2	On/Off	1 Bit	KÜ
The parameterized telegram is sent if the value exceeds or falls below the set threshold value.				
10	Blocking	0=normal / 1=blocked	1 Bit	KLSÜ
Via this 1-bit object sending of each single object can be blocked (Blocking=1) or released (Blocking=0). The parameters are set on the parameter tabs for the object to be blocked.				

Note

When the Blocking object is set to normal then each object that was blocked immediately sends its current value. In case of bus voltage failure the Blocking object is set to the value of 0.

Note

The value of a communication object is only initialized or updated when sending based on an event. A visualization should not read the value of these objects.

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Maximum number of group addresses: 15
Maximum number of assignments: 15

Parameter

General

Parameter	Settings
Number of brightness thresholds	**1 brightness threshold** 2 brightness thresholds 3 brightness thresholds
Setting defining how many thresholds shall be used.	
Function of brightness threshold 1	**Brightness threshold** automatic brightness control
Setting defining whether brightness threshold 1 shall be used as a threshold switch or as an automatic brightness control. IMPORTANT: If threshold 1 is used as an automatic brightness control it can no longer be included in a logic function!	
Number of temperature thresholds	**No temperature thresholds** 1 temperature threshold 2 temperature thresholds
Setting defining if and how many temperature thresholds shall be used.	
Number of logic function objects	**No logic operation** 1 logic function object 2 logic function objects
Setting defining if and how many logic function objects shall be used.	

Brightness value

Parameter	Settings
Minimal change of brightness to transmit a new value	No sending on change 5% min. 1 lux 10% min. 1 lux **20% min. 1 lux** 30% min. 1 lux
Setting defining by what percentage the measured new brightness value must deviate from the brightness value sent last to be sent again.	

Parameter	Settings
Interval for cyclical sending	No cyclical sending 1 minute 3 minutes 5 minutes **10 minutes** 20 minutes 30 minutes 45 minutes 60 minutes
Setting of the interval at which the brightness value is sent repeatedly to the bus.	

Note

If both „no sending on change" and „no cyclical sending" are selected then sending is not performed.

Temperature value

Note

If both „no sending on change" and „no cyclical sending" are selected then sending is not performed.

Parameter	Settings
Minimal change of temperature to transmit a new value	No sending on change on change 1K **on change of 2K** on change of 3K
Setting defining by what value the measured new temperature value must deviate from the temperature value sent last to be sent again.	
Interval for cyclical sending	No cyclical sending 1 minute 3 minutes 5 minutes 10 minutes **20 minutes** 30 minutes 45 minutes 60 minutes
Setting of the cycle interval at which the telegram is repeatedly sent via the bus.	

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Parameter	Settings
Temperature offset in 0,1K (-128 ... 127)	**0**
Enables a correction of the temperature measured if this temperature deviates from the true temperature due to the position of the device. The correction is performed in steps of 0.1 degrees i.e. from -12,8 to +12,7K. Example: The value 5 corresponds to a correction of 0.5 degrees. The value 10 equals 1 degree. In the latter case the device will send the following value when it measures a temperature of 20°C: 20 + 1 = 21°C.	

Automatic brightness control

Parameter	Settings
Set point for brightness control in 10 Lux	20 . **100** . 250
Setting of the set point for automatic brightness control. Permissible set point values are 200 to 2500 Lux, where the set point is entered as 20...250 * 10 Lux.	
Hysteresis	**10% min. 1 lux** 20% min. 1 lux 30% min. 1 lux 50% min. 1 lux
The hysteresis suppresses sending if the measured brightness value is in the range [set point ; set point plus hysteresis]. The hysteresis is defined as the maximum of x% (x=10, 20, 30 or 50) of the set point or 1 Lux.	
Limit number of telegrams for automatic control	Max. 2 telegrams per second **Max. 1 telegram per second** max. 1 telegram in 2 seconds
This parameter limits the number of control telegrams to reduce the bus load.	

Parameter	Settings
Control speed	Slow **Medium** Fast
This parameter determines how fast the automatic brightness control reaches the set point. Note: The setting „fast" can lead to over-shooting of the control loop set point.	
Interval for cyclical sending	1 minute 3 minutes 5 minutes **10 minutes** 20 minutes 30 minutes 45 minutes 60 minutes
Setting of the cycle interval at which the telegram is repeatedly sent via the bus.	
Behaviour if blocking object is ON	**Blocking disable** blocking enable
If the Blocking object is set to 1 = blocking and this parameter is set to blocking enable then sending for this object is inhibited.	

Brightness threshold 1 (2,3)

Function and parameters for Brightness thresholds 1, 2 and 3 are identical and described once only.

Parameter	Settings
Threshold	2 . **500 lux** . 100000 lux
Setting at which brightness level the switching threshold has been reached.	

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Parameter	Settings
Hysteresis	**10% min. 1 lux**
	20% min. 1 lux
	30% min. 1 lux
	50% min. 1 lux
The hysteresis suppresses sending if the measured brightness level is in the range [set point minus hysteresis; set point]. A threshold overflow is detected when the measured brightness value rises above the threshold. A threshold underflow is detected when the measured brightness value falls under [threshold minus hysteresis]. The hysteresis is the maximum of x% (x=10, 20, 30 or 50) of the threshold or 1 Lux.	
Delay above threshold	Undelayed
	2 seconds
	... (5, 10, 15, 20 seconds)
	30 seconds
	... (45, 60, 90 seconds)
	... (2, 3, 5, 10, 15 minutes)
	30 minutes
Delay between detection of a threshold overflow and the reaction to it (sending a telegram). It prevents false switching because of luminous reflectance or transient shading. Recommendation: Lighting control 2...60s Shading device 5... 30min	
Delay below threshold	Undelayed
	2 seconds
	... (5, 10, 15, 20, 30 seconds)
	45 seconds
	60 seconds
	90 **seconds**
	... (2, 3, 5, 10, 15 minutes)
	30 minutes
Delay between detection of a threshold underflow and the reaction to it (sending a telegram). It prevents false switching because of luminous reflectance or transient shading. Recommendation: Lighting control 2...60s Shading device 5... 30min **Note:** To avoid false switching the device is designed with a delay in case of a threshold underflow. The base delay is always present and cannot be changed by this parameter.	

Brightness object 1 (2,3)

Function and parameters for Brightness objects 1, 2 and 3 are identical and described once only.

Parameter	Settings
Function of threshold object	**Switch**
	Send value
The type of telegram that shall be sent. Switch on/ switch off telegram or value (0 ... 255).	
Behaviour above threshold	Do not send any telegrams
	send telegram only once
	send telegram cyclically
	send no value
	send value only once
	cyclical sending
Setting defining if and how often a telegram shall be sent in case of threshold overflow.	
Telegram	**Switch off**
	switch on
Value	**0**
	[0 ... 255]
Setting defining what shall be sent in case of threshold overflow.	
Behaviour below threshold	Do not send any telegrams
	send telegrams only once
	cyclical sending
	send no value
	send value only once
	send value cyclically
Setting defining if and how often a telegram shall be sent in case of threshold underflow.	
Telegram	Switch off
	switch on
Value	**0**
	[0 ... 255]
Setting defining what shall be sent in case of threshold underflow.	

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Parameter	Settings
Interval for cyclical sending	1 minute 3 minutes 5 minutes **10 minutes** 20 minutes 30 minutes 45 minutes 60 minutes
Setting of the cycle interval at which the telegram is repeatedly sent via the bus.	
Behaviour if blocking object is ON	**Blocking disable** blocking enable
If the Blocking object is set to 1 = blocking and this parameter is set to blocking enable then sending for this object is inhibited.	

Temperature threshold 1 (2)

Function and parameters for Temperature threshold 1, 2 and 3 are identical and described once only.

Parameter	Settings
Threshold value in °C [-15 ..50]	**5**
Setting of the temperature threshold.	
Hysteresis	**1 K** 2 K 3K 4K
The hysteresis suppresses sending if the measured temperature is in the range [set point minus hysteresis; set point]. A threshold overflow is detected when the measured temperature rises above the threshold. A threshold underflow is detected when the measured temperature falls under [threshold minus hysteresis]. The hysteresis is the maximum of x% (x=10, 20, 30 or 50) of the threshold or 1 Lux.	
Function of threshold object	**Switch** send value

Parameter	Settings
The type of telegram to be sent: Switch on/switch off telegram or value (0 ... 255)	
Behaviour above threshold	Do not send any telegrams send telegram only once **send telegram cyclically**
	send no value send value only once **cyclical sending**
Setting defining if and how often a telegram shall be sent in case of threshold overflow.	
Telegram	**Switch off** switch on
Value	**0** [0 ... 255]
Setting defining what shall be sent in case of threshold overflow.	
Behaviour below threshold	Do not send any telegrams send telegram only once **send telegram cyclically**
	send no value send value only once **cyclical sending**
Setting defining if and how often a telegram shall be sent in case of threshold underflow.	
Telegram	Switch off **switch on**
Value	**0** [0 ... 255]
Setting defining what shall be sent in case of threshold underflow.	
Interval for cyclical sending	1 minute 3 minutes 5 minutes **10 minutes** 20 minutes 30 minutes 45 minutes 60 minutes
Setting of the cycle interval at which the telegram is repeatedly sent via the bus.	
Behaviour if blocking object is ON	**Blocking disable** blocking enable
If the Blocking object is set to 1 = blocking and this parameter is set to blocking enable then sending for this object is inhibited.	

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Logic function 1 (2)

Temperature threshold 1	Temperature threshold 2	**Logic function 1**	Logic function object 1
If brightness is		not evaluated	▾
and if temperature is		higher than temperature threshold 1	▾

Function and parameters for Logic functions 1 and 2 are identical and described once only.

Parameter	Settings
If brightness is	**not evaluated**
	higher than brightness threshold 1
	higher than brightness threshold 2
	higher than brightness threshold 3
	lower than brightness threshold 1
	lower than brightness threshold 2
	lower than brightness threshold 3
First part of logic function:	
What shall the brightness value be to fulfil the logic function condition?	
Important note:	
If the Brightness threshold 1 is used for automatic brightness control then it shall not be used in the logic functions!	
and if temperature is	not evaluated
	higher than temperature threshold 1
	higher than temperature threshold 2
	higher than temperature threshold 3
	lower than temperature threshold 1
	lower than temperature threshold 2
	lower than temperature threshold 3
second part of logic function:	
What shall the temperature value be to fulfil the logic function condition together with the brightness value?	

Logic object 1 (2)

Temperaturschwelle 1	Temperaturschwelle 2	Verknüpfung 1	**Verknüpfungsobjekt 1**
Funktion des Verknüpfungsobjekts 1		Schalten	▾
Sendeverhalten wenn Verknüpfungs-bedingung erfüllt ist		Telegramm zyklisch senden	▾
Telegramm		ausschalten	▾
Sendeverhalten wenn Verknüpfungs-bedingung nicht erfüllt ist		Telegramm zyklisch senden	▾
Telegramm		einschalten	▾
Zeitdauer für zyklisches Senden		10 Minuten	▾
Verhalten wenn Sperrobjekt Ein ist		Sperren ignorieren	▾

Function and parameters for Logic function objects 1 and 2 are identical and described once only.

Parameter	Settings
Function of the logic object 1	**Switch**
	send value
Type of the telegram which is to be sent; switching On/Off telegram or value (0 ... 255)	
Behaviour if logic operation is true	Do not send any telegrams
	send telegram only once
	send telegram cyclically
	send no value
	send value only once
	cyclical sending
Setting defining if and how often a telegram shall be sent in case the logic operation is true.	
Telegram	Switch off
	switch on
Value	**0**
	[0 ... 255]
Setting defining what shall be sent in case the logic function result is true.	
Behaviour if logic operation is false	Do not send any telegrams
	send telegram only once
	send telegram cyclically
	send no value
	send value only once
	cyclical sending
Setting defining if and how often a telegram shall be sent in case the logic operation is false.	
Telegram	Switch off
	switch on
Value	**0**
	[0 ... 255]
Setting defining what shall be sent in case the logic function result is false.	
Interval for cyclical sending	1 minute
	3 minutes
	5 minutes
	10 minutes
	20 minutes
	30 minutes
	45 minutes
	60 minutes
Setting of the cycle interval at which the telegram is repeatedly sent via the bus.	
Behaviour if blocking object is ON	**Blocking disable**
	blocking enable
If the Blocking object is set to 1 = blocking and this parameter is set to blocking enable then sending for this object is inhibited.	

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