Technical Manual

MDT
TECHNOLOGIES

Twilight Sensor / Temperature Sensor KNX

SCN-DTSEN1.01

Further Documents:

Data sheet:

https://www.mdt.de/EN_Downloads_Datasheets.html

Assembly and Operation Instructions:

https://www.mdt.de/EN_Downloads_Instructions.html

Solution Proposals for MDT products:

https://www.mdt.de/EN_Downloads_Solutions.html

KNX

Content

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2 Overview

2.1 Overview devices

The description refers to the following devices (order number in bold):

- **SCN-DTSEN1.01** Twilight sensor/Temperature sensor KNX
    - Light sensor for detection of twilight and brightness
    - Temperature sensor to measure the outside temperature

2.2 Functions

Light sensor

In addition to the current value in lux, the light sensor provides two separately adjustable threshold values (1-bit switch or 1-byte scene). The threshold values can be locked by object. Due to the wide measuring range of up to 100000 lux, the sensor, in combination with an MDT Shutter Actuator, is also suitable for targeted shading of individual windows or facades.

Twilight sensor

The twilight sensor makes the "Day/Night" object available to the KNX bus via adjustable lux values, the polarity ("1/0" or "0/1") is adjustable. This means, for example, that the MDT Glass Push Button II Smart automatically switches to Night mode when it gets dark. Blinds or shutters can be raised or lowered via the 1-bit switch object with an adjustable delay in the morning and/or evening with the twilight.

Temperature sensor

The measured outdoor temperature can, as a 2-byte value or via one of the two adjustable threshold values, for example, block or release the shading of the MDT Shutter Actuators. The temperature can be displayed in a visualisation or e.g. on the Glass Push Button II Smart.

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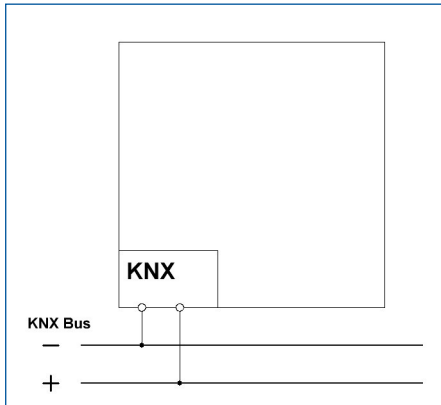State 03/2023

2.3 Exemplary Circuit Diagram

Figure 1: Exemplary circuit diagram

2.4 Structure & Handling

The following picture shows the structure of the device (circuit board visible after opening the cover):
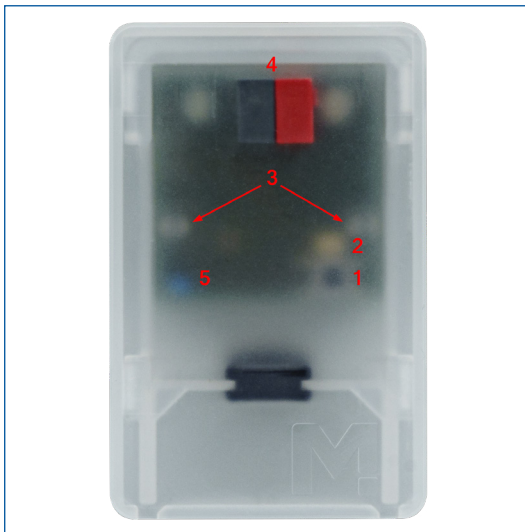

Figure 2: Structure & Handling

1 = Programming button
2 = Programming LED
3 = Brightness sensorsets
4 = Bus connection terminal
5 = Temperature sensor

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2.5 Commissioning

After wiring the unit, the physical address is assigned, and the application is programmed

1. Connect the programming interface with the bus, e.g. with MDT USB Interface.

2. Switch-on bus voltage.

3. Press the programming button (red programming LED lights up).

4. Loading the physical address from the ETS software via the interface (red LED goes out as soon as this has been successfully completed).

5. Loading the application, with desired settings.

6. If the device is enabled, you can test the requested functions (also possible by using the ETS-Software).

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3 Communication objects

3.1 Standard settings of the communication objects

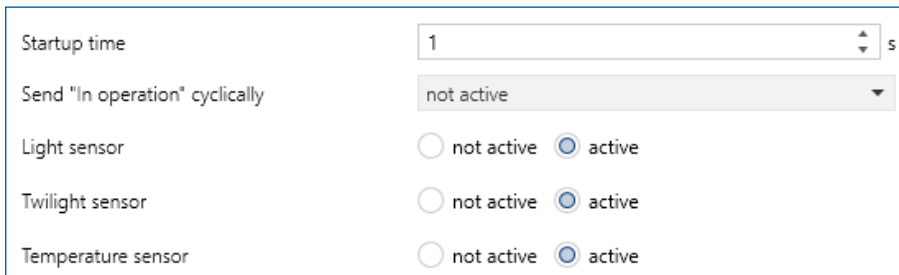| Standard settings								
No.	Name	Object functions	Length	C	R	W	T	U
0	In operation	Status	1 Bit	■	■		■	
1	Brightness	Send measured value	2 Byte	■	■		■	
2	Brightness	Threshold value 1	1 Bit 1 Byte	■	■		■	
3	Brightness	Threshold value 2	1 Bit 1 Byte	■	■		■	
4	Brightness	Lock object: Threshold values	1 Bit	■		■	■	
5	Twilight	Send measured value	2 Byte	■	■		■	
6	Twilight	Switchover Day/Night	1 Bit	■	■		■	
7	Twilight	Blinds Up/Down	1 Bit	■	■		■	
8	Twilight	Lock object: Blinds Up/Down	1 Bit	■		■	■	
9	Temperature	Send measured value	2 Byte	■	■		■	
10	Temperature	Threshold value 1	1 Bit 1 Byte	■	■		■	
11	Temperature	Threshold value 2	1 Bit 1 Byte	■	■		■	

Table 1: Communication objects - Standard settings

The table above shows the preset default settings. The priority of the individual communications objects and the flags can be adjusted by the user as required. The flags assign the communication objects their respective tasks in programming, where "C" stands for communication, "R" for read, "W" for write, "T" for transmit and "U" for update.

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4 ETS-Parameter

4.1 General Settings

The following figure shows the general settings:

Startup time	1	s
Send "In operation" cyclically	not active	
Light sensor	○ not active ◉ active	
Twilight sensor	○ not active ◉ active	
Temperature sensor	○ not active ◉ active	

Figure 3: General settings

The following table shows the possible settings:

ETS Text	Dynamic range [Default]	Comment
Startup time	0 ... 240 s **[1 s]**	Sets the time between restart and functional start-up of the device.
Send „In operation" cyclically	**not active** 10 min – 24 h	Activation of a cyclic "in operation" telegram.
Light sensor	■ not active ■ **active**	Activation/deactivation of the menu for the light sensor.
Twilight sensor	■ not active ■ **active**	Activation/deactivation of the menu for the twilight sensor.
Temperature sensor	■ not active ■ **active**	Activation/deactivation of the menu for the temperature sensor.

Table 2: General settings

Startup time
This time defines when the unit "boots up" after a restart (reset, reprogramming, bus voltage recovery). This can be important if, for example, a bus reset is carried out. If there are many units on a line, all units would start at the same time and load the bus. With a variable time, the units can thus start differently.

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„In operation"
The "In operation" object is used to show on the bus that the unit is "alive". If activated, an "ON" telegram is sent cyclically.

Activating the various **sensors** opens a corresponding menu in each case, in which they can then be individually set.
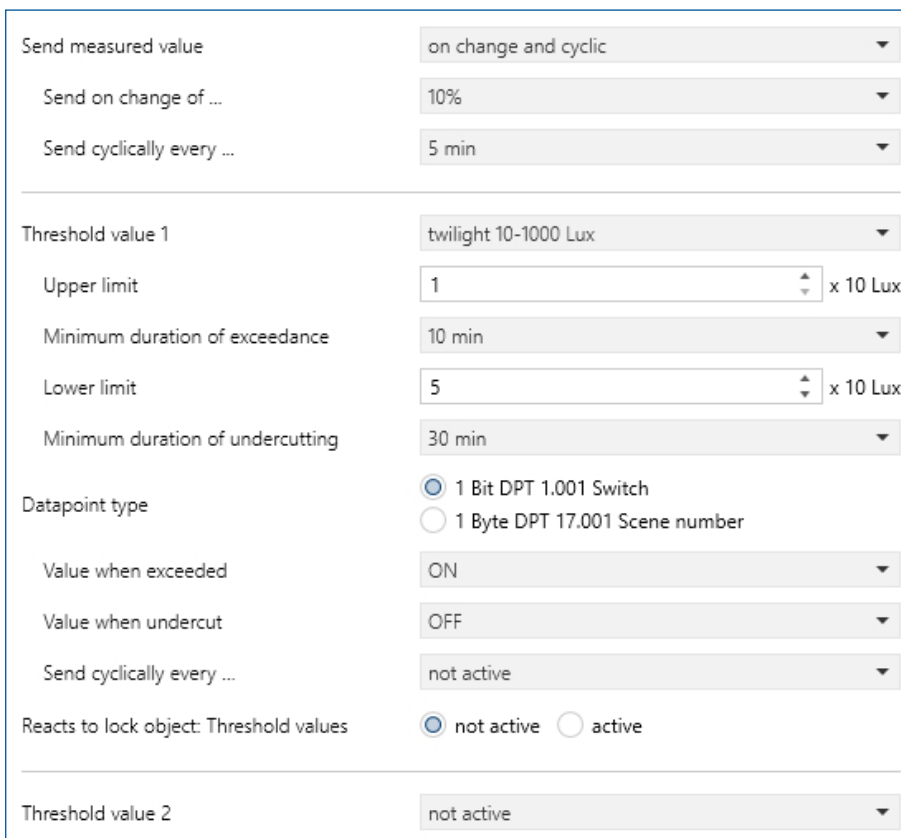
The table shows the general communication object.

Number	Name/Object function	Length	Usage
0	In operation - Status	1 Bit	Sending a cyclic "In operation" telegram

Table 3: General Communication object

4.2 Light sensor

The following settings are available for this menu:

Figure 4: Settings - Light sensor

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The following table shows the possible settings:

ETS Text	Dynamic range [Default]	Comment
Send measured value	■ not active, only on request ■ **on change** ■ cyclic ■ on change and cyclic	Setting of the sending condition for the measured value.
Send on change of …	■ **10 %** ■ 20 % ■ 30 %	Setting at which change the measured value should be sent. **Only with selection "on change …"**
Send cyclically every …	10 s - 60 min. **[5 min]**	Setting whether and at what interval the measured value is sent cyclically. **Only with selection „… cyclic".**
Threshold value 1 / 2	■ **not active** ■ twilight 10-1000 Lux ■ brightness 1-100 kLux	Activation of a threshold value and within which range this should be set.
Upper limit	1 … 100 (x 10 Lux) **[10]** **[20]** 1 … 100 (kLux) **[35]** **[40]**	(x 10 Lux) with selection "twilight" Setting of the upper limit for the threshold value. (kLux) with selection „brightness".
Minimum duration of exceedance	not active, 10 s – 60 min **[10 min]**	Setting for how long the upper limit value must be exceeded at least to trigger a telegram.
Lower limit	1 … 100 (x 10 Lux) **[5]** **[15]** 1 … 100 (kLux) **[30]** **[35]**	(x 10 Lux) with selection "twilight" Setting of the lower limit for the threshold value. (kLux) with selection „brightness".
Minimum duration of undercutting	not active, 10 s – 60 min **[30 min]**	Setting for how long the upper limit value must be exceeded at least to trigger a telegram.
Datapoint type	■ 1 Bit DPT 1.001 Switch ■ 1 Byte DPT 17.001 Scene number	Setting of the datapoint type that is to be sent when exceeding or undercutting.

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ETS Text	Dynamic range [Default]	Comment
Value when exceeded	■ not active ■ **ON** ■ OFF	Setting of the value to be sent when the corresponding threshold value is exceeded/undercut. **For DPT "Switch".**
Value when undercut	■ not active ■ ON ■ **OFF**	
Scene number when exceeded	1 – 64 **[1]**	Setting of the scene to be sent when the corresponding threshold value is exceeded/undercut. **For DPT „Scene number".**
Scene number when undercut	1 – 64 **[2]**	
Send cyclically every ...	**not active**, 10 s – 60 min	Setting whether and at what interval the value or scene is to be sent cyclically.
Reacts to lock object: Threshold values	■ **not active** ■ active	Setting, if the threshold value reacts to the lock object.

Table 4: Settings - Light sensor

Send measured value
By setting **"not active, only on request"**, the measured value is not actively sent, but can be queried externally via object. **"on change"** means that the measured value is actively sent on the bus on a change. The value at which change is to be sent is defined with the setting under "Send on change of ...".
The **"cyclic"** setting can be used to set the intervals at which the current measured value is to be sent. It is also sent if the value has not changed.
With the selection **"on change and cyclic"**, both settings are reacted to accordingly.

Threshold value 1 / 2
Two threshold values can be configured independently of each other. It is possible to adjust the resolution of the brightness range. With the setting **"twilight 10-1000 Lux"**, a threshold value can be finely adjusted in a range of less than 1000 Lux (typical range for twilight). With the setting **"brightness 1-100 kLux"**, a threshold value can be set in a range from 1000 lux to 100000 lux (typical values for sunlight). The threshold value is determined by one value each for the **"Upper limit"** and the **"Lower limit"**. To avoid frequent triggering, a minimum time can be set for exceeding and falling below the threshold. This means that the set limit value must be permanently exceeded/undercut for this time before a telegram is sent. This avoids, for example, frequent movement of the sunshade when a cloud only darkens for a short time.

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Datapoint type
The selected datapoint type determines whether either "ON" or "OFF" telegrams (1 bit) or scenes (1 byte) are sent when the threshold value is exceeded/undercut. The determination is made via the parameters "Value/Scene number when exceeded/undercut". In addition, it can be determined whether the telegrams are to be sent cyclically.

Reacts to lock object: Threshold values
The communication object 4 "Lock object: Threshold values" is permanently displayed. For both threshold values, it can be decided in each case whether this should react to the lock object.
Example:
Set the parameter for threshold value 1 to "active" and for threshold value 2 to "not active". If a "1" is now sent to the lock object, the lock only affects threshold value 1. The lock is cancelled with a "0".

The following table shows the associated communication objects:

Number	Name/Object function	Length	Usage
1	Brightness – Send measured value	2 Byte	Sending the current measured value
2	Brightness – Threshold value 1	1 Bit 1 Byte	Sends a telegram when threshold value 1 is exceeded/undercut. DTP depending on parameter setting
3	Brightness – Threshold value 2	1 Bit 1 Byte	Sends a telegram when threshold value 2 is exceeded/undercut. DTP depending on parameter setting.
4	Brightness – Lock object: Threshold values	1 Bit	Set/unset a lock

Table 5: Communication objects - Light sensor

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4.3 Twilight sensor

The following settings are available:

Figure 5: Settings - Twilight sensor

The table shows the possible settings:

ETS Text	Dynamic range [Default]	Comment
Send measured value	■ not active, only on request ■ **on change** ■ cyclic ■ on change and cyclic	Setting of the sending condition for the measured value.
Send on change of …	■ **10 %** ■ 20 % ■ 30 %	Setting at which change the measured value should be sent. **Only with selection "on change …"**
Send cyclically every …	10 s – 60 min **[5 min]**	Setting whether and at what interval the measured value is sent cyclically. **Only with selection „… cyclic".**
Day/Night switchover / Blinds control	■ **not active** ■ active	Activation of the function for "Day/ Night" switchover and a delayed blinds movement.
„Day" if greater than …	20 – 950 Lux **[380]**	Setting of the upper limit for the threshold value.

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ETS Text	Dynamic range [Default]	Comment
„Night" if less than …	0 – 200 Lux **[10]**	Setting of the lower limit for the threshold value.
Send cyclically every …	**not active,** 10 s – 60 min	Setting whether and at what interval the measured value is sent cyclically.
Day/Night object	▪ not active ▪ Day=1 Night=0 ▪ Day=0 Night=1	Activation and setting of the polarity of the Day/Night object.
Object for blinds control	▪ **not active** ▪ active	Activates the movement function of the blinds/shutter depending on Day/Night.
Delay after change to „Day"	**no function** 1min – 60min	Setting whether and with what time a drive-up should be started after switching to "Day".
Delay after change to „Night"	**no function** 1min – 60min	Setting whether and with what time a downward movement is to be started after switching to "Night".

Table 6: Settings - Twilight sensor

Send measured value
By setting **"not active, only on request"**, the measured value is not actively sent, but can be queried externally via object. **"on change"** means that the measured value is actively sent on the bus on a change. The value at which change is to be sent is defined with the setting under "Send on change of …". The **"cyclic"** setting can be used to set the intervals at which the current measured value is to be sent. It is also sent if the value has not changed. With the selection **"on change and cyclic"**, both settings are reacted to accordingly.

Day/Night switchover / Blinds control
With the activation of the "Day/Night switchover", further settings can subsequently be made. "Day if greater than" determines the threshold above which the unit switches to "Day" mode. "Night if less than" determines the threshold below which the unit switches to "Night" mode. After a switchover, the unit remains in the corresponding operating mode until the other threshold is undercut or exceeded. Further-more, the current status can be sent cyclically to the bus when activated.

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Day/Night object
When activated, a separate communication object appears and the polarity can be set at the same time via the parameter. The current status of "Day/Night" is sent to the bus via the object.

Object for blinds control
With activation of the function, it is possible to send delayed telegrams after Day/Night switchover via a separate object. On the one hand, a delay for starting an upward movement can be set when switching to "Day" and a delay for a downward movement can be set when switching to "Night".
If the setting is "no function", no telegram is sent. A "1" on the "Lock object: Blinds Up/Down" locks the function, a "0" removes the lock.
Important: When changing to "Day" a "0" is always sent, when changing to "Night" a "0" is always sent. This can also be used, for example, to switch the outdoor lighting On/Off.

The following table shows the available communication objects:

Number	Name/Object function	Length	Usage
5	Twilight – Send measured value	2 Byte	Sending the current measured value
6	Twilight – Switchover Day/Night	1 Bit	For switchover between Day and Night operation. Polarity according to parameter.
7	Twilight – Blinds Up/Down	1 Bit	Object for moving the blinds/shutter
8	Twilight – Lock object: Blinds Up/Down	1 Bit	Locking the up/down movement

Table 7: Communication objects - Twilight sensor

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4.4 Temperature sensor

The following settings are available:

Figure 6: Settings - Temperature sensor

The table shows the possible settings:

ETS Text	Wertebereich [Standardwert]	Kommentar
Send measured value	■ not active, only on request ■ **on change** ■ cyclic ■ on change and cyclic	Setting of the sending condition for the measured value.
Send on change of …	0,1 K – 2,0 K **[1,0 K]**	Setting at which change the measured value should be sent. Only with selection "on change …"
Send cyclically every …	10 s – 60 min **[5 min]**	Setting whether and at what interval the measured value is sent cyclically. **Only with selection „… cyclic".**
Calibration value for sensor (value x 0,1)	-50 – 50 K **[0]**	Temperature adjustment for internal sensor.

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ETS Text	Wertebereich [Standardwert]	Kommentar
Smooth measured value	■ low ■ **normal** ■ high	Setting for how the measured value (dependence of brightness on temperature) is compensated.
Threshold value 1 / 2	■ **not active** ■ active	Activation of a threshold value.
Upper limit	-30 – 50 °C **[6]** **[40]**	Setting of the upper limit for the threshold value.
Lower Limit	-30 – 50 °C **[4]** **[35]**	Setting of the lower limit for the threshold value.
Datapoint type	■ **1 Bit DPT 1.001 Switch** ■ 1 Byte DPT 17.001 Scene Number	Setting of the datapoint type that is to be sent when exceeding or undercutting.
Value when exceeded Value when undercut	■ not active ■ ON ■ **OFF** ■ not active ■ **ON** ■ OFF	Setting of the value to be sent when the corresponding threshold value is exceeded/undercut. **For DPT "Switch".**
Scene number when exceeded Scene number when undercut	1 – 64 **[1]** 1 – 64 **[2]**	Setting of the scene to be sent when the corresponding threshold value is exceeded/undercut. **For DPT „Scene number".**
Send cyclically every …	**not active**, 10 s – 60 min	Setting whether and at what interval the value or scene is to be sent cyclically.

Table 8: Settings - Temperature sensor

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Send measured value

By setting **"not active, only on request"**, the measured value is not actively sent, but can be queried externally via object. **"on change"** means that the measured value is actively sent on the bus on a change. The value at which change is to be sent is defined with the setting under "Send on change of …". The **"cyclic"** setting can be used to set the intervals at which the current measured value is to be sent. It is also sent if the value has not changed. With the selection **"on change and cyclic"**, both settings are reacted to accordingly.

With the parameter **"Calibration value for sensor"** a correction value can be entered. This is used to increase/decrease the actual measured value. The temperature sensor sends the corrected temperature value when this function is activated.

Smooth measured value

The brightness affects the temperature (the surface heats up more in direct sunlight than in cloudy conditions). With a filter function/compensation, this behaviour can be influenced here to avoid "sudden" changes.

Threshold value 1 / 2

Two threshold values can be configured independently of each other. Each threshold is defined by one value each for the **"Upper limit"** and the **"Lower limit"**.

Datapoint type

The selected datapoint type determines whether either "ON" or "OFF" telegrams (1 bit) or scenes (1 byte) are sent when the threshold value is exceeded/undercut. The determination is made via the parameters "Value/Scene number when exceeded/undercut". In addition, it can be determined whether the telegrams are to be sent cyclically.

The following table shows the available communication objects:

Number	Name/Object function	Length	Usage
9	Temperature – Send measured value	2 Byte	Sending the current measured value
10	Temperature – Threshold value 1	1 Bit 1 Byte	Sends a telegram when threshold value 1 is exceeded/undercut. DTP depending on parameter setting.
11	Temperature – Threshold value 2	1 Bit 1 Byte	Sends a telegram when threshold value 2 is exceeded/undercut. DTP depending on parameter setting.

Table 9: Communication objects - Temperature sensor

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5.1 Register of illustrations

5.2 List of tables

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6 Appendix

6.1 Statutory requirements

The devices described above must not be used in conjunction with devices which directly or indirectly serve human, health, or life-safety purposes. Furthermore, the devices described must not be used if their use may cause danger to people, animals, or property.
Do not leave the packaging material carelessly lying around. Plastic foils/ bags etc. can become a dangerous toy for children.

6.2 Disposal

Do not dispose of the old devices in the household waste. The device contains electrical components that must be disposed of as electronic waste. The housing is made of recyclable plastic.

6.3 Assembly

⚠️ **Danger to life from electric current!**

The device may only be installed and connected by qualified electricians. Observe the country-specific regulations and the applicable KNX guidelines

The units are approved for operation in the EU and bear the CE mark.
Use in the USA and Canada is not permitted!

6.4 History

V1.0   First Version of Technical Manual   DB V1.0 12/2022

V1.1   General changes   DB V1.0 03/2023

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