KNX PY

Pyranometer

Item number 70157

This manual is amended periodically and will be brought into line with new software releases. The change status (software version and date) can be found in the contents footer. If you have a device with a later software version, please check **www.elsner-elektronik.de** in the menu area "Service" to find out whether a more up-to-date version of the manual is available.

Clarification of signs used in this manual

⚠	Safety advice.
⚡	Safety advice for working on electrical connections, components, etc.
DANGER!	... indicates an immediately hazardous situation which will lead to death or severe injuries if it is not avoided.
WARNING!	... indicates a potentially hazardous situation which may lead to death or severe injuries if it is not avoided.
CAUTION!	... indicates a potentially hazardous situation which may lead to trivial or minor injuries if it is not avoided.
🛑 **ATTENTION!**	... indicates a situation which may lead to damage to property if it is not avoided.
ETS	In the ETS tables, the parameter default settings are marked by underlining.

1.   Safety and operating instructions

Installation, testing, operational start-up and troubleshooting should only be performed by a qualified electrician.

CAUTION!
Live voltage!

- Inspect the device for damage before installation. Only put undamaged devices into operation.
- Comply with the locally applicable directives, regulations and provisions for electrical installation.
- Immediately take the device or system out of service and secure it against unintentional switch-on if risk-free operation is no longer guaranteed.

Use the device exclusively for building automation and observe the operating instructions. Improper use, modifications to the device or failure to observe the operating instructions will invalidate any warranty or guarantee claims.

Operate the device only as a fixed-site installation, i.e. only in assembled condition and after conclusion of all installation and operational start-up tasks, and only in the surroundings designated for it.

Elsner Elektronik is not liable for any changes in norms and standards which may occur after publication of these operating instructions.

For information on installation, maintenance, disposal, scope of delivery and technical data, please refer to the installation instructions.

2.   Description

The **Pyranometer KNX PY** measures global irradiance, which is perceived as heat. The measured current irradiance (watts per squaremetre) allows for drawing conclusions on the energy input to an area during a defined period of time (kilowatt hours per squaremetre). Both values can be read out by the **KNX PY**. Four switching outputs with adjustable threshold values as well as additional AND and OR logic gates are available.The sensor system, the evaluation electronics and the electronics of the bus connection are mounted in a compact housing.

Functions:

- **Measurement of global irradiance**: The current irradiance is measured (W/m²). The energy input to an area during a defined period of time can be read out (kWh/m²)
- **4 threshold values** can be adjusted per parameter or via communication objects
- **2 AND and 2 OR logic gates** with each 4 inputs. Every switching incident as well as 8 logic inputs (in the form of communication objects) may be used as

inputs for the logic gates. The output of each gate may optionally be configured as 1 bit or 2 x 8 bits

3. Commissioning

Configuration is made using the KNX software ETS. The **product file** can be downloaded from the Elsner Elektronik website on **www.elsner-elektronik.de** in the "Service" menu.

After the bus voltage has been applied, the device will enter an initialisation phase lasting a few seconds. During this phase no information can be received or sent via the bus.

3.1. Addressing of the device at the bus

The equipment is delivered with the individual address 15.15.250. This can be changed via the ETS. There is a button and a control LED on the circuit board inside the housing for this purpose.

4.   Transmission Protocol

Units of measurement:

Irradiation intensity in Watt per square metre (W/m²)
Application of energy in kilowatt hours per square metre (kWh/m²)

4.1.   List of all communication objects

Abbreviations Flags:

C   *Communication*
R   *Read*
W   *Write*
T   *Transmit*
A   *Actualise*

No.	Name	Function	DPT	Flags
0	Measured value W/m²	Output	9.022	C R T
1	Measured value KWh/m²	Output	9.022	C R T
2	Measured value KWh/m² set on 0	Input	1.006	C R W
3	Request maximum value	Input	1.006	C R W
4	Maximum value	Output	9.022	C R T
5	Reset maximum value	Input	1.006	C R W
6	Sensor malfunction	Output	1.001	C R T
7	Threshold value 1: 16 bit value	Input / Output	9.008	C R W T A
8	Threshold value 1: 1 = increment | 0 = decrement	Input	1.006	C R W
9	Threshold value 1: Increment	Input	1.006	C R W
10	Threshold value 1: Decrement	Input	1.006	C R W
11	Threshold value 1: Switching output	Output	1.006	C R T
12	Threshold value 1: Switching output block	Input	1.006	C R W
13	Threshold value 2: 16 bit value	Input / Output	9.008	C R W T A
14	Threshold value 2: 1 = Increment | 0 = Decrement	Input	1.006	C R W
15	Threshold value 2: Increment	Input	1.006	C R W
16	Threshold value 2: Decrement	Input	1.006	C R W
17	Threshold value 2: Switching output	Output	1.006	C R T
18	Threshold value 2: Switching output block	Input	1.006	C R W
19	Threshold value 3: 16 bit value	Input / Output	9.008	C R W T A

No.	Name	Function	DPT	Flags
20	Threshold value 3: 1 = Increment | 0 = Decrement	Input	1.006	C R W
21	Threshold value 3: Increment	Input	1.006	C R W
22	Threshold value 3: Decrement	Input	1.006	C R W
23	Threshold value 3: Switching output	Output	1.006	C R T
24	Threshold value 3: Switching output block	Input	1.006	C R W
25	Threshold value 4: 16 bit value	Input / Output	9.008	C R W T A
26	Threshold value 4: 1 = Increment | 0 = Decrement	Input	1.006	C R W
27	Threshold value 4: Increment	Input	1.006	C R W
28	Threshold value 4: Decrement	Input	1.006	C R W
29	Threshold value 4: Switching output	Output	1.006	C R T
30	Threshold value 4: Switching output block	Input	1.006	C R W
31	Logic input 1	Input	1.001	C R W
32	Logic input 2	Input	1001	C R W
33	Logic input 3	Input	1001	C R W
34	Logic input 4	Input	1001	C R W
35	Logic input 5	Input	1001	C R W
36	Logic input 6	Input	1001	C R W
37	Logic input 7	Input	1001	C R W
38	Logic input 8	Input	1001	C R W
39	AND Logic 1	Switching output	1.001	C R T
40	AND Logic 1	8 bit output A	5.010	C R T
41	AND Logic 1	8 bit output B	5.010	C R T
42	AND Logic 2	Switching output	1.001	C R T
43	AND Logic 2	8 bit output A	5.010	C R T
44	AND Logic2	8 bit output B	5.010	C R T
45	OR Logic 1	Switching output	1.001	C R T
46	OR Logic 1	8 bit output A	5.010	C R T
47	OR Logic 1	8 bit output B	5.010	C R T
48	OR Logic 2	Switching output	1.001	C R T
49	OR Logic 2	8 bit output A	5.010	C R T
50	OR Logic 2	8 bit output B	5.010	C R T
51	Software version	readable	217.001	C R

5.   Setting of parameters

5.1.   General settings

Measurement value in W/m²	• do not transmit • transmit periodically • transmit on change • transmit on change and periodically
From measurement value change of *(only if sending "on change")*	1 … 50%; 5 %
Periodically transmit measured value all *(only if sending "periodically")*	5 secs … 2 h
Use measurement value in kWh/m²	No • Yes
Transmission behaviour as with measured value in W/m²	
Reset measurement value KWh/m² to 0	• at sunrise • on reception of a communication object
Use maximum value	No • Yes (Value is not retained after reset)
Use malfunction object	No • Yes
Maximum message rate	1 • 2 • 3 • 5 • 10 • 20 messages per second

Transmission delays after power up and programming	
Measurement values and threshold values	5 secs … 2 h
Switching outputs and logic outputs	5 secs … 2 h

5.2.　Threshold values

The instantaneous global radiation in Central Europe at mid-day in summer is when the sky is clear 900 … 1000 W/m² and when the sky is overcast approx. 100 W/m².

Use threshold value 1 / 2 / 3 / 4	No • Yes

5.2.1.　Threshold value 1 / 2 / 3 / 4

Threshold value

Threshold value setting via	Parameter • Communication object

If threshold value is set via Parameter:

Threshold value setting via	**Parameter**
Threshold value in W/m²	0 … 2500; 500
Hysteresis of the threshold value in %	0 … 50; 20

If threshold value is set via Communication object

Threshold value setting via	**Communication object**
The last communicated value shall be retained	• not • after voltage restoration 　(the changed threshold value can be safed 　at least 100,000 times) • after voltage restoration and 　programming (Attention: Do not use 　during initial start-up)
Start threshold value in W/m² valid until 1. communication	0 … 2500; 500
Type of threshold value change	• Absolute value with a 16-bit comm. object • Increase / Decrease with a comm. object • Increase / Decrease with two 　comm. objects
Step length in W/m² *(only if type of threshold value change is* *„Increase/Decrease")*	1 • 2 • 5 • 10 • 20 • 50 • 100 • 200
Hysteresis of the threshold value in %	0 … 50; 20

Switching output

Output is (TV = Threshold Value)	• TV above = 1 | TV - Hyst. below = 0 • TV above = 0 | TV - Hyst. below = 1 • TV below = 1 | TV + Hyst. above = 0 • TV below = 0 | TV + Hyst. above = 1
Switching delay from 0 to 1	none • 1 secs … 2 h

Switching delay from 1 to 0	none • 1 secs … 2 h
Switching output transmits	• on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
Transmit switching output in the cycle of *(only if sending "periodically")*	5 secs … 2 h

Block

Use switching output block	No • Yes

Only if switching output block is used:

Use switching output block	**Yes**
Evaluation of blocking object	• on value 1: block | on value 0: release • on value 0: block | on value 1: release
Value of blocking object before 1. communication	0 • 1
Behaviour of switching output on block	• do not transmit message • transmit 0 • transmit 1
Behaviour of switching output on release	if switching output = 0 ➜ transmit 0

Blocking

„Blocking" only appears if using „Switching output sends on change"

Use block of the switching output	Yes • No

If block of the switching output is used:

Use block of the switching output	**Yes**
Evaluation of the blocking object	• if value 1: block | if value 0: release • if value 0: block | if value 1: release
Value of the blocking object before 1. communication	0 • 1
Behaviour of the switching output with blocking	• do not send telegram • send 0 • send 1
Behaviour of the switching output with release (selection possible according to previous settings)	• do not send telegram • send status of the switching output • if switching output = 1 => send 1 • if switching output = 0 => send 0

5.3. Logic

Communication objects logic inputs	do not release • release

AND Logic

Logic 1 / 2	not active • active

OR Logic

Logic 1 / 2	not active • active

5.3.1. AND Logic 1 / 2

1. / 2. / 3. / 4. Input	• do not use • all switching events which the sensor provides (see "Linkage inputs of the AND logic")
Logic output sends	• not • one 1 bit object • two 8 bit objects

Logic output sends "one 1 bit Object":

Logic output sends	**one 1 bit object**
if logic = 1 ➔ object value	1 • 0
if logic = 0 ➔ object value	1 • 0
Communication object AND Logic 1 sends	• in case of the change of logic • in case of the change of logic to 1 • in case of the change of logic to 0 • in case of the change of logic and cyclically • in case of the change of logic to 1 and cyclically • in case of the change of logic to 0 and cyclically
send cyclically every *(only if sending "cyclically")*	5 sec … 2 h

Logic output sends "two 8 bit objects":

Logic output sends	**two 8 bit objects**
if logic = 1 ➔ object A value	0 … 255; 127
if logic = 0 ➔ object A value	0 … 255
if logic = 1 ➔ object B value	0 … 255; 127
if logic = 0 ➔ object B value	0 … 255

Communication objects AND Logic 1 A and B sends	• in case of the change of logic • in case of the change of logic to 1 • in case of the change of logic to 0 • in case of the change of logic and cyclically • in case of the change of logic to 1 and cyclically • in case of the change of logic to 0 and cyclically
send cyclically every *(only if sending "cyclically")*	<u>5 sec</u> … 2 h

5.3.2. Linkage inputs of AND Logic

do not use
Communication object logic input 1
Communication object logic input 1 inverted
Communication object logic input 2
Communication object logic input 2 inverted
Communication object logic input 3
Communication object logic input 3 inverted
Communication object logic input 4
Communication object logic input 4 inverted
Communication object logic input 5
Communication object logic input 5 inverted
Communication object logic input 6
Communication object logic input 6 inverted
Communication object logic input 7
Communication object logic input 7 inverted
Communication object logic input 8
Communication object logic input 8 inverted
Threshold value 1
Threshold value1 inverted
Threshold value 2
Threshold value 2 inverted
Threshold value 3
Threshold value 3 inverted
Threshold value 4
Threshold value 4 inverted
Malfunction
Malfunction inverted

5.3.3. OR Logic 1 / 2

1. / 2. / 3. / 4. Input	• <u>do not use</u> • all switching events which the sensor provides (see "Linkage inputs of the OR logic")

Logic output sends	• <u>one 1 bit object</u>
	• two 8 bit objects

All settings of the OR logic correspond to those of the AND logic.

5.3.4. Linkage inputs of OR Logic

The linkage inputs of the OR logic correspond with the parameters of the AND logic. The OR logic is additionally provided with the following inputs:

AND Logic output 1
AND Logic output 1 inverted
AND Logic output 2
AND Logic output 2 inverted

Questions about the product?

You can reach the technical service of Elsner Elektronik under
Tel. +49 (0) 70 33 / 30 945-250 or
service@elsner-elektronik.de

We need the following information to process your service request:

• Type of appliance (model name or item number)
• Description of the problem
• Serial number or software version
• Source of supply (dealer/installer who bought the device from Elsner Elektronik)

For questions about KNX functions:

• Version of the device application
• ETS version used for the project