Product name:	**4-channel analog sensor interface**
Design:	REG (DIN-rail type)
Article-no.:	**1021 00**
ETS search path:	Gira Giersiepen / Input / analog input / 4-channel analog sensor interface

Scope of application:

The analog sensor interface processes measured-value data supplied by analog sensors. Four analog transducers in any combination can be connected to the input. The analog sensor interface evaluates voltage and current signals.

| Voltage signals: | 0 … 1 V DC | 0 … 10 V DC |
| Current signals: | 0 … 20 mA DC | 4 … 20 mA DC |

The 4...20 mA current inputs can be monitored for open-circuit conditions.

The following sensors can be connected to the analog inputs:

Brightness	Order no. 0576 00
Twilight	Order no. 0572 00
Temperature	Order no. 0577 00
Wind	Order no. 0580 00
Rain	Order no. 0579 00

A 6-pole connector can be used for future extensions.

The measured values are encoded by the analog sensor interface in the form of value telegrams (DPT 9.0xx, 2 byte oder DPT 5.001, 1 byte) so that other bus subscribers (e.g. visualization software, Info Display, …) can display these measured values, generate messages or intervene in automatic control processes.

Each measured value has two presettable limit values. As soon as a measured value rises above or drops below these limits, the analog sensor interface can display the corresponding messages. The limit values can also be modified in operation by other devices as, for instance, a touch sensor serving as a value transmitter.

The analog sensor interface needs 24 V AC for operation. This voltage can be supplied, for instance, by the power supply unit, Order no. 1024 00. This power supply unit can at the same also supply the power for wind sensor heating

The terminals Us and GND supply 24 V DC (max. 100 mA altogether) to external analog sensors. In the event of short-circuits or overload between Us and GND, the power is shut off.

Layout
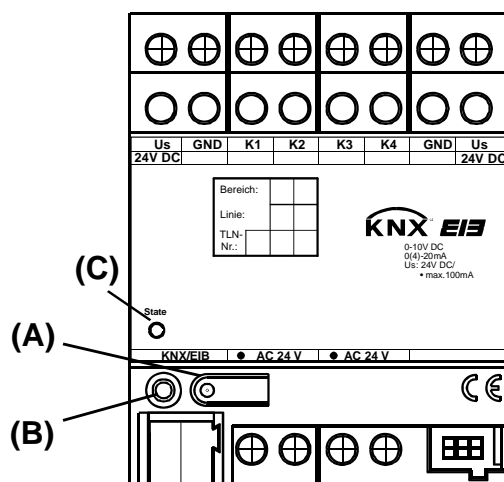
Dimensions:

Width: 4 mod, 72 mm
Height: 90 mm
Depth: 58 mm

Status LED functions:

LED off	no power supply
LED orange/on	modul scan by analog input
LED red/flashing slowly	fault: Us short-circuited
LED red/flashing fast	fault: no project, parameterization error
LED green/flashing slowly	pojecting OK
LED green/on	initialization process terminated, everthing OK

| slow flashing: | approx. 1 Hz |
| fast flashing: | approx. 2 Hz |

Controls:

A:	Programming button
B:	Programming LED
C:	Status LED, three-colour (red, orange, green)

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Sensor

Technical data

instabus KNX/EIB supply
    Voltage: 21 … 32 V DC, SELV
    Power consumption: typically 150 mW
    Connection: bus connection terminal KNX type 1
External supply
    Voltage: 24 V AC +- 10 %, SELV
    Current: max. 250 mA

Terminals:	screw terminals	$0.5 \, mm^2$ to $4 \, mm^2$ single wire
	screw terminals	$0.34 \, mm^2$ to $4 \, mm^2$ stranded wire (without ferrule)
	screw terminals	$0.14 \, mm^2$ to $2.5 \, mm^2$ stranded wire (with ferrule)

Response to voltage failure
    Bus voltage only: no communication with KNX / EIB
    Operating voltage only: no communication with KNX / EIB, sensors without power supply
    Bus and operating voltage: no communication with KNX / EIB, sensors without power supply
Response on reactivation:
    Bus voltage only: no communication with KNX / EIB, sensors without power supply
    Operating voltage only: no communication with KNX / EIB
    Bus and operating voltage: communication with KNX / EIB as per initialization parameters

Analog inputs
    Number: 4
    Signal voltages / currents: 0...1V DC, 0...10V DC, 0...20mA DC or 4...20mA DC,
                                      depending on parametrization

Input resistance	voltage input:	approx. 18 kΩ
	current input:	approx. 100 Ω
Terminals:	screw terminals	$0.5 \, mm^2$ to $4 \, mm^2$ single wire
	screw terminals	$0.34 \, mm^2$ to $4 \, mm^2$ stranded wire (without ferrule)
	screw terminals	$0.14 \, mm^2$ to $2.5 \, mm^2$ stranded wire (with ferrule)

Module connection
    Number: 1
    Connection: 6-pole system connector for future extensions

Outputs for the supply of sensors
    Number: 2
    Nominal voltage: 24 V DC ± 10 %
    Nominal current: 100 mA DC (total)

Terminals:	screw terminals	$0.5 \, mm^2$ to $4 \, mm^2$ single wire
	screw terminals	$0.34 \, mm^2$ to $4 \, mm^2$ stranded wire (without ferrule)
	screw terminals	$0.14 \, mm^2$ to $2.5 \, mm^2$ stranded wire (with ferrule)

Degree of protection: IP 20
Mark of approval: KNX / EIB
Ambient temperature: -5 °C bis +45 °C
Storage / transport temperature: - 25 °C ... +70 °C,
                                      reduced lifetime when stored above +45°C
Max. housing temperature   Tc = 75 °C
Relative humidity: Max. 93% r. h., no condensation
Fitting position: any
Minimum distances: none
Type of fixing: snap-fastenening on DIN rail 35 x 7,5 mm
                               no data rail required

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Wiring diagram and terminals:
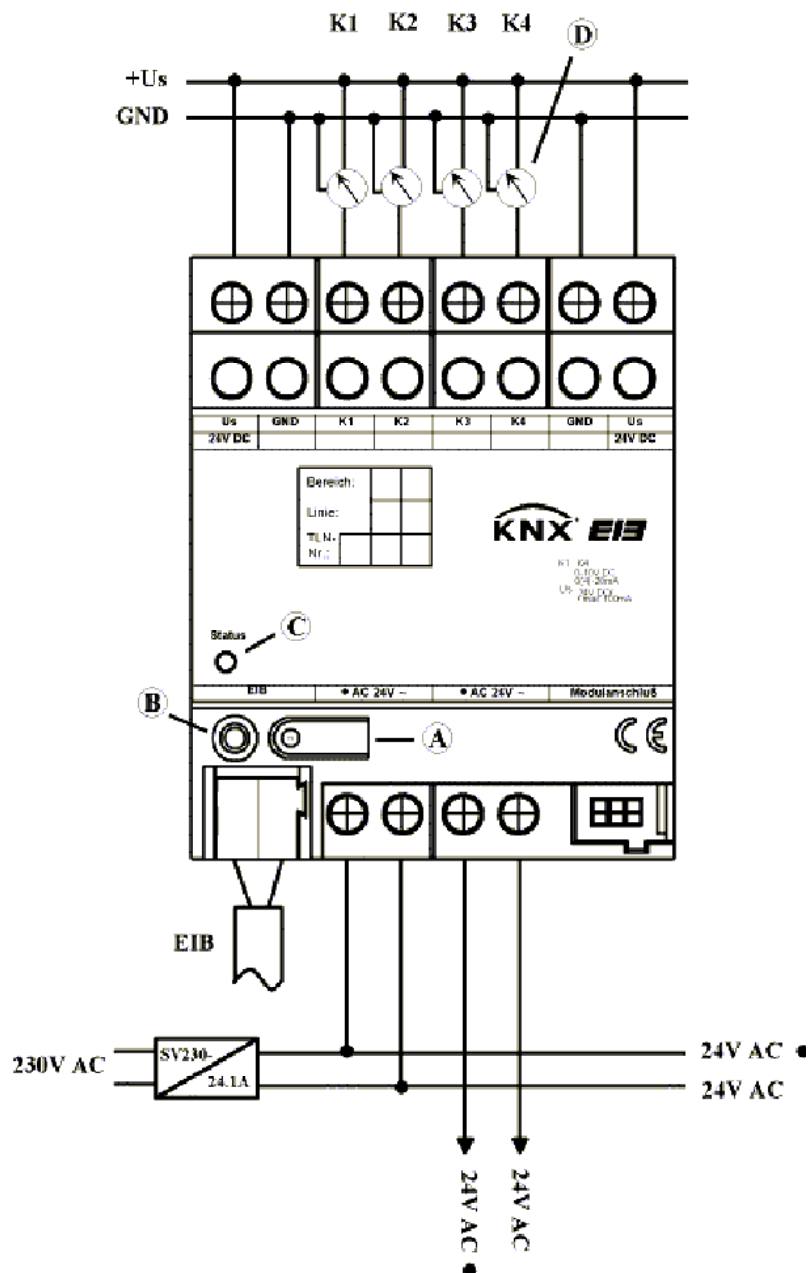
Terminals:

+US:	supply of external sensors	A:	programming button
GND:	reference potential for +US and inputs	B:	programming LED
K1..K4	sensor inputs	C:	status LED, three-colour (red, orange, green)
		D:	sensors

EIB:	KNX/EIB terminal
24V AC:	external supply voltage
Anschluss	
6-polig:	for future extensions

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Hardware information:

- Connected sensors can be supplied with power from terminals +US and GND (see wiring diagram). The device is equipped with two pairs of these terminals which are internally connected. The total current requirements of all sensors supplied from these terminals must not exceed 100 mA.

- In case of overload or short-circuit between +US and GND, the supply voltage is shut off. After removal of the fault, the supply is restored automatically.

- Connected sensors can also be supplied from external sources (SELV) e.g. if their current requirement exceeds 100 mA. The sensors are connected between terminals K1 … K4 and GND.

- US and GND must not be connected with the corresponding terminals of another device. Supplying the sensors with power from an analog input module connected to the device is not permitted (risk of irreparable damage!).

- After first activation, the analog sensor interface performs a module scan (status LED: "Orange / On"). As a new decive is not projected from the start, the status LED thereafter switches to "Red / Flashing fast"

- After loading a project into the analog sensor interface, the status LED switches to "Green / On"; and the module switches its status LED off.
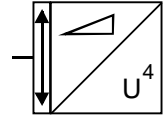
GIRA

Software description:

ETS search path: ETS-Symbol:

Input / 4-channel analog input / analog sensor interface B00713

Applications:

Short description:	Name:	Date:	Page:	Data base
Analog input	Analog sensor interface B00713	07.05	6	10219190

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Sensor

Application: **Analog sensor interface B00713**

Scope of functions:

- Up to four analog sensors with output signals of 0 … 1 V DC, 0 … 10 V DC, 0 … 20 mA DC, 4 … 20 mA DC can be connected directly to the analog sensor interface.

- The connecting lines of the sensors with 4 … 20 mA outputs can be monitored for open-circuit conditions.

- The values measured by the analog sensors can be transmitted in the form of 16-bit or 8-bit values.

- The measuring values can be transmitted after value changes and/or cyclically.

- For analog sensors, two limit values with definable hysteresis characteristics can be used.

- The limit values can be can preset from with external devices as 8-bit values or as 16-bit values.

Object description:

Object		Object description
0	**Alarm object**	1-bit object to indicate when on one of the inputs an overvoltage has been detected or when the voltage supply for external sensors has been overloaded.
		Object value = "0": no alarm Object value = "1": alarm
1 … 4	**Measuring value input...**	1-byte object or 2-byte object for output of current measuring value.
5 … 12	**Limit value …**	1-bit object to indicate when the limit values are exceeded or underrun.
13 … 20	**External limit value …**	1-byte or 2-byte objects for limit value correction by other bus devices (e.g. touch sensor as value transmitter, visualization) These values overwrite the parameterized values.
21 …25	**Open-circuit monitoring..**	1-bit object for reporting whether a fault has occurred in the electrical connection of a sensor with 4 … 20 mA signal. The value of the object for open-circuit monitoring is presettable.

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Number of addresses (max.):	200	dynamic table management:	Yes ☒ No ☐
Number of assignments (max.):	200	maximum table length:	200
Communication objects:	24		

Object		Function	Name	Typ	Flag
⬜	0	Analog input	Alarm object [1]	1 bit	C, T
⬜	1 … 4	Analog input	Measuring value input 1 … 4 [3]	2 byte	C, T
⬜	1 … 4	Analog input	Measuring value input 1 … 4 [3]	1 byte	C, T
⬜	5 … 12	Analog input	Limit value 1 / 2 input 1 … 4	1 bit	C, T
⬜	13 … 20	Analog input	External limit value 1 / 2 Input 1 … 4 [4]	2 byte	C, W
⬜	13 … 20	Analog input	External limit value 1 / 2 Input 1 … 4 [4]	1 byte	C, W
⬜	21 … 24	Analog input	Open-circuit monitoring input 1 … 4 [2]	1 bit	C, T

[1]   Objects 0 are visible only if the "Alarm analog input" parameter is set to "Transmit alarm bit".
[2]   Objects 21 … 25 "Open-circuit monitoring input…" are visible only if open-circuit monitoring is active for an input with a 4 … 20 mA signal.
[3]   Objects 1 … 4 can optionally transmit 8-bit values or 16-bit values depending on the setting of the "Transmit format …" parameter.
[4]   Objects 13 … 20 can optionally receive 8-bit values or 16-bit values depending on the setting of the "Format of external limit-value object …" parameter.

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Sensor

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1 Basic settings in the projecting phase

The analog sensor interface is primarily designed to receive and to transmit analog signals. For this purpose, different sensors can be used:

- Basically, any type of sensor with the following output signal characteristics can be connected to the device:
  - 0 … 1 V DC,
  - 0 … 10 V DC
  - 0 … 20 mA DC
  - 4 … 20 mA DC.

  Up to four of these sensors can be connected in a freely chosen combination directly to the analog sensor interface.

- Special analog weather sensors permit detecting specific climatic conditions. The following sensors can be used:
  - Brightness: Order no. 0576 00
  - Twilight: Order no. 0572 00
  - Wind: Order no. 0580 00
  - Rain: Order no. 0579 00
  - Temperature: Order no. 0577 00

  These sensors operate within the signal range of 0 … 10 V.

1.1 Selecting the sensor type

Up to four sensors of any type with voltage or current output signals of 0 … 1 V, 0 … 10 V, 0 … 20 mA or 4 … 20 mA can be connected to an analog sensor interface.

In a first step, the type of input signal compatible with the sensor used must be preset. Further dependent parameters are displayed on the parameter filecards "Measuring value …" and "Input …".

For sensors with 4 … 20 mA signals, the function for detecting open-circuit conditions can be activated in addition. If the open-circuit monitoring function is activated, the decive generates an additional 1-bit communication object which transmits a telegram with a presettable value in the event of faults.

1.2 Measuring value settings

Among the most important settings is the decision, whether the measuring values are to be transmitted as 8-bit or as 16-bit values. The choice is basically dependent on the other devices working with the data. 8-bit values can be processed by many devices, although with limited resolution. 16-bit values are perfectly suited for display purposes, e.g. in visualization software. They have a significantly higher resolution.

These settings are made on the "Measuring value …" parameter filecard

1.2.1 Measuring value output in 16-bit format

When 16-bit values are used, the following parameters are available: "Measuring value for 0% of measuring signal", "Measuring value for 100% of measuring signal" and "Measuring range scaling factor".

The two basic values must then be chosen together with the common scaling factor in such a way that the measuring range of the sensor is fully covered.

In order to achieve a good resolution, a low factor should be chosen. On the other hand, the resolution should not be so as to suggest an unrealistic precision as, for instance, a room temperature precise to 2 places after the decimal point.
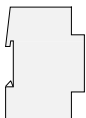
Example:
A pressure transmitter has a measuring range of –50 Pa … +150 Pa.
Its output signal is 0 … 10 V.

The combination

measuring value for 0% of the measuring signal:	–5000
measuring value for 100% of the measuring signal:	+15000
Measuring range scaling factor:	0.01

then covers the range between –50.00 Pa … +150.00 Pa with two places after the decimal point.

The combination

measuring value for 0% of the measuring signal:	–50
measuring value for 100% of the measuring signal:	+150
Measuring range scaling factor:	1

then covers the range between –50 Pa … +150 Pa without any places after the decimal point.

As far as the use in combination with other devices is concerned, attention must be paid to the fact that only numerical values are transmitted in bus telegrams. The physical quantities and the corresponding units are defined in the KNX standard and must be the same for different devices. For 2-byte floating point values, the following data points are defined:

Type	Physical quantity	Range of values	Resolution/unit
9.001	Temperature	-273 … 670760	1 °C
9.002	Temperature differential	-670760 … 670760	1 K
9.003	Temperature change	-670760 … 670760	1 K/h
9.004	Lighting intensity	0 …670760	1 lux
9.005	Wind speed	0 …670760	1 m/s
9.006	Pressure	0 …670760	1 Pa
9.007	Relative humidity	0 …670760	1 %
9.008	Air quality	0 …670760	1 ppm
9.010	Time 1	-670760 … 670760	1 s
9.011	Time 2	-670760 … 670760	1 ms
9.020	Voltage	-670760 … 670760	1 mV
9.021	Current	-670760 … 670760	1 mA

1.2.2 Measuring value output in 8-bit format

When 8-bit values are used, the following parameters are available: "Measuring value for 0% of measuring signal" and "Measuring value for 100% of measuring signal".

If the measuring values are to be transmitted as 8-bit values, an ouput value between 0 and 255 can be selected for the minimimum and the maximum value of the analog input range respectively. The minimum output value must be less than the maximum output value.

1.3 Transmission criteria

The values measured can be transmitted automatically after a value has changed or after a certain period has elapsed since the last telegram.

To prevent unnecessary loading of the bus, the parameter "Transmit measured value after a change by..." can be used to define how big the change must be for a telegram to be transmitted. The selection offered is "0.5%", "1%", "3%", "10%" and "no transmission".

If the measured values are to be transmitted cyclically, the cycle time is preset with the parameter "Cyclical transmission factor". In conjunction with the fixed base of 10 seconds, factors from 0 to 255 permit the selection of cycling times up to 42.5 minutes. Factor 0 means no cyclical transmission of measured values.

1.4   Limit values and hysteresis

For each analog measuring value, the analog sensor interface has two limit values which can be preset on the parameter filecard "Input …". For each limit value there is a parametrizable hysteresis with the possibility of fixing the response when the value is exceeded or not reached.

Example:
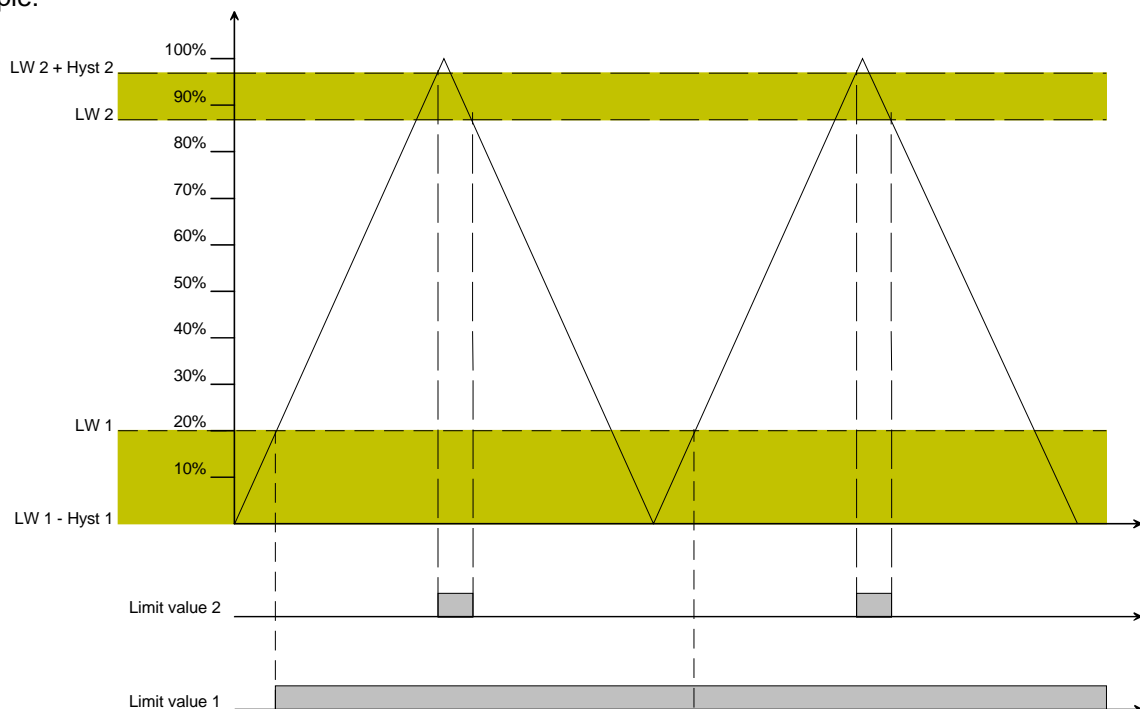
The limit values and the hysteresis characteristics are specified as a percentage of the full measuring range. When setting the limit values and the pertaining hysteresis, a safety margin of about 1% from the minimum value (0%) and from the maximum value (100%) should be observed. Or else the signals cannot underrun or exceed the respective thresholds. In this case, the limit-value object can transmit at maximum one telegram as shown for limit value 1.

1.5   External limit values

If the parameter "External limit-value object …" is set to "Yes", the ETS shows an additional communication object that can be used for changing the preset limit value during operation. The following parameter "External limit-value format …" determines whether 16-bit floating point values or 8-bit percentage values are to be transmitted to this communication object.

In both cases, it is necessary to limit the predefined values in the devices used as limit-value transmitters in such a way that in consideration of the hysteresis a corresponding safety margin is always ensured.

Attention: An external value overwrites the internal value. Only after a new download of the project will the internal value be reactivated. A readout of the object values yields correct results only after data have been written into the objects at least once via the bus after a reset.

1.6   Alarm in case of overvoltage or overload

Für die vier Eingänge der Analog-Sensorschnittstelle kann ein gemeinsames Alarmobjekt aktiviert werden, wenn zum Beispiel eine Überspannung an einem Eingang auftritt, oder wenn an dem Anschluss zur Versorgung der Messwertaufnehmer eine Überlast auftritt. Eine unmittelbare Aussage über die direkte Fehlerursache ist mit diesem Kommunikationsobjekt nicht möglich.

2   Connection of analog weather sensors

The analog sensor interface can also be connected to weather sensors sensing each a separate physical quantitiy. For these analog weather sensors, the following data point types of the communication objects are defined in the KNX / EIB standard:

Sensor	Unit	Data point type
Brightness	lux	9.004
Twilight	lux	9.004
Wind	m/s	9.005
Temperature	°C	9.001
Humidity	% r.h.	9.007
Air pressure	Pa	9.006

The parameter settings described in the following sections permit a simple adaptation to the respective measuring ranges. The limit and hysteresis values indicated are to be considered as typical examples which can be easily adapted to the special situation in the building.

2.1   Wind speed

For determination of the wind force, the wind sensor is equipped with a vane which is heated as a protection against icing. The measuring range of the sensor covers 0 … 40 m/s. For use with the analog sensor interface, the following parameters are recommended:

Parameter	Setting	corresponds to
Measuring value for 0% of the measuring signal:	0	0 m/s
Measuring value for 100% of the measuring signal:	4000	40 m/s
Measuring range factor:	0.01	
Limit value 1:	25 %	10 m/s
Hysteresis 1:	8 %	3.2 m/s
Limit value 2:	30 %	12 m/s
Hysteresis 2:	8 %	3.2 m/s

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2.2   Brightness

The brightness sensor is equipped with a probe which is normally installed in vertical position in front of the building wall. The measuring range of the sensors covers 0 … 60,000 lux. For use with the analog sensor interface, the following parameters are recommended:

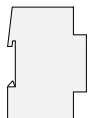| Parameter	Setting	corresponds to
Measuring value for 0% of the measuring signal:	0	0 lux
Measuring value for 100% of the measuring signal:	+6000	60000 lux
Measuring range factor:	10	
Limit value 1:	33%	20000 lux
Hysteresis 1:	5%	3000 lux
Limit value 2:	83%	50000 lux
Hysteresis 2:	5%	3000 lux

2.3   Twilight

The twilight sensor is equipped with a probe which is normally installed in vertical position in front of the building wall. The measuring range of the sensors covers 0 … 255 lux. For use with the analog sensor interface, the following parameters are recommended:

Parameter	Setting	corresponds to
Measuring value for 0% of the measuring signal:	0	0 lux
Measuring value for 100% of the measuring signal:	+25500	255 lux
Measuring range factor:	0,01	
Limit value 1:	40 %	100 lux
Hysteresis 1:	10 %	25 lux
Limit value 2:	80 %	200 lux
Hysteresis 2:	10 %	25 lux

2.4   Temperature

The temperature sensor senses the temperature of the ambient air. The measuring range of the sensor extends from –30 to +70 °C. For use with the analog sensor interface, the following parameters are recommended:

Parameter	Setting	corresponds to
Measuring value for 0% of the measuring signal:	–3000	–30°C
Measuring value for 100% of the measuring signal:	+7000	+70°C
Measuring range factor:	0,01	
Limit value 1:	30 %	0 °C
Hysteresis 1:	2 %	2 K
Limit value 2:	35 %	5 °C
Hysteresis 2:	2 %	2 K

2.5 Rain

The rain sensor is equipped with a meandering conductor track and evaluates the conductivity of rain water.
For use with the analog sensor interface, the following parameters are recommended:

Parameter	Setting	corresponds to
Measuring value for 0% of the measuring signal:	0	
Measuring value for 100% of the measuring signal:	+1000	
Measuring range factor:	0,01	
Limit value 1:	60 %	Regen
Hysteresis 1:	20 %	Kein Regen
Limit value 2:		
Hysteresis 2:		

Contrary to the other weather sensors, the rain detector does not supply analog measuring values but toggles between 0 volt and 10 volts so that displaying an analog value makes no sense. For this reason, the object "Measuring value" should not transmit neither in case of a change at the input nor cyclically.

The settings for 0% of the measuring range, 100% of the measuring range and the measuring range factor are necessary for the limit value detection to function properly. The suggested parameters for the limit value ensure that the switching threshold is always safely detected.

2.6 Humidity

The humidity sensor senses the relative humidity of the air and the room temperature. Both measuring values are made available in the form of analog voltages. The measuring ranges of the sensor extend from 0 to 100 % of relative humidity and from –30 to +70 °C. For use with the analog sensor interface, the following parameters are recommended:

Parameter	Setting	corresponds to
Measuring value for 0% of the measuring signal:	0	0 % r. h.
Measuring value for 100% of the measuring signal:	10000	100 % r. h.
Measuring range factor:	0,01	
Limit value 1:	40 %	40 % r. h.
Hysteresis 1:	5 %	5 % r. h.
Limit value 2:	70 %	70 % r. h.
Hysteresis 2:	5 %	5 % r. h.
Measuring value for 0% of the measuring signal:	–3000	–30°C
Measuring value for 100% of the measuring signal:	+7000	+70°C
Measuring range factor:	0,01	
Limit value 1:	50 %	20 °C
Hysteresis 1:	2 %	2 K
Limit value 2:	55 %	25 °C
Hysteresis 2:	2 %	2 K

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2.7   Air pressure

For an air pressure sensor with an input range of 70.000 … 120.000 Pa which is converted to 0 … 10 volts, the following parameters are recommended for use with the analog sensor interface:

Parameter	Setting	corresponds to
Measuring value for 0% of the measuring signal:	7000	700 hPa
Measuring value for 100% of the measuring signal:	12000	1200 hPa
Measuring range factor:	10	
Limit value 1:	60 %	1000 hPa
Hysteresis 1:	2 %	10 hPa
Limit value 2:	64 %	1020 hPa
Hysteresis 2:	4 %	20 hPa

3   Commissioning

The analog sensor interface is programmed with the help of the ETS.

3.1   Initialization / status indication

After switching on the device for the first time the analog sensor interface starts a module scan (status LED: "Orange / on"). As a new device comes by default without configuration, the status LED switches thereafter to "Red / flashing fast".

After downloading a project into the analog sensor interface, the status LED shows "Green / on".

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Sensor

Parameter		
Description	Values	Remarks
📁 General parameters		
Signal input …	No sensor Sensor 0 … 10V Sensor 0 … 1V Sensor 0 … 20mA Sensor 4 … 20mA	This parameter determines whether a sensor and which sensor is connected to one of the inputs. The format and the scaling factor of the measuring values for the sensor types can be set on a special parameter filecard. On another filecard, two limit values per input and the response when exceeded or underrun can be adjusted.
Open-circuit detection	**No detection** continuity = 0, open-circuit = 1 continuity = 1, open-circuit = 0	When a sensor with 4 … 20mA ouput is used, this parameter permits reporting if the electrical connection is interrupted. This is done by enabling a 1-bit communication object.
Alarm analog input	**No transmission** Transmit alarm bit	An alarm message can be transmitted if the device detects a fault in one of the analog inputs or in the sensor supply. When the parameter is set to "Transmit alarm bit", the "Alarm object" is activated.
📁 Measuring value …		
Measuring value transmission format	**16-bit EIS5** 8-bit EIS6	The parameter defines whether the measuring values of this input are transmitted in the form of signed floating point numbers or as unsigned relative values. Depending on this parameter, further parameters for the adaptation and scaling of measuring values are shown.
🔘 Measuring value format = 16-bit value		
Measuring value for 0% of measuring signal Measuring value for 100% of measuring signal Measuring range scaling factor	-32768 … (**0**) … 32767 -32768 … (**1000**) … 32767 **x 0.01** x 0.1 x 1 x 10 x 100	With the three parameters "Measuring value for 0%", " Measuring value for 100%" and "Factor" of measuring range, the analog sensor interface can adapt itself to the actual measuring range of the sensor used. To achieve a high resolution, the two base values should be selected in such a way that a good coverage of the measuring range of the sensor is obtained with a scaling factor as low as posssible

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🟢 Measuring value format = 8-bit value		
Base value 0% of measuring value Base value 100% of measuring value	**0** … 255 0 … **255**	With these two parameters, the analog sensor interface can convert the analog input signal to value range of the 1-byte communication object.
Transmit measuring value in the event of a change by...	No transmission 0.5% 1% **3%** 10%	The parameter defines the percentage of change required with respect to the previous object value for the new value to be transmitted. In a sensor with a measuring range extending from 0 … 10V, a measuring value difference of 3% corresponds to 0.3V. When the last telegram had a value of 4V, a new telegram will be transmitted when the actual measuring value is below 3.7V or above 4.3V. If "No transmission" is selected, the measuring value is transmitted only cyclically or after a WRITE request.
Measuring value cyclical transmission factor (base 10s, 0 = no cyclical transmission)	**0** … 120	The parameter fixes the time after which the actual measuring value is being transmitted, even if the difference with the respect to the previous value has not yet been reached. In the "0" standard setting, the measuring value is not transmitted cyclically.
📁 Input …		

Limit value … (in % of measuring range)
 	
Limit value hysteresis …
 	
Limit value (LV) activation …
	0 … 100%
	
	0 … 100%
	
	above LV = ON,
	    below LV-hysteresis = OFF
	above LV = OFF,
	    below LV-hysteresis = ON
	below LV = ON,
	    above LV+hysteresis = OFF
	below LV = OFF
	    above LV+hysteresis = ON
		These three parameters define the thresholds which – when exceeded or underrun – generate the corresponding switching telegrams.
		To make sure the thresholds can be safely execceded or underrun it is necessary to respect a reasonable safety margin from the extreme values of 0% and 100% when selecting the limit values and the hysteresis.

External limit value object LV …	Yes **No**	The parameter defines whether an object for external change of the limit value is to be activated.
Format of external limit value object LV …	**16-bit EIS5** 8-bit EIS6	The parameter enables either a 2-byte or a 1-byte object which permits changing the limit value while in operation.