Installation, inspection, commissioning and troubleshooting of the device must only be carried out by a competent electrician.

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. Description

The **KNX L brightness sensor** measures the intensity of illumination and transfers the value to the KNX system. Six 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:

- **Brightness measurement**: The current light intensity is measured by a sensor
- **3 switching outputs for twilight** (up to 1000 lux), 3 for **daylight** (1-99 klux), each with adjustable threshold values (Threshold values can be set by parameter or via communication objects)
- **8 AND and 8 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

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

1.1. Technical specifications

Housing	Plastic material
Colour	White / translucent
Mounting	On-wall
Protection category	IP 44
Dimensions	approx. 96 × 77 × 118 (W × H × D, mm)
Weight	approx. 150 g
Ambient temperature	Operation -30…+50°C, storage -30…+70°C
Operating voltage	KNX bus voltage
Current	max. 10 mA, residual ripple 10%
Data output	KNX +/- bus terminal plug
BCU type	Own micro controller
PEI type	0
Group addresses	max. 254
Allocations	max. 255
Communication objects	117
Measurement range brightness	0...150.000 lux

Resolution (brightness)	1 lux at 0…120 lux 2 lux at 121…1.046 lux 63 lux at 1.047…52.363 lux 423 lux at 52.364…150.000 lux
Accuracy (brightness)	±35%

The product conforms with the provisions of EU directives.

2. Installation and commissioning

2.1. Installation notes

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

CAUTION!
Live voltage!
There are unprotected live components inside the device.

- National legal regulations are to be followed.
- Ensure that all lines to be assembled are free of voltage and take precautions against accidental switching on.
- Do not use the device if it is damaged.
- Take the device or system out of service and secure it against unintentional use, if it can be assumed, that risk-free operation is no longer guaranteed.

The device is only to be used for its intended purpose. Any improper modification or failure to follow the operating instructions voids any and all warranty and guarantee claims.

After unpacking the device, check it immediately for possible mechanical damage. If it has been damaged in transport, inform the supplier immediately.

The device may only be used as a fixed-site installation; that means only when assembled 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.

2.2. Location

Select an assembly location at the building where sun may be collected by the sensors unobstructedly. The sensor may not be shaded by the building or for example by trees.

At least 60 cm of clearance must be left all round the device. Concurrently, the prevents spray (raindrops hitting the device) or snow (snow penetration) from impairing the

measurement. It also does not allow birds to bite it. Please ensure that the extended awning does not cast shade on the unit, and that this is not protected from the wind.

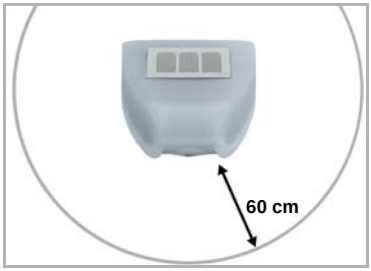


Fig. 1
There must be at least 60 cm of space below, to the sides and in front of the sensor left from other elements (structures, construction parts, etc.).

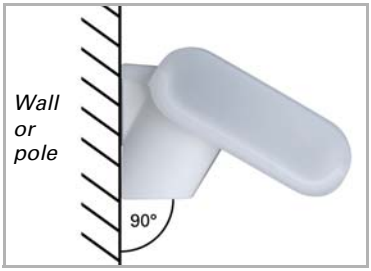


Fig. 2
The sensor must be mounted onto a vertical wall (or pole).

Fig. 3
The sensor must be mounted horizontally in the lateral direction.

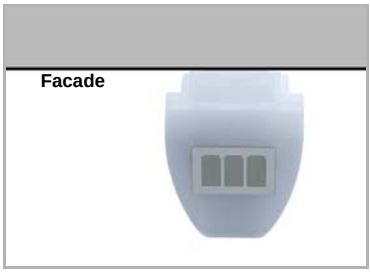


Fig. 2
The sensor must be aligned in the direction of the façade on which shade is to be provided.

2.3. Mounting the sensor

2.3.1. Attaching the mount

The sensor comes with a combination wall/pole mount. The mount comes adhered by adhesive strips to the rear side of the housing. Fasten the mount vertically onto the wall or pole.

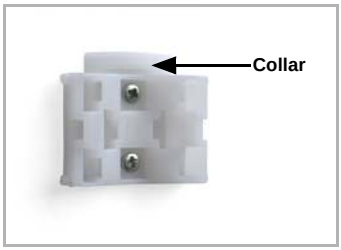


Fig. 3
When wall mounting: flat side on wall, crescent-shaped collar upward.

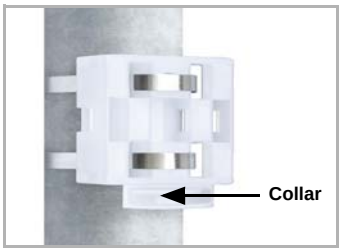


Fig. 4
When pole mounting: curved side on pole, collar downward.

Fig. 5
Different mounting arms are available from Elsner Elektronik as additional, optional accessories for flexible installation of the weather station on a wall, pole or beam (pictures of sensors exemplary).
Example of the use of a mounting arm: Due to flexible ball joints, the sensor can be brought into ideal position.

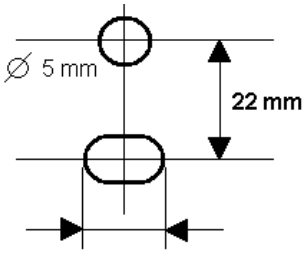
Fig. 6
Example use of the hinge arm mounting:
With the hinge arm mounting, the weather station projects from beneath the roof overhang. Sun, wind and precipitation can act upon the sensors without hindrance.

Fig. 7
Example use of the hinge arm mounting: Fitting to a pole with worm drive hose clips

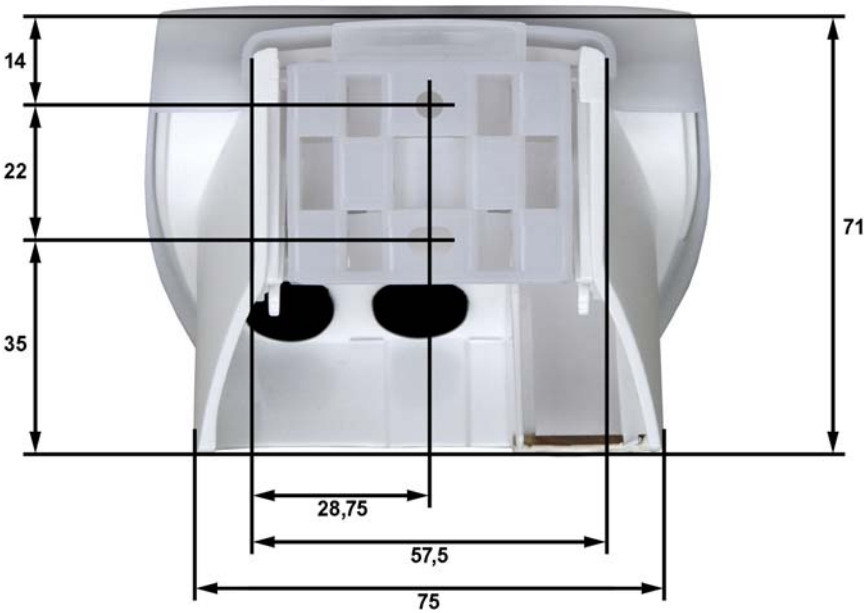
2.3.2. View of rear side and drill hole plan

Fig. 8 a+b
Drill hole plan

Dimensions of rear side of housing with bracket. Subject to change for technical enhancement.



Langloch 7,5 x 5 mm



2.3.3. Preparing the sensor

Fig. 9
1 Cover Snaps
2 Bottom part of housing

The sensor cover snaps in on the left and right along the bottom edge (see Fig.). Remove the cover.
Push the bus connection cable through the rubber seal on the bottom of the sensor and connect bus +/- to the provided clamps.

2.3.4. PCB layout

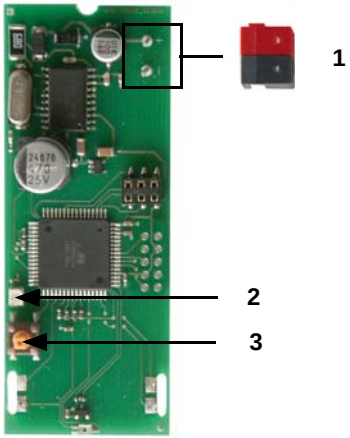


Fig. 10
1 Slot for KNX clamp +/-
2 Programming LED
3 Programming pushbutton for the teach-in of the device

2.3.5. Mounting the sensor

Close the housing by putting the cover back over the bottom part. The cover must snap in on the left and right with a definite “click”.

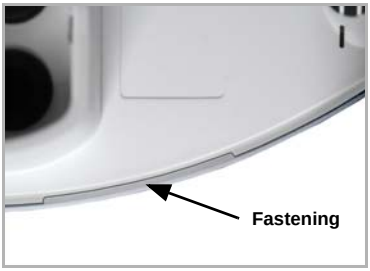


Fig. 11
Make sure the cover and bottom part are properly snapped together! This picture is looking at the closed sensor from underneath.

Fig. 12
Push the housing from above into the fastened mount. The bumps on the mount must snap into the rails in the housing.

To remove it, the sensor can be simply pulled upwards out of the mount, against the resistance of the fastening.

2.4. Notes on mounting and commissioning

Do not open the device if water (rain) might ingress: even some drops might damage the electronic system.

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. Addressing of the device at the bus

The device is supplied with the bus address 15.15.250. You can program another address into the ETS by overwriting the 15.15.250 address or by teaching via the programming key on the circuit board inside the housing.

4. Maintenance

WARNING!
Risk of injury caused by components moved automatically!
The automatic control can start system components and place people in danger.
- Always isolate the device from the mains for servicing and cleaning.

The device must regularly be checked for dirt twice a year and cleaned if necessary. In case of severe dirt, the sensor may not work properly anymore.

ATTENTION
The device can be damaged if water penetrates the housing.
- Do not clean with high pressure cleaners or steam jets.

5. Transmission protocol

Units of measurement:

brightness in lux

5.1. List of all communication objects

Abbreviations EIS types:

1 Switching 1/0
5 Floating point value
6 8 bit value

Abbreviations flags:

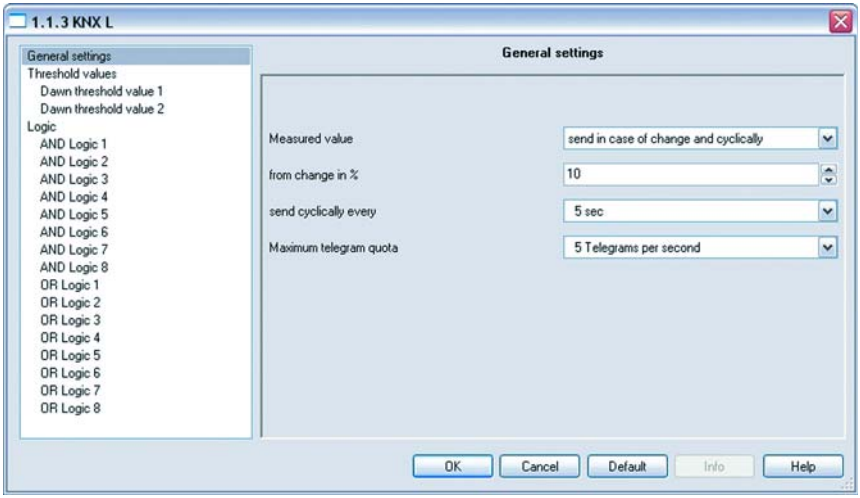
C Communication
R Read
W Write
T Transmit

No.	Name	Function	EIS type	Flags
90	Brightness threshold value 2	Switching output	1	C R T
91	Brightness threshold value 2	Switching output blocking	1	C R W
92	Brightness threshold value 3	16 bit value	5	C R W T
93	Brightness threshold value 3	1 = increment | 0 = decrement	1	C R W
94	Brightness threshold value 3	increment	1	C R W
95	Brightness threshold value 3	decrement	1	C R W
96	Brightness threshold value 3	Switching output	1	C R T
97	Brightness threshold value 3	Switching output blocking	1	C R W
98	Twilight threshold value 1	16 bit value	5	C R W T
99	Twilight threshold value 1	1 = increment | 0 = decrement	1	C R W
100	Twilight threshold value1	increment	1	C R W
101	Twilight threshold value 1	decrement	1	C R W

No.	Name	Function	EIS type	Flags
102	Twilight threshold value 1	Switching output	1	C R T
103	Twilight threshold value 1	Switching output blocking	1	C R W
104	Twilight threshold value 2	16 bit value	5	C R W T
105	Twilight threshold value 2	1 = increment | 0 = decrement	1	C R W
106	Twilight threshold value 2	increment	1	C R W
107	Twilight threshold value 2	decrement	1	C R W
108	Twilight threshold value 2	Switching output	1	C R T
109	Twilight threshold value 2	Switching output blocking	1	C R W
110	Twilight threshold value 3	16 bit value	5	C R W T
111	Twilight threshold value3	1 = increment | 0 = decrement	1	C R W
112	Twilight threshold value 3	increment	1	C R W
113	Twilight threshold value 3	decrement	1	C R W
114	Twilight threshold value 3	Switching output	1	C R T
115	Twilight threshold value 3	Switching output blocking	1	C R W
116	Software Version	readable	6	CR

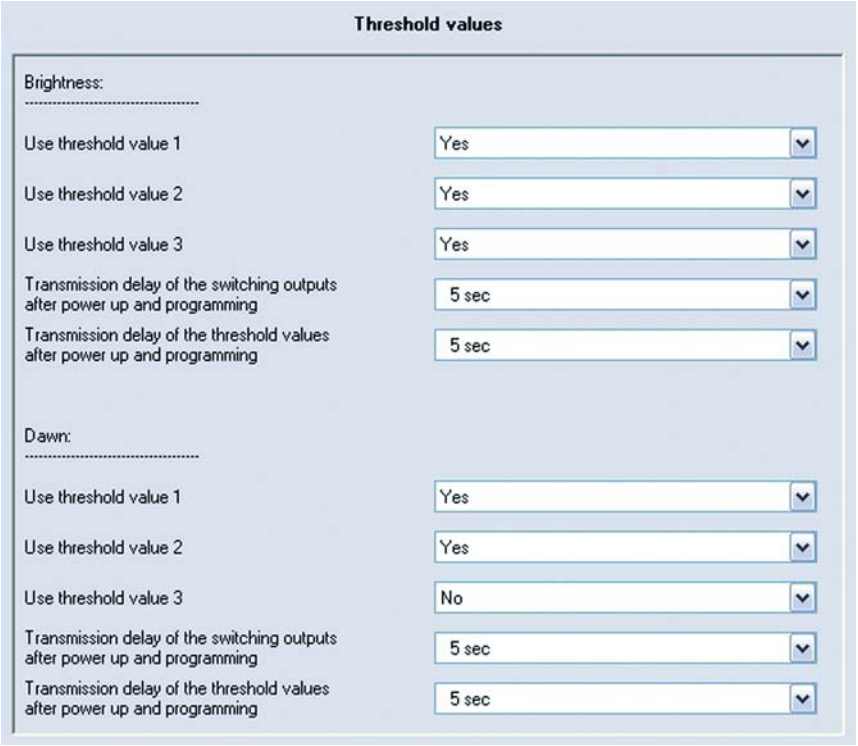
6. Setting of parameters

6.1. General settings



Measured value	• do not send • send periodically • send on change • send on change and periodically
From change of (in relation to last measured value) *(only if sending „on change“)*	1 ... 50; 10
send cyclically every *(only if sending “cyclically”)*	5 sec ... 2 h
Maximum telegram quota	1 • 2 • 3 • 5 • 10 • 20 telegrams per second

6.2. Threshold values



Brightness

Use threshold value 1 / 2 / 3	No • Yes
Transmission delay of the switching outputs after power up and programming	5 sec ... 2 h
Transmission delay of the switching outputs after power up and programming	5 sec ... 2 h

Twilight

Use threshold value 1 / 2 / 3	No • Yes
Transmission delay of the switching outputs after power up and programming	5 sec ... 2 h
Transmission delay of the switching outputs after power up and programming	5 sec ... 2 h

6.2.1. Brightness threshold value 1 / 2 / 3

Threshold value

Threshold value setpoint per	Parameter • Communication object

If the threshold value is set per Parameter:

Threshold value setpoint per	**Parameter**
Threshold value in klux	0 ... 99; 60
Hysteresis of the threshold value in %	0 ... 50; 20

If the threshold value is set per Communication object:

Threshold value setpoint per	**Communication object**
The value communicated last shall be maintained	• not • after restoration of voltage (der geänderte Grenzwert kann mindestens 100.000 Mal gesichert werden) • after restoration of voltage and programming (Attention: Do not use for first commissioning)
Start threshold value in kLux valid until 1. communication *(only if the value communicated last is „not“ maintained or „after restoration of voltage“)*	0 ... 99; 60
Type of threshold change	• Absolute value with a 16 bit communication object • Increment / decrement with one communication object • Increment / decrement with two communication objects
Step size *(only if sending „Increment/decrement“)*	1 klux • 2 klux • 3 klux • 4 klux • 5 klux • 10 klux
Hysteresis of the threshold value in %	0 ... 50; 20

Switching output

Ausgang ist bei (TV = Threshold Value)	• TV above = 1 | TV - Hyst. below = 0 • TV above = 0 | GW - Hyst. below = 1 • TV below = 1 | GW + Hyst. above = 0 • TV below = 0 | GW + Hyst. above = 1
Switching delay from 0 to 1	none • 1 sec ... 2 h
Switching delay from 1 to 0	none • 1 sec ... 2 h

Switching output sends	• not • 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
send cyclically every *(only if sending "cyclically")*	5 sec … 2 h

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 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

6.2.2. Twilight threshold value 1 / 2 / 3

Threshold value

Threshold value setpoint per	Parameter • Communication object

If the threshold value is set per Parameter:

Threshold value setpoint per	**Parameter**
threshold value in lux	0 … 1000; 200
Hysteresis of the threshold value in %	0 … 50; 20

If the threshold value is set per Communication object:

Threshold value setpoint per	**Communication object**
The value communicated last shall be maintained	• not • after restoration of voltage (der geänderte Grenzwert kann mindestens 100.000 Mal gesichert werden) • after restoration of voltage and programming (Attention: Do not use for first commissioning)
Start threshold value in lux valid until 1. communication *(only if the value communicated last is „not" maintained or „after restoration of voltage")*	0 … 1000; 200
Type of threshold change	• Absolute value with a 16 bit communication object • Increment / decrement with one communication object • Increment / decrement with two communication objects
Step size *(only if sending „Increment/decrement")*	1 lux • 2 lux • 3 lux • 4 lux • 5 lux • 10 lux • 20 lux • 30 lux • 40 lux • 50 lux • 100 lux
Hysteresis of threshold value in %	0 … 50; 20

Switching output

See „Brightness threshold value 1 / 2 / 3"

Blocking

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

See „Brightness threshold value 1 / 2 / 3"

6.2.3. Logic

Communication objects logic inputs	do not release • release

AND Logic

Logic 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8	not active • active
Transmission delay of the switching outputs after power up and programming	5 sec … 2 h

OR Logic

Logic 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8	not active • active
Transmission delay of the switching outputs after power up and programming	5 sec … 2 h

6.2.4. AND Logic 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8

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")*	5 sec … 2 h

6.2.5. Linkage inputs of AND logic

do not use
Twilight threshold value 1
Twilight threshold value 1 inverted
Twilight threshold value 2
Twilight threshold value 2 inverted
Twilight threshold value 3
Twilight threshold value 3 inverted
Brightness threshold value 1
Brightness threshold value 1 inverted
Brightness threshold value 2
Brightness threshold value 2 inverted
Brightness threshold value 3
Brightness threshold value 3 inverted
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 inputg 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 invertiert
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

6.2.6. OR Logic 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8

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

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

6.2.7. 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
AND Logic output 3
AND Logic output 3 inverted
AND Logic output 4
AND Logic output 4 inverted
AND Logic output 5
AND Logic output 5 inverted
AND Logic output 6
AND Logic output 6 inverted
AND Logic output 7
AND Logic output 7 inverted
AND Logic output 8
AND Logic output 8 inverted