

The analogue input is a built-in device, that can be mounted for example in trunking or false ceilings.

It has 4 inputs for connecting external physical sensors with output signals in ranges of 0/4 to 20 mA or 0 to 10 V. Sensors can be connected as two- or three-wire. The analogue input can thus provide the sensors with their required voltage.

In addition to processing general electrical signals, there are special light control possibilities such as constant light control.

The device requires a power supply of 230 V.

Technical Data

Power supply	– EIB	24 VDC, via the bus line
	– Auxiliary supply	230 VAC +/- 10 %, 50 Hz
	– Power input	≤ 2 VA
Inputs	– Voltage for sensors	0 ... 10 V
	– Current for sensors	0 ... 20 mA or 4 ... 20 mA
	– Optional voltage for supplying external sensors	18 VDC (max. 100 mA)
Operating and display elements	– red LED and push button	for assigning the physical address
Connections	– Power supply	Screw terminals Wire range 1 ... 2.5 mm ²
	– Inputs	Screw terminals, wire range 0.14 ... 1.5 mm ² (rigid) or 0.14 ... 1.0 mm ² (flexible)
	– EIB	Pins for bus connecting terminals
Type of protection	– IP 20, EN 60 529	
Ambient temperature range	– Operation	- 5 °C ... 45 °C
	– Storage	-25 °C ... 55 °C
	– Transport	-25 °C ... 70 °C
Design	– Built-in device	
Housing, colour	– Plastic housing, white	
Mounting	– Screw fixing in trunking, false ceilings, ...	
Dimensions	– 42 x 240 x 32 mm (H x B x T)	
Weight	– 0.27 kg	
Certification	– EIB-certified	
CE norm	– in accordance with the EMC guideline and the low voltage guideline	

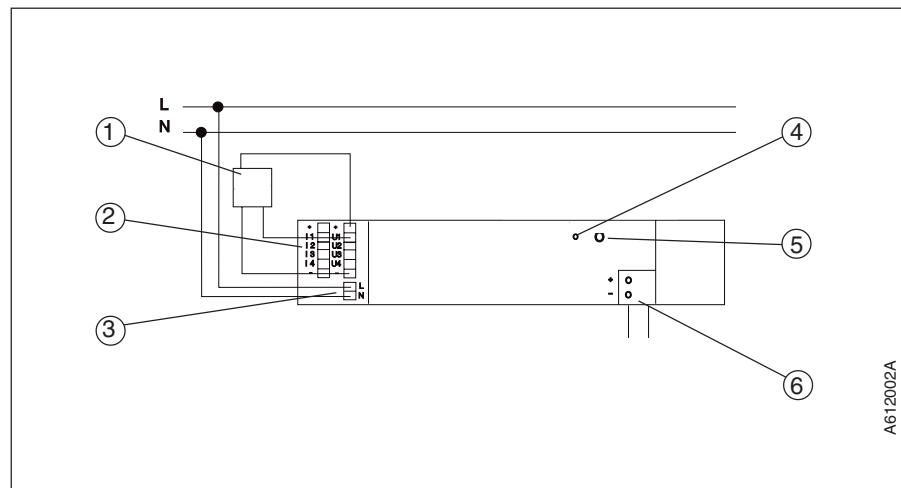
Application programs	Number of communication objects	Max. number of group addresses	Max. number of associations
Switch Threshold /1	4	4	4
Switch Threshold Channel selection /1	4	10	10
Value Cyclic /1	8	8	8
Value Cyclic Correct. table /1	8	8	8
Value Value change /1	5	5	5
Const. light control Preset /2	4	4	4
Const. light control Activation /2	4	4	4
Light control Value Value change /1	5	5	5

The following applications serve for constant brightness control:

Constant brightness save setpoint /1	5	21	22
Constant brightness setpoint /1	5	21	22
Outdoor brightness dependant illum. control /2	6	6	6
Outdoor brightness Switch Channel /1	4	4	4
Outdoor brightness Switch Channels /1	4	2	2

A detailed description of the application programs for constant brightness control/ brightness depending illumination are deposited on the EIB-database CD-ROM in PDF-format.

Circuit diagram



1 Sensor
2 Input terminal
3 230 V power supply

4 Programming LED
5 Programming push button
6 Bus connecting terminal

Note

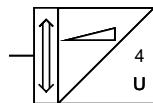
It is possible to connect both sensors with their own power supply and sensors that are supplied externally. Sensors that are supplied by the analogue input must have a nominal voltage range of up to 18 VDC.

The maximum output current for supplying the sensors is 100 mA (total, all the channels).

When using a constant light controller: use a Philips light sensor type LRF 101, Order no. 137.0302.

For switching or dimming dependent on external light: use a Theben light sensor, Order no. 907 0 008.

Switch Threshold /1



Switch

The analogue input has a 1 bit communication object for each of the four inputs, that can send "On" or "Off" telegrams when there is an overflow or underflow in a threshold value.

So that no unwanted telegrams are sent in the event of noisy signals with quick input changes, there is an input slew rate each time for noise suppression, that delays the changes of the input signal internally.

Selection in ETS2

- ABB
 - └ Input
 - └ Analogue input, 4-fold

Threshold

The threshold values can be set separately for each channel. The value "0" corresponds to 0 % or 0 V or 0 mA, while the value "255" corresponds to 100 % or 10 V or 20 mA. For every channel there is in addition the difference between the upper and lower threshold value for setting a hysteresis.

Communication objects

No.	Type	Name	Function
0	1 bit	Input 1	Telegr. switch
1	1 bit	Input 2	Telegr. switch
2	1 bit	Input 3	Telegr. switch
3	1 bit	Input 4	Telegr. switch

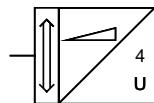
Parameters

The default setting for the values is **printed in bold type**.

Separate for each input:

– Upper threshold value (0 ... 255, corresp. 0 ... 100 %)	128
– Difference between upper and lower threshold value (2 ... 255, corresp. 1 ... 100 %)	8
– Reaction when reaching the threshold value	Exceeding: ON, Undershoot: OFF Exceeding: OFF, Undershoot: ON
– Input slew rate (noise suppression) 1 V resp. 2 mA rise per	switch through input directly / 0.2 s / 0.5 s / 1 s / 2 s / 3 s / 6 s / 20 s / 40 s / 75 s

Switch Threshold Channel selection /1



Selection in ETS2

- ABB
 - └ Input
 - └ Analogue input, 4-fold

Switch

The analogue input has a 1 bit communication object for each of the four inputs, that can send "On" or "Off" telegrams when there is an overflow or underflow in a threshold value.

Channel selection

Each of the four switching objects can be connected to one of the four input terminals. It is also possible e.g. to control all four objects A to D using a sensor.

Threshold

The threshold values can be set separately for each channel. The value "0" corresponds to 0 % or 0 V or 0 mA, while the value "255" corresponds to 100 % or 10 V or 20 mA. For every channel there is in addition the difference between the upper and lower threshold value for setting a hysteresis.

So that no unwanted telegrams are sent in the event of noisy signals with quick input changes, there is an input slew rate each time for noise suppression, that delays the changes of the input signal internally.

Via a common communication object, all four channels can be enabled or disabled simultaneously.

Communication objects

No.	Type	Name	Function
0	1 bit	Object A	Telegr. switch
1	1 bit	Object B	Telegr. switch
2	1 bit	Object C	Telegr. switch
3	1 bit	Object D	Telegr. switch
4	1 bit	Input 1 ... 4	Activation

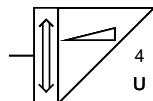
Parameters

The default setting for the values is **printed in bold type**.

Separate for each input object:

– Object ... is connected to input terminal	U1 or I1 / U2 or I2 / U3 or I3 / U4 or I4
– Upper threshold value (0 ... 255, corresp. 0 ... 100 %)	128
– Difference between upper and lower threshold value (2 ... 255, corresp. 1 ... 100 %)	8
– Reaction on reaching the threshold value	Exceeding: ON, Undershoot: OFF Exceeding: OFF, Undershoot: ON
– Input slew rate (noise suppression) 1 V resp. 2 mA rise per	switch through input directly / 0.2 s / 0.5 s / 1 s / 2 s / 3 s / 6 s / 20 s / 40 s / 75 s
Activation:	ON OFF
– Preset of object "Activation" on bus voltage recovery	

Value Cyclic /1



Selection in ETS2

- ABB
 - └ Input
 - └ Analogue input, 4-fold

Value

The analogue input has a 1 byte communication object for each of the four channels. It can be established in the parameters whether in the event of a rising input signal (0 to 10 V or 0 to 20 mA), the transmitted value is changed in proportion from 0 to 255 or in inverse proportion from 255 to 0.

Each channel can be disabled or enabled individually via four "Activation" objects. So that they achieve a defined function on bus voltage recovery, the "Activation" objects each have a preset value.

Cyclic

The analogue input sends the current measured values cyclically according to a set interval. The cyclic time is produced from the two parameters "Time base" and "Factor". The time base of 32 ms may only be used if only one of the four channels is going to be used.

So that no unwanted telegrams are sent in the event of noisy signals with quick input changes, there is an input slew rate each time for noise suppression, that delays the changes of the input signal internally.

Communication objects

No.	Type	Name	Function
0	1 byte	Input 1	Telegr. value
1	1 byte	Input 2	Telegr. value
2	1 byte	Input 3	Telegr. value
3	1 byte	Input 4	Telegr. value
4	1 bit	Input 1	Activation
5	1 bit	Input 2	Activation
6	1 bit	Input 3	Activation
7	1 bit	Input 4	Activation

Parameters

The default setting for the values is **printed in bold type**.

General:

– Time base for cyclic sending 32 ms (only for single applications) / **520 ms** / 8.4 s / 2.2 min

– Factor for cyclic sending **31**
(7 ... 255)

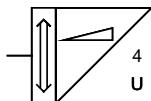
Separate for each input:

– Analogue value 0 V...10 V / 0 mA...20 mA corresponds to **0 ... 255**
255 ... 0

– Input slew rate (noise suppression)
1 V resp. 2 mA rise per 0.2 s / 0.5 s / 1 s / 2 s / 3 s / 6 s / 20 s / 40 s / 75 s

– Preset of the object "Activation Input ..." **ON**
on bus voltage recovery OFF

Value Cyclic Correct. table /1



Selection in ETS2

- ABB
 - └ Input
 - └ Analogue input, 4-fold

Value

The analogue input has a 1 byte communication object for each of the four channels. It can be established in the parameters whether in the event of a rising input signal (0 to 10 V or 0 to 20 mA), the transmitted value is changed in proportion from 0 to 255 or in inverse proportion from 255 to 0.

Each channel can be disabled or enabled individually via four "Activation" objects. So that they achieve a defined function on bus voltage recovery, the "Activation" objects each have a preset value.

Cyclic

The analogue input sends the current measured values cyclically according to a set interval. The cyclic time is

produced from the two parameters "Time base" and "Factor". The time base of 32 ms may only be used if only one of the four channels is going to be used.

Correction table

A conversion table can be defined to accommodate the characteristics of various sensors. This table describes the corresponding brightness values for five different sensor values.

So that no unwanted telegrams are sent in the event of noisy signals with quick input changes, there is an input slew rate each time for noise suppression that delays the changes of the input signal internally.

Communication objects

No.	Type	Name	Function
0	1 byte	Input 1	Telegr. value
1	1 byte	Input 2	Telegr. value
2	1 byte	Input 3	Telegr. value
3	1 byte	Input 4	Telegr. value
4	1 bit	Input 1	Activation
5	1 bit	Input 2	Activation
6	1 bit	Input 3	Activation
7	1 bit	Input 4	Activation

Parameters

The default setting for the values is **printed in bold type**.

General:

– Time base for cyclic sending **32 ms** (only for single applications) / **520 ms** / 8.4 s / 2.2 min

– Factor for cyclic sending **31** (7 ... 255)

Separate for each input:

– Analogue value 0 V...10 V / 0 mA...20 mA corresponds to **0 ... 255**
255 ... 0
– Usage of conversion table **no / yes**
– Input slew rate (noise suppression) **switch through input directly / 0.2 s / 0.5 s / 1 s / 2 s / 3 s / 6 s / 20 s / 40 s / 75 s**
1 V resp. 2 mA rise per

– Preset of object "Activation" on bus voltage recovery **ON**
OFF

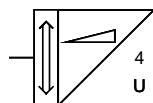
Conversion table:

– 1) Lowest sensor value (0 ... 255) **0**
– 1) Allocated brightness value (0 ... 255) **0**

...

– 5) Next higher sensor value (0 ... 255) **255**
– 5) Allocated brightness value (0 ... 255) **255**

Value Value change /1



Value

The analogue input has a 1 byte communication object for each of the four channels. It can be established in the parameters whether in the event of a rising input signal (0 to 10 V or 0 to 20 mA), the transmitted value is changed in proportion from 0 to 255 or in inverse proportion from 255 to 0.

Using the parameter "Operation...", it is possible to determine for each channel whether it can be disabled or enabled via a common "Activation" object. The "Activation" object has a preset value so that it can achieve a defined function on bus voltage recovery.

Value change

The parameter "min. change of object value ..." is used to set the sensitivity of the analogue input. As a result, the input only sends a telegram if the analysed value has changed by the set amount.

In order to limit the load on the bus, it is necessary to define the minimum waiting time that must elapse between two values before the next telegram may be sent.

So that no unwanted telegrams are sent in the event of noisy signals with quick input changes, there is an input slew rate each time for noise suppression that delays the changes of the input signal internally.

Selection in ETS2

– ABB
 └ Input
 └ Analogue input, 4-fold

Communication objects

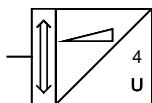
No.	Type	Name	Function
0	1 byte	Input 1	Telegr. value
1	1 byte	Input 2	Telegr. value
2	1 byte	Input 3	Telegr. value
3	1 byte	Input 4	Telegr. value
4	1 bit	Input 1 ... 4	Activation

Parameters

The default setting for the values is **printed in bold type**.

General:

– Minimum waiting time between 2 sent telegrams of one object	0.25 s / 0.5 s / 0.8 s / 1 s / 2 s / 4 s / 8 s
– Preset of object "Activation Input 1 ... 4" on bus voltage recovery	ON OFF
Separate for each input:	
– Analogue value 0 V...10 V / 0 mA...20 mA corresponds to	0 ... 255 255 ... 0
– Operation of object telegr. value	always enabled always disabled dependent on object "Activation"
– Input slew rate (noise suppression) 1 V resp. 2 mA rise per	switch through input directly / 0.2 s / 0.5 s / 1 s / 2 s / 3 s / 6 s / 20 s / 40 s / 75 s
– min. change of object value for aut. sending (1 ... 255, corresp. 0,4 ... 100 %)	2

Const. light control Preset /2**Selection in ETS2**

- ABB
 - └ Input
 - └ Analogue input, 4-fold

Constant light control

This application program is used for constant light control. The analogue input has two channels available. Both channels send 1 byte values. This means that it is possible to have two separate constant light controllers.

Preset

In order to be able to influence the brightness in a room, both channels have a communication object each, via which the brightness values can be preselected. So that the control functions correctly, the preset value must not exceed 128.

The analogue input switches luminaires that are connected to dimming actuators and regulates the brightness so that the desired preset value can be attained.

If the analogue input is activated automatically directly after commissioning or manually at a later date and the amount of external light is sufficient at this time, the controller in the analogue input would normally not switch the luminaires on. So that the user recognises that the controller is functioning correctly, the parameter "Activation of the controller on sufficient external light" is preset so that the luminaires are switched on nevertheless and are then regulated by the analogue input.

So that the analogue input does not switch the light on e.g. after the office has closed, there is the possibility of preventing the light from being automatically switched on when the external light fades. The switching object is thus set to the value "0" after automatic deactivation so that the control must be switched on again manually.

The parameter "Starting brightness" is preset to a field value. After a possible necessary adjustment to the actuator in use, the analogue input can also start with the minimum brightness value.

If the luminaires are used with devices with electronic ballast, the device with the lowest level of brightness should be switched on. In this case the analogue input can disconnect the lamp if there is a sufficient level of external light. For electronic ballasts that generally switch on with maximum brightness and then dim down, it can be a good idea to set the parameter "Switch off operation ..." to "Manual". The light will then only be dimmed down to the minimum brightness.

The parameter "Switch off hysteresis ..." contains the values by which the current measured value must exceed the internal value of 128, in order for the light to be disconnected. The preset option "112" is a field value.

The parameters on the page "Other parameters" are preset with field values, which normally lead to good results. These presets should only be changed in exceptional circumstances.

The parameter "Minimum control ..." is the smallest 1 byte value at which the lamp connected to the actuator gives off light that can still be detected by the human eye.

The permitted tolerance depends on the actuator in use. For the switch/dimmer actuator, the value 4 should be used whereas 12 should be used for the universal dimmer actuator. The value should not drop below 4.

The parameter "Min. telegram repetition rate ..." and "Time constants" influence the loading of telegrams on the bus and the speed with which the analogue input readjusts the lighting. They should not be changed.

The parameters "Value of preset object voltage ..." determine whether the controller is active immediately on bus voltage recovery or whether it must be started manually (e.g. by a push button action or a timer).

Communication objects

No.	Type	Object name	Function
0	1 byte	Object 1	Brightness value for the dimmer
1	1 byte	Object 2	Brightness value for the dimmer
2	1 byte	Object 3	Preset value
3	1 byte	Object 4	Preset value

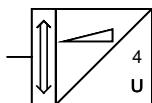
Parameters

The default setting for the values
is **printed in bold type**.

The complete parameter list is only
displayed in the setting "High Access".

Switch on operation:	
– Activation of the controller on sufficient external light	switch on and regulate do not switch on
– After automatic deactivation, the switching object	is set to 0 ♦ switched on manually maintains a value ♦ switched on automatically
– Starting brightness	use parameterized value (see below) use minimum control (see "Other parameters")
only if "use parameterized values" is selected:	
– Indicate value (0 ... 255 resp. 0 ... 100%)	168
Switch off operation:	
– Switch off operation on increasing external light	automatic manual (remains in minimum control)
only for automatic deactivation:	
– Switch off hysteresis channel 1 0 ... 128	112
– Switch off hysteresis channel 2 0 ... 128	112
Other parameters:	
– Other parameters	use standard parameters input parameters individually
– Minimum control of the dimmer (0 ... 127)	25
– Tolerance (0 ... 63)	4
– Min. telegram repetition rate (Base 16 ms)	48
– Time constants (1 ... 255)	24
– Value of preset object after bus voltage K1 has been applied	0
– Value of preset object after bus voltage K2 has been applied	0

Const. light control Activation /2



Selection in ETS2

- ABB
 - └ Input
 - └ Analogue input, 4-fold

Constant light control

This application program is used for constant light control. The analogue input has two channels available. Both channels send 1 byte values. This means that it is possible to have two separate constant light controllers.

In order to be able to influence the brightness in a room, both channels have a "Setpoint ..." parameter each on the "Other parameters" page, via which a brightness value can be preselected. So that the controller functions correctly, the setpoint value may not be greater than 128.

The analogue input switches luminaires that are connected to dimming actuators and regulates the brightness so that the desired preset value can be attained.

Activation

If the analogue input is activated automatically directly after commissioning or manually at a later date by the 1 bit communication object "Activation ..." and the amount of external light is sufficient at this time, the controller in the analogue input would normally not switch the luminaires on. So that the user recognises that the controller is functioning correctly, the parameter "Activation of the controller on sufficient external light" is preset so that luminaires are switched on nevertheless and are then regulated by the analogue input.

So that the analogue input does not switch the light on e.g. after the office has closed, there is the possibility of preventing the light from being automatically switched on when the external light fades. The switching object is thus set to the value "0" after automatic deactivation so that the control must be switched on again manually.

The parameter "Starting brightness" is preset to a field value. After a possible necessary adjustment to the actuator in use, the analogue input can also start with the minimum brightness value.

If the luminaires are used with devices with electronic ballast, the device with the lowest level of brightness should be switched on. In this case the analogue input can disconnect the lamp if there is a sufficient level of external light. For electronic ballasts that generally switch on with maximum brightness and then dim down, it can be a good idea to set the parameter "Switch off operation ..." to "Manual". The light will then only be dimmed down to the minimum brightness.

The parameter "Switch off hysteresis ..." contains the values by which the current measured value must exceed the internal value of 128, in order for the light to be disconnected. The preset option "112" is a field value.

The parameters on the page "Other parameters" are preset with field values, which normally lead to good results. These presets should only be changed in exceptional circumstances.

The parameter "Minimum control ..." is the smallest 1 byte value at which the lamp connected to the actuator gives off light that can still be detected by the human eye.

The permitted tolerance depends on the actuator in use. For the switch/dimmer actuator, the value 4 should be used whereas 12 should be used for the universal dimmer actuator. The value should not drop below 4.

The parameter "Min. telegram repetition rate ..." and "Time constants" influence the loading of telegrams on the bus and the speed with which the analogue input readjusts the lighting. They should not be changed.

The parameters "Status after bus voltage ... has been applied" determine whether the controller is active immediately on bus voltage recovery or whether it must be started manually (e.g. by a push button action or a timer).

Communication objects

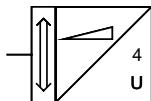
No.	Type	Object name	Function
0	1 byte	Object 1	Brightness value for the dimmer
1	1 byte	Object 2	Brightness value for the dimmer
2	1 bit	Object 3	Switching object
3	1 bit	Object 4	Switching object

Parameters

The default setting for the values is **printed in bold type**.

The complete parameter list is only displayed in the setting "High Access".

Switch on operation:	
– Activation of the controller on sufficient external light	switch on and regulate do not switch on
– After automatic deactivation, the switching object is	set to 0 ♦ switched on manually maintains the value 1 ♦ switched on automatically
– Starting brightness	use parameterized value (see below) use minimum control (see "Other parameters")
only if "use parameterized value" is selected:	
– Indicate value (0 ... 255 corresp. 0 ... 100%)	168
Switch off operation:	
– Switch off operation on increasing external light	automatic manual (remains in minimum control)
only for automatic deactivation:	
– Switch off hysteresis channel 1 0 ... 128	112
– Switch off hysteresis channel 2 0 ... 128	112
Other parameters:	
– Other parameters	use standard parameters input parameters individually
– Setpoint of channel 1 (0 ... 255 corresp. 0 ... 10 V / 0 ... 20 mA)	128
– Setpoint of channel 2 (0 ... 255 corresp. 0 ... 10 V / 0 ... 20 mA)	128
– Minimum control of the dimmer (0 ... 127)	25
– Tolerance (0 ... 63)	4
– Min. telegram repetition rate (Base 16 ms)	48
– Time constants (1 ... 255)	24
– Status after bus voltage has been applied to channel 1	controller OFF controller ON
– Status after bus voltage has been applied to channel 2	controller OFF controller ON

Light control Value
Value change /1**Selection in ETS2**

- ABB
 - └ Input
 - └ Analogue input, 4-fold

Light control

The application program has been developed specifically for dimming luminaires dependent on external light.

Value

The analogue input has four 1 byte communication objects. They can be connected to the input terminals as required.

All the channels can be enabled or disabled via a common activation object. Using the parameter “Preset of object ...”, it can be determined whether the control is active once the program has been restarted or must be switched on by a telegram.

Value change

The parameter “Difference ...” indicates the differential of external brightness that must be exceeded in order for the analogue input to adjust the luminaires. The preset value should then only be increased if the luminaires switch or dim too frequently.

The sample rate determines the speed at which brightness is scanned internally and the maximum rate for telegrams. This value should not be reduced.

The four input objects A to D can each be linked with one of the three conversion tables. It is thus possible to adjust for example the non-linearity of sensors, actuators and luminaires.

Communication objects

No.	Type	Object name	Function
0	1 byte	Object A	Teigr. brightness value
1	1 byte	Object B	Teigr. brightness value
2	1 byte	Object C	Teigr. brightness value
3	1 byte	Object D	Teigr. brightness value
4	1 bit	Input telegr.	Activation Input 1 ... 4

Parameters

The default setting for the values is **printed in bold type**.

General:

– Difference between upper and lower threshold value (0 ... 255, corresp. 0 ... 100 %)	16
– Minimum control of the actuator (1 ... 255)	50
– Preset of object “Activation Input 1 ... 4” on bus voltage recovery	ON OFF
– Time base for sample rate	32 ms (only for single applications) / 520 ms / 8.4 s / 2.2 min
– Factor for sample rate (1 ... 255)	2

Separate for each input object:

– Object A is connected to input terminal	U1 or I1 / U2 or I2 / U3 or I3 / U4 or I4
– Conversion table used	Conversion table 1 / Conversion table 2 / Conversion table 3

Conversion table 1 ... 3:

– 1) Lowest sensor value (0 ... 255)	0
– 1) Allocated brightness value (0 ... 255)	0
...	
– 5) Next sensor value (0 ... 255)	255
– 5) Allocated brightness value (0 ... 255)	0