Logics

USER MANUAL

Translation of the Original Instructions

Version: **1.2**

Date: **11/Mar/2024**

Contents

VERSION	DATE	CHANGES
1.0	29/Nov/2022	-
1.1	15/Jan/2024	added Multiplexer
1.2	11/Mar/2024	added Cyclic read and RGB/Index

Any information inside this manual can be changed without advice.

This handbook can be download freely from the website:
www.eelectron.com

Exclusion of liability:
Despite checking that the contents of this document match the hardware and software, deviations cannot be completely excluded. We therefore cannot accept any liability for this.
Any necessary corrections will be incorporated into newer versions of this manual.
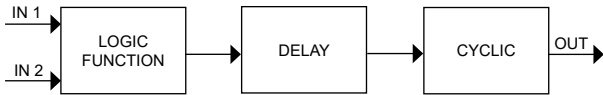
Symbol for relevant information

Symbol for warning

1. Logics

The logic functions are organized into groups of 3 objects: 2 inputs and 1 output, except the one called "Expression". The scheme of logics is as follows:

Inputs
Input datatypes can be bit, byte, float, etc. according to the selected logic.
IN1 is always present. IN2 maybe unused (or hidden directly by ETS).

Delay
The logic output can be delayed according to the ETS parameter, if a new value is received, the output is overwritten, and the delay reset.

Cyclic
The delayed output can be retransmitted n times according to ETS parameters

Logic Function
Each logic block can be configured to perform one of the following functions available in the drop-down menu on the corresponding page:

- disabled (no logic function);
- bit no transfer function;
- byte no transfer function;
- NOT, AND, OR, NAND, NOR, XOR, XNOR;
- bit to byte conversion;
- byte to bit conversion;
- byte threshold;
- 2 bytes float threshold;
- 4 bytes float threshold;
- proportional fancoil;
- proportional / speed fancoil conversion;
- dew point humidistat;
- surveillance;
- constant illuminance;
- multiplexer;
- expression

The setting is performed separately for each logic from the ETS "Logics" page, by clicking on the corresponding name.

Bit and Byte no transfer functions

Communication objects involved:

"<Logic x> Output"	1 Bit	CRT
"<Logic x> Input"	1 Bit	CW
"<Logic x> Output"	1 Byte	CRT
"<Logic x> Input"	1 Byte	CW

KNX PARAMETER	SETTINGS
Logic name	
This parameter defines the name of the module; the name can be used to rapidly identify the functionality.	
Logic delay	0,100,200,500 ms, 1,2,5,10,20,30 s, 1,5,10,15,30 min,1 h
This parameter defines the delay to send output on the BUS after calculation.	
Number of transmissions on output	1,2,3,4,5,10,15,20,30,60
This parameter defines the number of Output transmissions on the BUS.	
Retransmission time	short / long
This parameter defines the size of the delay between retransmissions: • short: 250 ms to 1 min • long: from 1 minute to 24 hours	
Retransmission delay	250 ms ... 24h
This parameter defines the time interval to send the Output object cyclically on the BUS.	

NOT-AND-OR-NAND-NOR-XOR-XNOR

Communication objects involved:

"<Logic x> Output"	1 Bit	CRT
"<Logic x> Input A"	1 Bit	CW
"<Logic x> Input B"	1 Bit	CW

The logic gates perform the Logicl conjunction between the two inputs.
The ETS parameters are the same as the logic function described above.

Bit to Byte conversion

Communication objects involved:

"<Logic x> Output"	1 Byte	CRT
"<Logic x> Input"	1 Bit	CW

The ETS parameters are the same as the transfer bits and bytes function to which are added:

KNX PARAMETER	SETTINGS
Value sent when 0 is received	0 ... 255
This parameter defines the name of the module; the name can be used to quickly identify functionality.	
Value sent when 1 is received	0 ... 255
This parameter defines the delay to send the Output on the BUS after the calculation.	

Byte to Bit conversion

Communication objects involved:

"<Logic x> Output"	1 Bit	CRT
"<Logic x> Input"	1 Byte	CW

The ETS parameters are the same as the transfer bits and bytes function to which are added:

KNX PARAMETER	SETTINGS
Byte value	0 ... 255

This parameter defines the value to be considered for conversion.

Output bit when byte is received	0 ... 255

This parameter defines the value to be sent on object "<Logic xx> Output" when the value received on the object "<Logic xx> Input" corresponds to the one set by parameter "Byte value".

Output bit otherwise	0 ... 255

This parameter defines the value to be sent on object "<Logic xx> Output" when the value received on the object "<Logic xx> Input" does not correspond to the one set by parameter "Byte value".

Threshold for byte / 2 bytes float / 4 bytes float

Communication objects involved:

"<Logic x> Output"	1 Bit	CRT
"<Logic x> Input"	1 Bit / 2 Bytes / 4 Bytes	CW

The ETS parameters are the same as the transfer bits and bytes function to which are added:

KNX PARAMETER	SETTINGS
Threshold value	0 ... 255

This parameter defines the value of the threshold of the logic.

Output bit when input > threshold	nothing, 0, 1

This parameter defines the value to be sent on object "<Logic xx> Output" when the value received on the object "<Logic xx> Input" is higher than the one set by parameter "Threshold value".

Output bit when input < = threshold	0 ... 255

This parameter defines the value to be sent on object "<Logic xx> Output" when the value received on the object "<Logic xx> Input" is lower or equal to the one set by parameter "Threshold value".

Proportional fancoil

Communication objects involved:

"<Logic x> Input Temperature"	2 Bytes	CW
"<Logic x> Input Setpoint"	2 Bytes	CW
"<Logic x> Input HVAC"	1 Byte	CW
"<Logic x> Input Heat / Cool"	1 Bit	CW
"<Logic x> Output Valve %"	1 Byte	CRT
"<Logic x> Output Heat Valve %"	1 Byte	CRT
"<Logic x> Output Cool Valve %"	1 Byte	CRT

KNX PARAMETER	SETTINGS
Logic name	

This parameter defines the name of the module; the name can be used to rapidly identify the functionality.

Logic delay	0,100,200,500 ms, 1,2,5,10,20,30 s, 1,5,10,15,30 min,1 h

This parameter defines the delay in sending the "output" objects on the BUS, applied after the calculation.

KNX PARAMETER	SETTINGS
Control mode	setpoint HVAC mode

This parameter defines the mode of the control:

- setpoint: set value of the setpoint through object
- HVAC mode: set value of the setpoint through object HVAC

Dead band [0.1°C]	0 ... 255

This parameter defines the value of the dead band around the setpoint.
The limits of the dead band are:

- difference of setpoint and half of the dead band
- sum of setpoint and half of the dead band

If the value of the object "<Logic xx> Input Temperature" is included between the limits, the output value is 0%.

Proportional band [Bp] [0.1°C]	0 ... 255

This parameter defines the value of the proportional band.
In heating control, the limits of the band are:

- difference of setpoint and half of the dead band
- difference of setpoint, half of the dead band and proportional band

In cooling control, the limits of the band are:

- sum of setpoint and half of the dead band
- sum of setpoint, half of the dead band and proportional band

If the value of the object "<Logic xx> Input Temperature" is included between the limits, a percentage control from 0% to 100% is set on output object.

Control type|VIRT	proportional / integral

This parameter defines the type of the control:

- proportional: only proportional contribution to ouput value
- integral: proportional and integral contribution to output value

Integration time [min] [Ti]	5 ... 250

This parameter defines the time to consider for integral contribution to output.

System type	2 pipes / 4 pipes

This parameter defines the number of output valves:

- 2 pipes: only 1 valve for heating and cooling mode
- 4 pipes: 2 different valves for heating and cooling mode

SETPOINT MODE

KNX PARAMETER	SETTINGS
Heat/Cool object after download	0=cooling 1=heating

This parameter defines the value of object "<Logic xx> Input Heat/Cool" after a download.

Setpoint after download [°C]	-300 ... 300

This parameter defines the value of the setpoint after a download.

HVAC MODE

KNX PARAMETER	SETTINGS
HVAC object after download	comfort standby economy off (frost / high temperature protection)
This parameter defines the value of object "<Logic xx> Input HVAC" after a download.	

Heat/Cool object after download	0=cooling 1=heating
This parameter defines the value of object "<Logic xx> Input Heat/Cool" after a download.	

Heating

KNX PARAMETER	SETTINGS
Setpoint frost protection [°C]	-300 ... 300
This parameter defines the protection mode setpoint value for the heating / cooling mode.	
Setpoint economy heating [°C]	-300 ... 300
This parameter defines the value of the setpoint in economy mode for heating mode.	
Setpoint standby heating [°C]	-300 ... 300
This parameter defines the value of the setpoint in standby mode for heating mode	
Setpoint comfort heating [°C]	-300 ... 300
This parameter defines the value of the setpoint in comfort mode for heating mode.	

Cooling

The same parameters apply as in the heating mode for cooling.

Proportional / speed fan coil conversion

Communication objects involved:

"<Logic x> Output Value %"	1 Byte	CRT
"<Logic x> Input Speed 1"	1 Bit	CW
"<Logic x> Input Speed 2"	1 Bit	CW
"<Logic x> Input Speed 3"	1 Bit	CW

"<Logic x> Input Value %"	1 Byte	CW
"<Logic x> Output Speed 1"	1 Bit	CRT
"<Logic x> Output Speed 2"	1 Bit	CRT
"<Logic x> Output Speed 3"	1 Bit	CRT

"<Logic x> Input Enable / Disable"	1 Bit	CW

KNX PARAMETER	SETTINGS
Logic name|VIRT	
This parameter defines the name of the module; the name can be used to rapidly identify the functionality.	
Logic delay	0,100,200,500 ms, 1,2,5,10,20,30 s, 1,5,10,15,30 min,1 h
This parameter defines the delay in sending the "output" objects on the BUS, applied after the calculation.	
Proportional conversion	bit to proportional proportional to bit
This parameter defines the conversion done by the module: • from bit to byte • from byte to bit	
Initial enable state	disabled / enabled
Set this parameter to "enabled" to activate logic after a download.	
Enable activation telegram	telegram "0" telegram "1"

This parameter defines the telegram value to enable activation of the logic function.

Lower limit value	0 ... 255
This parameter defines the threshold value for change between "no speed" and speed 1.	
Limit value speed 1/2	0 ... 255
This parameter defines the threshold value for change between speed 1 and speed 2.	
Limit value speed 2/3	0 ... 255
This parameter defines the threshold value for change between speed 2 and speed 3.	
Limit value speed 1	0 ... 255
This parameter defines the Output value when Speed 1 is activated.	
Limit value speed 2	0 ... 255
This parameter defines the Output value when Speed 2 is activated.	
Limit value speed 3	0 ... 255
This parameter defines the Output value when Speed 3 is activated.	

Dew point humidistat

Communication objects involved:

"< Logic x> Input Temperature"	2 Bytes	CW
"< Logic x> Input Relative Humidity"	2 Bytes	CW
"< Logic x> Input Regulation Temperature"	2 Bytes	CW
"< Logic x> Output Dew Point Temperature"	2 Bytes	CRT
"< Logic x> Output Command"	1 Bit	CRT
"< Logic x> Output Value %"	1 Byte	CRT

KNX PARAMETER	SETTINGS
Logic name	
This parameter defines the name of the module; the name can be used to rapidly identify the functionality.	
Logic delay	0,100,200,500 ms, 1,2,5,10,20,30 s, 1,5,10,15,30 min,1 h
This parameter defines the delay in sending the "output" objects on the BUS, applied after the calculation.	
Bandgap [0.1°C]	- 128 ... 127
This parameter defines the offset to be added to the dew point temperature for the algorithm controls	
Altitude (tens of meters above sea level)	0 ... 255
This parameter defines the altitude of the system.	
Proportional band [Bp] [0.1°C]	0 ... 255

This parameter defines the value of the proportional band.
In heating control, the limits of the band are:
  • difference of setpoint and half of the dead band
  • difference of setpoint, half of the dead band and proportional band
In cooling control, the limits of the band are:
  • sum of setpoint and half of the dead band
  • sum of setpoint, half of the dead band and proportional band
If the value of the object "<Logic xx> Input Temperature" is included between the limits, a percentage control from 0% to 100% is set on output object.

Output type	on / off value 0-100%

This parameter defines if the output object is 1 bit off/on or 1 byte 0-100%.

Inverted control	no / yes

This parameter allows to invert the limit values of the proportional band (off-on or on-off if output 1 bit / 0%-100% or 100%-0% if output 1 byte).

Surveillance

Communication objects involved:

"<Logic x> Input Surveillance"	1 Bit ... 4 Bytes	CW
"<Logic x> Input Status"	1 Bit ... 4 Bytes	CW
"<Logic x> Input Reset"	1 Bit	CW
"<Logic x> Output Alarm"	1 Bit	CRT

KNX PARAMETER	SETTINGS
Logic name	
This parameter defines the name of the module; the name can be used to rapidly identify the functionality.	
Logic delay	0,100,200,500 ms, 1,2,5,10,20,30 s, 1,5,10,15,30 min,1 h
This parameter defines the delay in sending the "output" objects on the BUS, applied after the calculation.	
Surveillance time [min]	1 ... 255
Defines the time (in minutes) of the surveillance control before activating the alarm.	
DPT Surveillance/status	1 bit 1 byte signed 1 byte unsigned 2 bytes signed 2 bytes unsigned 2 bytes float 4 bytes signed 4 bytes unsigned 4 bytes float
This parameter defines the DPT of the surveillance object. The telegram can be: • 1 bit • 1 byte (signed, unsigned) • 2 bytes (signed, unsigned, float) • 4 bytes (signed, unsigned, float)	
Status control	any value fixed value last surveillance value
This parameter defines the condition to match for object "<Logic xx> Input Status" to restart the surveillance time. Control can be: • any value: consider any value of the object to restart time • fixed value: set a value for the object to restart the time • last surveillance value: match th value of object "<Logic xx> Input Surveillance" to restart the time	
Status value	0 ... 255
This parameter defines the value of object "<Logic xx> Input Status" to restart the surveillance time.	
Status also clears alarm	no / yes
This parameter defines if object "<Logic xx> Input Status" clears active alarm.	
Alarm telegram	telegram "0" / telegram "1"

This parameter defines the telegram of object "<Logic xx> Output Alarm" when alarm is active.

Alarm cyclic sending	nothing / 1,2,5,10,30 min / 1,2 hours

This parameter defines the time interval to send cyclically on the BUS the object "<Logic xx> Output Alarm".

Reset telegram	telegram "0" telegram "1"

This parameter defines the telegram to reset alarm through object "<Logic xx> Input Reset".

Costant illuminance

Communication objects involved:

"<Logic x> Command for Semiautomatic"	1 Bit	CW
"<Logic x> Command for Presence"	1 Bit	CW
"<Logic x> Illuminance Measured"	2 Bytes	CW
"<Logic x> Illuminance Setpoint"	2 Bytes	CW
"<Logic x> Output Brightness"	1 Byte	CRT

KNX PARAMETER	
Logic name	
This parameter defines the name of the module; the name can be used to rapidly identify the functionality.	
Logic delay	0,100,200,500 ms, 1,2,5,10,20,30 s, 1,5,10,15,30 min,1 h
This parameter defines the delay in sending the "output" objects on the BUS, applied after the calculation.	
Algorithm type	constant illumination, dependent on presence automatic lighting, dependent on presence, semi-automatic
This parameter defines the algorithm to be applied. If semi-automatic, control can be activated by object "<Logic xx> Command for Semi-Automatic".	
Manual command activation telegram	telegram "0" / telegram "1"
This parameter defines which telegram activates manual command.	
Follow-Up Time	
Hours	0 ... 24
This parameter defines the time (in hours) for follow-up. The follow-up time defines how long, after the detection of a presence, the "presence" status is valid even if presence is not detected anymore. At the end of the follow-up time, the new status is "absence".	
Minutes	0 ... 59
This parameter defines the time (in minutes) for follow-up. The follow-up time defines how long, after the detection of a presence, the "presence" status is valid even if presence is not detected anymore. At the end of the follow-up time, the new status is "absence".	
Standby function	
Set this parameter to "enabled" to activate the stanby funcion.	
Standby Time	
Hours	0 ... 24

This parameter defines the time (in hours) for standby that can be considered between the status of "presence" and "absence". The standby time defines how long, after the end of the follow-up time, the "presence" status is kept active before entering the "absence" status. It is generally applied to control the lights with reduced brightness to avoid the area to be completely in the dark. At the end of the standby time, the new status is "absence".

Minutes	0 ... 59

This parameter defines the time (in minutes) for standby that can be considered between the status of "presence" and "absence". The standby time defines how long, after the end of the follow-up time, the "presence" status is kept active before entering the "absence" status. It is generally applied to control the lights with reduced brightness to avoid the area to be completely in the dark. At the end of the standby time, the new status is "absence".

Standby value	disable / enable

This parameter defines the value set for object "<Logic xx> Output Brightness" when the status is "standby".

Setpoint after download [* 10 Lux]	0 ... 255

This parameter defines the value set for object "<Logic xx> Illuminance Setpoint" after a download.

Speed regulation	very fast fast normal slow very slow

This parameter defines the speed for the algorithm to react to changes of illuminance level. The "very fast" configuration can lead to very frequent switching on/off of the light while the "very slow" configuration can introduce delays in the switching on/off of the light.

Minimum output telegram delay	2,3,4,5,8,10,15,20 s

This parameter defines the minimum time that must elapse between sending of a telegram on object "<Logic xx> Output Brightness" and the next one.

Initial brightness on presence	0 ... 100%

This parameter defines the initial value set for object "<Logic xx> Output Brightness" when the status is "presence".

Send initial brightness when over setpoint	no / yes

This parameter defines if the brightness control is activated for "presence" status even if the value of object "<Logic xx> Illuminance Measured" is higher than the value of object "<Logic xx> Illuminance Setpoint".

Absence value	0 ... 100%

This parameter defines the value to be sent for "absence" status.

Minimum value	0 ... 50%

This parameter defines the minimum value that can be set for object "<Logic xx> Output Brightness".

Maximum value	0 ... 50%

This parameter defines the maximum value that can be set for object "<Logic xx> Output Brightness".

Cyclic sending for brightness	no cyclic sending 1, 2, 5, 10, 15, 20, 30, 45 minutes 1, 1,5, 2, 3 4 hours

This parameter defines the time interval to send cyclically on the BUS the object "<Logic xx> Output Brightness".

Multiplexer

Communication objects involved:

"<Logic x> Command A"	1 Bit ... 4 Bytes	CRWT
"<Logic x> Command B"	1 Bit ... 4 Bytes	CRWT
"<Logic x> Control"	1 Bit	CW
"<Logic x> Input Enable/Disable"	1 Bit	CW

Logic multiplexer can be used to select different inputs (analog or digital) and collecte and send them to a single output line.

KNX PARAMETER	SETTINGS
Logic name	
This parameter defines the name of the module; the name can be used to rapidly identify the functionality.	
Logic delay	0,100,200,500 ms, 1,2,5,10,20,30 s, 1,5,10,15,30 min,1 h
This parameter defines the delay in sending the "output" objects on the BUS, applied after the calculation.	
DPT Command A/B	1 bit 1 byte signed 1 byte unsigned 2 bytes signed 2 bytes unsigned 2 bytes float 4 bytes signed 4 bytes unsigned 4 bytes float
This parameter defines the DPT of the objects "<Logic x> Command A" and "<Logic x> Command B". The telegram can be: • 1 bit • 1 byte (signed, unsigned) • 2 bytes (signed, unsigned, float) • 4 bytes (signed, unsigned, float)	
Action when control is 0	object A || object B object A -> object B object A <- object B object A <> object B
It defines the action to do when the value of the object "<Logic x> Control" is 0: • object A || object B: the value sent on the object A is sent on the object B and vice versa • object A -> object B: the value sent on the object A is sent on the object B but not vice versa • object A <- object B: the value sent on the object B is sent on the object A but not vice versa • object A <> object B: values are not exchanged. Values are independent.	
Action when control is 1	object A || object B object A -> object B object A <- object B object A <> object B
It defines the action to do when the value of the object "<Logic x> Control" is 1: • object A || object B: the value sent on the object A is sent on the object B and vice versa • object A -> object B: the value sent on the object A is sent on the object B but not vice versa • object A <- object B: the value sent on the object B is sent on the object A but not vice versa • object A <> object B: values are not exchanged. Values are independent.	

Initial enable state	disabled / enabled

Set this parameter to "enabled" to activate logic after a download.

Enable activation telegram	telegram "0" telegram "1"

This parameter defines the telegram value to enable activation of the logic function.

Cyclic read

Communication objects involved:

"<Logic x> Reader A"	1 Bit	CWTU
"<Logic x> Reader B"	1 Bit	CWTU
"<Logic x> Reader C"	1 Bit	CWTU
"<Logic x> Reader D"	1 Bit	CWTU
"<Logic x> Reader E"	1 Bit	CWTU

KNX PARAMETER	SETTINGS
Logic name	

This parameter defines the name of the module; the name can be used to rapidly identify the functionality.

Reader x (A-E)	
DPT type	1 bit 1 byte signed 1 byte unsigned 2 bytes signed 2 bytes unsigned 2 bytes float 4 bytes signed 4 bytes unsigned 4 bytes float

This parameter defines the DPT of the object cyclic read.
The telegram can be:
- 1 bit
- 1 byte (signed, unsigned)
- 2 bytes (signed, unsigned, float)
- 4 bytes (signed, unsigned, float)

Read - hours	0..24

Defines the cyclic reading time in hours.

Read - minutes	0..59

Defines the cyclic reading time in minutes.

Read - seconds	0..59

Defines the cyclic reading time in seconds.

Read on power up	no/yes

Defines if cyclic read is done after device power up.

Expression

Communication objects involved:

"<Logic x> Output"	1 Bit ... 4 Bytes	CW
"<Logic x> Input A"	1 Bit ... 4 Bytes	CW
"<Logic x> Input B"	1 Bit ... 4 Bytes	CW
"<Logic x> Input C"	1 Bit ... 4 Bytes	CW

"<Logic x> Input D"	1 Bit ... 4 Bytes	CW

Logic expression can be used to implement custom logic and arithmetic operation between values received on the KNX bus. The logic expression has 5 objects: 4 inputs and 1 output. The scheme of logic expression is as follows:
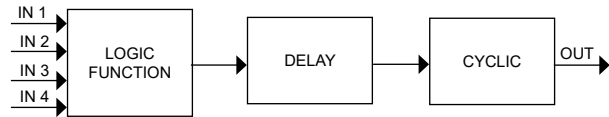
Configurable through an ETS parameter of 24 (maximum) character string. The output of the logic is the arithmetic evaluation of this expression.
Inputs objects can be accessed through their letters (A, B, C, D), the result is sent to the delay block.

Permitted operands:
"+" arithmetic sum
"-" arithmetic subtraction
"*" arithmetic multiplication
"/" arithmetic division
"&" logic AND
"|" logic OR
"^" logic XOR
"!" logic NOT
">" greater than
"<" less than
"=" equal to
"?" ":" ternary conditional
"(" and ")" grouping operands

Ternary conditional:
<condition> ? <expression1> : <expression2>
Where:
condition is the expression to be evaluated.
expression1 is evaluated when condition is TRUE
expression2 is evaluated when condition is FALSE
expression1 or expression2 can be "N" when "no expression has to be evaluated"

Expression examples:
"(A+B+C)/3" calculate the mean of the A, B, C objects.
"A*9/5+32" convert object A Celsius degree to Fahrenheit degrees.
"A*1000" convert object A KW to W
"A*3.6" convert object A m/s to Km/h

Quotation marks must not be included in expressions If wrong or unrecognized characters are used in expression then it will be not processed and discarded.

KNX PARAMETER	SETTINGS
Logic name	

This parameter defines the name of the module; the name can be used to rapidly identify the functionality.

Logic delay	0,100,200,500 ms, 1,2,5,10,20,30 s, 1,5,10,15,30 min,1 h

This parameter defines the delay in sending the "output" objects on the BUS, applied after the calculation.	
Number of transmissions on output	1,2,3,4,5,10,15,20,30,60
This parameter defines the number of Output transmissions on the BUS.	
Retransmission time	corti / lunghi
This parameter defines the size of the delay between retransmissions: • short: 250 ms to 1 min • long: from 1 minute to 24 hours	
DPT Output	1 bit 1 byte signed 1 byte unsigned 2 bytes signed 2 bytes unsigned 2 bytes float 4 bytes signed 4 bytes unsigned 4 bytes float
This parameter defines the DPT of the output. The telegram can be: • 1 bit • 1 byte (signed, unsigned) • 2 bytes (signed, unsigned, float) • 4 bytes (signed, unsigned, float)	
DPT Input A / B / C / D	1 bit 1 byte signed 1 byte unsigned 2 bytes signed 2 bytes unsigned 2 bytes float 4 bytes signed 4 bytes unsigned 4 bytes float
This parameter defines the DPT of "Input A". The telegram can be: • 1 bit • 1 byte (signed, unsigned) • 2 bytes (signed, unsigned, float) • 4 bytes (signed, unsigned, float)	
Trigger on Input A / B / C / D	trigger / no trigger
This parameter defines if when a value is received on the object "Input A",the calculated value for the output is sent on the bus or not..	