

A1P05QAT80 A2P05QAT80

Luminescence Sensors



Interface Protocol

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1. Control Characters

Character	ASCII	HEX	Function
/	47	2Fh	Start character
.	46	2Eh	Stop bit
NAK	21	15h	Negative acknowledge
BCC	2 Byte	qq	Checksum

2. Frame Layout for Data Transmission

Transmitting Partner	Characters (ASCII)		Receiving Partner	Frame Segment
Start character	/ (ASCII 47)	=>	Connect	Frame header
Length information	2 Byte	=>	Connect	Frame header
Command bytes	2 Byte	=>		Frame header
1 st data byte	2 Byte	=>	Data information	User data
2 nd data byte	2 Byte	=>		User data
..	..	=>	Data information	User data
n th data byte	..	=>	Data information	User data
BCC	2 Byte	=>		Frame end
Stop bit	. (ASCII 46)	=>	Disconnect	Frame end

2.1. Connect (frame header)

In order to establish a connection with the communications partner, the Sensor transmits the start bit: "/" (ASCII 47), followed by length information and a command byte for the data bytes.

2.2. Transmitting Data (user data)

After establishing a connection, user data are transmitted.

2.3. Disconnect (frame end)

If the NAK character is transmitted during data transfer, the wenglor® Sensor disconnects and establishes a new connection. After all data have been transmitted, the wenglor® Sensor transmits the checksum BCC and finally the stop bit: "." (ASCII 46).

2.4. Data Format

The data format for length information, user data and the checksum is always hexadecimal. The following range of ASCII characters may occur:

“0” (ASCII 48) – “9” (ASCII 57)

“A” (ASCII 65) – “F” (ASCII 70)

Example:

Data to be transmitted: decimal 123

Decimal Hexadecimal
123d = 7Bh

= > Transmitted character string “7” (ASCII 55) “B” (ASCII 66)

2.5. Calculating the Checksum BCC

The checksum is generated from an EXOR frame operation.

Calculation begins with the start bit and ends with the last character of the user data.

Example:

Transmitted Frame

Start character	Length	Command	Data	BBC	Stop bit
/	02	0D	00	59	.
2FH	30H 32H	30H 44H	30H 30H	35H 39H	2EH

Data ranged utilized for calculation of the checksum

Table 8

				Start	
				Transmitting Frame=“/020D0059.” (Example) Transmitting Frame Length=10 (in this example);	
				Checksum = 0; n = 1;	
				As long as: n < (Transmitting Frame Length - 3)	
				Checksum = Checksum EXOR Transmitting Frame character (n)	
				n = n + 1	
				End	
/	2FH	=	0010 1111	→ BCC = 59H	
0	30H	=	0011 0000		
	XOR	=	0001 1111		
2	32H	=	0011 0010		
	XOR	=	0010 1101		
0	30H	=	0011 0000		
	XOR	=	0001 1101		
D	44H	=	0100 0100		
	XOR	=	0101 1001		
0	30H	=	0011 0000		
	XOR	=	0111 1001		
0	30H	=	0011 0000		
BCC	XOR	=	0101 1001		

3. Commands

3.1. Commands Overview

Function	Command
Teach-In	T
Adjust on and Off-Delay	A
Read out intensity value	D
Set up output stages	O
Read out Sensor configuration	g
Change Sensor configuration	G
Query Sensor status	W
Execute Sensor reset	R
Query Sensor version	V

3.2. Description of the commands

In the next sections are explained the sensor commands and the bytes and bits fields used in these commands.

3.2.1. Teach-In

Function	Send Frame to the Sensor	Response Frame from the Sensor
Two-Point object	/020T0049.	/030MTa0qq.
Two-Point background	/020T0148.	/030MTa1qq.
Dynamic start	/020T024B.	/030MTa2qq.
Dynamic stop	/020T034A.	/030MTa3qq.
Potentiometer Function -1	/020T044D..	/030MTa4qq.
Potentiometer Function +1	/020T054C.	/030MTa5qq.
Potentiometer Function -16	/020T064F.	/030MTa6qq.
Potentiometer Function +16	/020T074E.	/030MTa7qq.

a: Potentiometer limit stop = 1, otherwise 0
 qq: Checksum

3.2.2. Adjust On and Off-Delay

Function	Send Frame to the Sensor	Response Frame from the Sensor
Adjust On-Delay	/040A01bbqq.	/030MA0111.
Adjust Off-Delay	/040A00bbqq.	/030MA0010.

bb: Delay value from 0 to 7
qq: Checksum

3.2.3. Read Out Intensity Value

Function	Send Frame to the Sensor	Response Frame from the Sensor
Query single value	/020D0059.	/0E0Dggggoooouuuaqq.
Activate continuous read-out	/020D0158.	/030MD0114. /040Kggggqq.*
Deactivate continuous read-out	/020D025B.	/030MD0217.

gggg: Intensity value Length: 4 bytes
oooo: Upper threshold Length: 4 bytes
uuuu: Lower threshold Length: 4 bytes
aa: Status of switching outputs Bit 0: output A, bit 1: output $\bar{A}$
*: Every 15 ms continuously
qq: Checksum

3.2.4. Change Sensor Output Stage Setting

The Sensor's output stage setting can be changed with this command.

Function	Send Frame to the Sensor	Response Frame from the Sensor
PNP outputs	/020O0153.	/030MO011F.
NPN outputs	/020O0250.	/030MO021C.
Push-Pull outputs	/020O0351.	/030MO031D.

3.2.5. Read Out Sensor Configuration

The entire Sensor configuration can be read out with this command.

Function	Send Frame to the Sensor	Response Frame from the Sensor
Read out configuration	/000g78.	/0E0gaaaabbbbccddeeffqq.

aaaa: Upper threshold
 bbbb: Lower threshold
 cc: Teach-In mode for external Teach-In
 02: Dynamic Teach-In
 03: Two-Point Teach-In
 dd: Selected Off-Delay
 00-07: 0-1-2-5-10-20-50-100 ms
 ee: Selected On-Delay
 00-07: 0-1-2-5-10-20-50-100 ms
 ff: Output stage programming
 01: PNP
 02: NPN
 03: Push-Pull
 qq : Checksum

3.2.6. Change Sensor Configuration

The entire Sensor configuration can be changed with this command.

Function	Send Frame to the Sensor	Response Frame from the Sensor
Change configuration	„/100Gaaaabbbbccddeeffqq.	/030MG0016.

aaaa: Upper threshold
 bbbb: Lower threshold
 cc: Teach-In mode for external Teach-In
 02: Dynamic Teach-In
 03: Two-Point Teach-In
 dd: Selected Off-Delay
 00-07: 0-1-2-5-10-20-50-100 ms
 ee: Selected On-Delay
 00-07: 0-1-2-5-10-20-50-100 ms
 ff: Output stage programming
 01: PNP
 02: NPN
 03: Push-Pull
 qq: Checksum

3.2.7. Query Sensor Status

Function	Send Frame to the Sensor	Response Frame from the Sensor
Query status	/000W48.	/0A0W000000ddeeqq.

dd: Off-delay value
ee: On-delay value
qq: Checksum

3.2.8. Execute Sensor Reset

Function	Send Frame to the Sensor	Response Frame from the Sensor
Execute reset	/000R4D.	/070V8a:bbccqq. /050ROK0007C. /030MR4D73.

a: Software version
bb: Sensor group (luminescence Sensor: OC)
cc: Sensor type (A1P05: 01, A1P16: 02, A2P05: 03, A2P16: 04)
qq: Checksum

3.2.9. Query Sensor Version

Function	Send Frame to the Sensor	Response Frame from the Sensor
Query Sensor version	/000V49.	/070V8a:bbccqq.

a: Software version
bb: Sensor group (luminescence Sensor: OC)
cc: Sensor type (A1P05: 01, A1P16: 02, A2P05: 03, A2P16: 04)
qq: Checksum

3.2.10. Error Messages

Function	Send Frame to the Sensor	Response Frame from the Sensor
Error frame	Faulty data	/030Xabbqq.

If the Sensor receives faulty data, for example an incorrect checksum or an unknown command, it responds with an error message.

a: Last valid command
bb: Last valid command set
qq: Checksum

