

# Interface Protocol

WP02

WP04



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## 1. Control Characters

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

## 2. Frame Layout for Data Transmission

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

### 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 information has 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)

At the command “Deactivate continuous read-out” a break of > 5 ms has to follow each sign.

2.5. Calculating the Checksum BCC

The checksum is generated from an EXOR link to the frame.  
Calculation begins with the start bit and ends with the last character of the user data.

Example:  
Transmitted Frame

Start bit	Lenght	Command	Data	BCC	Stop bit
/	02	0D	00	59	.
2FH	30H 32H	30H 44H	30H 30H	35H 39H	2EH
Data range utilized for calculation of the checksum					

/	2FH	=	0010	1111	
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	=	0010	0000	
	XOR	=	0111	1001	
0	30H	=	0010	0000	
BCC	XOR	=	0101	1001	=> BCC = 59H

3. Commands

3.1. Commands Overview

Function	Command
Teach-In	T
Adjust on and off-delay	A
Read out grey-scale value	D
Query sensor status	W
Execute sensor reset	R
Query sensor version	V

## 3.2. Description of the commands

### 3.2.1. Teachen

Function	Send Frame to the Sensor	Response Frame from the Sensor
Two-point object	/ 02 0T 00 49.	/ 03 06 T 007E.
Two-point background	/ 02 0T 01 48.	Signal difference OK: After approx. 1 sec: / 03 0M T 01 04. / 03 06 T 01 7F. Signal difference to small: / 03 06 T 11 7E.
Dynamic start	/ 02 0T 02 4AB.	/ 03 06 T 02 7C.
Dynamic stop	/ 02 0T 03 4A.	/ 03 0M T 03 06.
Potentiometer function threshold -1	/ 02 0T 04 4D.	/ 03 0M T a4 01.
Potentiometer function threshold +1	/ 02 0T 05 4C.	/ 03 0M T a5 00.
Potentiometer function threshold -16	/ 02 0T 06 4F.	/ 03 0M T a6 03.
Potentiometer function threshold +16	/ 02 0T 07 4E.	/ 03 0M T a7 02.

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	/ 04 0A 01 bb qq.	/ 03 0M A 01 11.
Adjust off-delay	/ 04 0A 00 bb qq.	/ 03 0M A 00 10.

bb: delay value from 0 to 7

qq: checksum

### 3.2.3. Read Out Grey-Scale Values

Function	Send Frame to the Sensor	Response Frame from the Sensor
Query single value	/ 02 0D 00 59.	/ 0E 0D gggg oooo uuuu aa qq.
Activate continuous read-out	/ 02 0D 01 58.	/ 03 0M D 01 14. / 04 0K gggg qq. *
Deactivate continuous read-out	/ 02 0D 02 5B.	/ 03 0M D 02 17.

gggg: Grey-scale value

Length: 4 Byte

oooo: Upper threshold

Length: 4 Byte

uuuu: Lower threshold

Length: 4 Byte

aa: Status of switching outputs

Bit 0 : Output A, Bit 1 : Output A

\*: Every 15 ms continuously

qq: Checksum

3.2.4. Query Sensor Status

Function	Send Frame to the Sensor	Response Frame from the Sensor
Query status	/ 00 0W 48.	/ 0A 0W 00 00 00 dd ee qq.

- dd: off-delay value
- ee: on-delay value
- qq: checksum

3.2.5. Execute Sensor Reset

Function	Send Frame to the Sensor	Response Frame from the Sensor
Execute reset	/ 00 0R 4D.	/ 07 0V 8a : bb cc qq. / 05 0R OK 0007C. /03 0M R 4D 73.

- a: Software version
- bb: Sensor group (printed marking scanner: 08)
- cc: Sensor type (WP02: 01, WP04: 02)
- qq: Checksum

3.2.6. Query Sensor Version

Function	Send Frame to the Sensor	Response Frame from the Sensor
Query Sensor Version:	/ 00 0V 49.	/ 07 0V 8a : bb cc qq.

- a: Software version
- bb: Sensor group (printed marking scanner: 08)
- cc: Sensor type (WP02: 01, WP04: 02)
- qq: Checksum

3.2.7. Transfer error message

On receipt of incorrect data, e.g. wrong checksum or unknown command, the Sensor sends back an error message.

Function	Send Frame to the Sensor	Response Frame from the Sensor
Error message	incorrect data	/ 03 0X a bb qq.

- a: Last valid command
- bb: Last valid addition
- qq: Checksum