RS485 Index Command List.
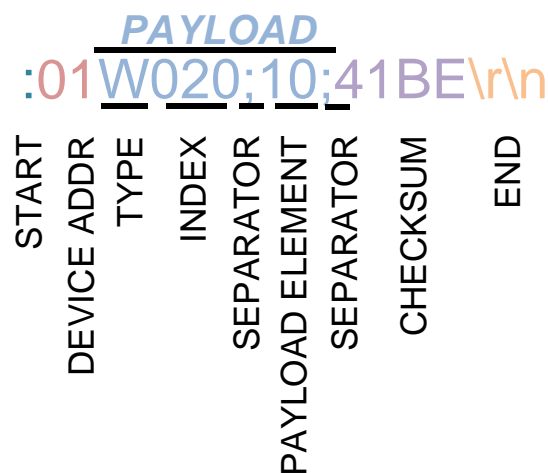## *PosCon OXC7.*

Contents

1 Introduction

This manual supplements the manual "RS485 Protocol Structure" and is valid for the Baumer PosCon CM sensors.

1.1 UART Interface Settings

Index Command	Value
Baud rate at power up	57600
Databits	8
Startbit	1
Stopbit	1
Parity	Even

2 Command Structure

An RS485 command is structured as follows.

PAYLOAD

:01W020;10;41BE\r\n

START
DEVICE ADDR
TYPE
INDEX
SEPARATOR
PAYLOAD ELEMENT
SEPARATOR
CHECKSUM
END

The information to be transmitted is called PAYLOAD and has to be sent in a so-called frame so that the command can be recognized and processed.

This frame always has the same structure and contains a start, a device address, a PAYLOAD, a checksum and an end.

START	DEVICE ADDR	PAYLOAD	CHECKSUM	END
1 char	2 char	n char	4 char	2 char
:	01…99	Index Command List	****	\r\n

3 Index Command List

Values marked with * are the Factory settings

Index	Read/Write		Content	Can be stored
6 (0x6)	RW		**Baudrate** Communication baud rate	Stored in configuration yes
	0	UINT8	0 38'400 1 * 57'600 2 115'200	

- Empty (Index)
- Offset
- Data Type
- Description (here 0 stands für 38400....)

3.1 Application Errors

0 (0x0)	R		**Application error** Contains the application error code of the last command. If an application error occurs, it is signalled using the underlying protocol. The error code has to be read immediately after the error is signalled. It will be overwritten by any other command.	Stored in configuration no
		UINT32	Application error 0 no error 1 value not accessible 10 all outputs off 20 display off 99 argument out of range 100 distance out of range 101 angle out of range 102 flatness out of range 103 length out of range	

3.2 Device identification

1 (0x1)	R		**Vendor info** Vendor information	Stored in configuration no
		UINT32	Vendor id 1 Baumer Electric AG	
		STRING 65	Vendor name default: `Baumer Electric AG`	

2 (0x2)	R		**Device info** Device information	Stored in configuration no
		UINT32	Device id	
		UINT32	Product id Material number	

| | | STRING 65 | Sensor type
E.g. OXE7.E25T-MB3E.SIMD.A7 | |
| | | STRING 15 | Serial number
1234567890AB | |

3.3 Communication features

5 (0x5)	RW		**Bus address**	Stored in configuration yes
		UINT8	Bus address Value range: `1 ... 99`	

6 (0x6)	RW		**Baudrate** Communication baud rate	Stored in configuration yes
		UINT8	Baudrate `0` 38'400 `1 *` 57'600 `2` 115'200	

3.4 User interface features

10 (0xA)	RW		**RS485 lock** Access lock for RS485. If the lock is activated, the sensor can be controlled using the touch buttons and all RS485 commands will be rejected (except access to this index). If the lock is deactivated, the sensor can be controlled using RS485. In this case, all physical outputs (switching and alarm out) will be deactivated and the LEDS will be set to a fixed state.	Stored in configuration no
		UINT8	RS485 lock `0` Lock deactivated `1 *` Lock activated	

11 (0xB)	RW		**Output reactivation** If enabled, the physical outputs (switching and alarm out) will be re-enabled. Be aware that using physical outputs and RS485 simultaneously may lead to interferences. When RS485 lock is active, the outputs are also activated regardless of this index.	Stored in configuration yes
		UINT8	Output reactivation `0 *` Outputs deactivated `1` Outputs activated	

15 (0xF)	RW		**Display language**	Stored in configuration yes
		UINT8	Display language `0 *` English `1` German `2` Italian `3` French	

16 (0x10)	RW		**Display backlight**	Stored in configuration yes
		UINT8	Display backlight 0 * 5 min Display backlight switched off after 5min inactivity. 1 10 min Display backlight switched off after 10min inactivity. 2 20 min Display backlight switched off after 20min inactivity. 3 Always on Display backlight is newer switched off.	

17 (0x11)	RW		**Touch button lock**	Stored in configuration yes
		UINT8	Touch button lock 0 * Touch buttons not locked 1 Touch buttons locked	

3.5   Measurement features

20 (0x14)	RW		**Measurement type selection**	Stored in configuration yes
		UINT8	Measurement type selection Measurement type to be used for display, digital and analogue output. 28 * Diameter 29 * X-center position 30 * Z-center position 31 * X-left position 32 * X-right position 33 * Z-top position	

21 (0x15)	R		**Measurement value** Measurement value selected by the "Measurement type selection" index.	Stored in configuration no
		FLOAT32	Measurement value [mm]	
		UINT8	Quality Quality of the optical input signal. 0 Valid 1 Low signal 2 No Object 4 No signal	

26 (0x1A)	R		**Circlefit values** The result of the circle fit.	Stored in configuration no
		UINT32	TimestampUs Timestamp in microseconds	
		UINT32	Quality Quality of the optical input signal. 0 Valid 1 Low signal 2 No Object 4 No signal	
		FLOAT32	Errorindicator Indicates the probable error of the fit Value range: -90000 ... 90000	
		FLOAT32	Diameter	

			Diameter of the Circle Value range: `0 ... 150`	
		FLOAT32	Center x X-Coordinate of the circle's centre in the current reference system Value range: `-90000 ... 90000`	
		FLOAT32	Center Z Z-Coordinate of the circle's centre in the current reference system Value range: `-90000 ... 90000`	
		FLOAT32	X Left X-Coordinate of the circle's centre minus half the diameter Value range: `-90000 ... 90000`	
		FLOAT32	X Right X-Coordinate of the circle's centre plus half the diameter Value range: `-90000 ... 90000`	
		FLOAT32	Z Top Z-Coordinate of the circle's centre plus half the diameter Value range: `-90000 ... 90000`	

30 (`0x1E`)	`RW`		**Field of view X** Lateral measuring field. Note that the difference between "limit right" and "Limit left" must be at least 10 mm.	Stored in configuration yes
		INT16	Limit left Field of view left limitation [mm]. Must be smaller then "Limit right". Value range: `-62 ... 62`	
		INT16	Limit right Field of view right limitation [mm]. Must be greater then "Limit left". Value range: `-62 ... 62`	

38 (`0x26`)	`RW`		**Field of view Z** Axial measuring field.	Stored in configuration yes
		FLOAT32	Offset Offset from the reference plane to the measurement field's far end [mm]. Value range: `0 ... 100`	
		FLOAT32	Height Height of the measurement field (not including the offset) [mm]. Note that the sum of height and offset might not be greater than 100 mm. Value range: `5 ... 100`	

39 (`0x27`)	`W`		**Set field of view auto** Sets "Limit left" and "Limit right" to computed values such that the measure range is rectangular and of the given height.	Stored in configuration yes
		FLOAT32	Height Height of the measurement field (not including the offset) [mm]. Note that the sum of height and offset might not be greater than 100 mm. Value range: `5 ... 100`	

31 (0x1F)	W		**Set field of view to MAX command** Sets the field of view to its maximum values in x and z dimensions.	Stored in configuration no
		UINT8	Set field of view to MAX command 1 Set field of view to MAX	

32 (0x20)	RW		**Object type** Adjust the exposure time for either dark target objects or bright target objects. Selecting "Dark object" will lead to a longer measurement cycle.	Stored in configuration yes
		UINT8	Object type 0 * Bright object 1 Dark object	

33 (0x21)	RW		**Precision** Adjusts the filtering of the measured values.	Stored in configuration yes
		UINT8	Precision 0 * Standard 1 High 2 Very high	

34 (0x22)	RW		**Laser off data hold** If activated, the measurement will be suspended and the laser is switched off. All outputs will hold the current value. The teach flex mount command and the diagnose mode (index 37, 50) are disabled. If deactivated, the measurement will continue.	Stored in configuration no
		UINT8	Laser off data hold 0 * Measurement is running 1 Measurement is holding	

3.6 Flex mount

35 (0x23)	RW		**Flex mount enable** See operating instructions for details.	Stored in configuration yes
		UINT8	Flex mount enable 0 * Disabled 1 Enabled	

36 (0x24)	RW		**Set flex mount** See operating instructions for details.	Stored in configuration yes
		FLOAT32	Angle Flex mount rotation angle [deg].	
		FLOAT32	Distance Flex mount offset distance [mm]. (i.e. the distance between the sensor and the reference plane measured along the z-axis)	

37 (0x25)	W		**Teach flex mount command** See operating instructions for details.	Stored in configuration no
		FLOAT32	Reference thickness [mm]	

3.7 Output configuration

40 (0x28)	RW		**Digital output configuration** Configuration of the digital output.	Stored in configuration yes
		FLOAT32	Switch point 1 Lower switch point of the digital output. Meaning and limits depend on the current measurement type selection. Value range: 0 ... 60	
		FLOAT32	Switch point 2 Upper switch point of the digital output. Meaning and limits depend on the current measurement type selection. Will be ignored with output type "Point", if output type "Window" is selected, then "Switch point 2" has to be greater than "Switch Point 1". Value range: 0 ... 60	
		UINT8	Digital output type 0 * Point 1 Window	
		UINT8	Digital output polarity 0 * Active high 1 Active low	

41 (0x29)	RW		**Analog output configuration** The analog output can be set as current or voltage output.	Stored in configuration yes
		UINT8	Analog output type 0 * Current 1 Voltage	
		UINT8	Analog output slope Slope of the analog characteristic curve. Can be positive (minimum output at minimum measurement value, fullscale output at maximum measurement value) or negative (vice versa). 0 * Positive 1 Negative	

42 (0x2A)	RW		**Analog output scaling** Points within the measuring range where the analog output value reaches its minimum/ full scale value (depends on "Analog output slope" setting).	Stored in configuration yes
		FLOAT32	Analog scaling start point [mm]	
		FLOAT32	Analog scaling stop point [mm]	

43 (0x2B)	W		**Set analog out scale to MAX command** Sets the analogue output scaling to its maximum values.	Stored in configuration no
		UINT8	Set analog out scale to MAX command 1 Set analog out scale to MAX.	

3.8 Diagnosis features

50 (0x32)	RW		**Diagnose mode** If diagnose mode is activated, the diagnosis features (live monitor and profile) can be used. During diagnose mode the	Stored in configuration no

			digital output will be set to a fixed value. The standard measurement values are not accessible (index 25,26) and the laser can't be switched off (index 34).	
		UINT8	Diagnose mode `0 *` Deactivated `1` Activated	

51 (`0x33`)	R		**Live monitor** The Live monitor values are based on the learned reference plane (Flex mount feature).	Stored in configuration no
		FLOAT32	Angle [deg] Value range: `-60 ... 60`	
		FLOAT32	Center height Height [mm] Value range: `0 ... 250`	
		FLOAT32	Left edge rising [mm]	

3.9   Configuration storage features

200 (`0xC8`)	W		**Load configuration command** Loads the selected configuration to ram (current configuration). For permanent storage of the loaded values, the "Store configuration command" has to be used.	Stored in configuration no
		UINT8	Configuration number `0` Active config `1` Config 1 `2` Config 2 `3` Config 3	

201 (`0xC9`)	W		**Store configuration command** Permanently stores the current configuration.	Stored in configuration no
		UINT8	Configuration number `0` Active config Current configuration will be stored to the active configuration. `1` Config 1 Current configuration will be stored to Config 1. `2` Config 2 Current configuration will be stored to Config 2. `3` Config 3 Current configuration will be stored to Config 3.	

202 (`0xCA`)	W		**Reset to factory settings command** All configurations will be reset to factory settings. The sensor will reboot after execution of this command.	Stored in configuration no
		UINT8	Reset to factory settings command `0` Reset to factory settings	

203 (`0xCB`)	R		**Configuration 1** Values stored in configuration 1.	Stored in configuration no
		UINT8	Measurement type selection Measurement type to be used for display, digital and analogue output. `28 *` Diameter `29 *` X-center position `30 *` Z-center position `31 *` X-left position `32 *` X-right position	

			`33 *` Z-top position
		UINT8	Object type `0 *` Bright object `1` Dark object
		UINT8	Precision `0 *` Standard `1` High `2` Very high
		UINT8	Flex mount enable `0 *` Disabled `1` Enabled
		FLOAT32	Angle Flex mount rotation angle [deg].
		FLOAT32	Distance Flex mount offset distance [mm]. (i.e. the distance between the sensor and the reference plane measured along the z-axis)
		INT16	Limit left Field of view left limitation [mm]. Must be smaller then "Limit right". Value range: `-62 ... 62`
		INT16	Limit right Field of view right limitation [mm]. Must be greater then "Limit left". Value range: `-62 ... 62`
		FLOAT32	Analog scaling start point [mm]
		FLOAT32	Analog scaling stop point [mm]
		UINT8	Analog output type `0 *` Current `1` Voltage
		UINT8	Analog output slope Slope of the analog characteristic curve. Can be positive (minimum output at minimum measurement value, fullscale output at maximum measurement value) or negative (vice versa). `0 *` Positive `1` Negative
		UINT8	Digital output type `0 *` Point `1` Window
		UINT8	Digital output polarity `0 *` Active high `1` Active low
		FLOAT32	Switch point 1 Lower switch point of the digital output. Meaning and limits depend on the current measurement type selection. Value range: `0 ... 60`
		FLOAT32	Switch point 2 Upper switch point of the digital output. Meaning and limits depend on the current measurement type selection. Will be ignored with output type "Point", if output type "Window" is selected, then "Switch point 2" has to be greater then "Switch Point 1". Value range: `0 ... 60`
		FLOAT32	Offset Offset from the reference plane to the measurement field's far end [mm].

			Value range: `0 ... 100`	
		FLOAT32	Height Height of the measurement field (not including the offset) [mm]. Note that the sum of height and offset might not be greater than 100 mm. Value range: `5 ... 100`	

204 (`0xCC`)	R		**Configuration 2** Values stored in configuration 2.	Stored in configuration no
		UINT8	Measurement type selection Measurement type to be used for display, digital and analogue output. `28 *` Diameter `29 *` X-center position `30 *` Z-center position `31 *` X-left position `32 *` X-right position `33 *` Z-top position	
		UINT8	Object type `0 *` Bright object `1` Dark object	
		UINT8	Precision `0 *` Standard `1` High `2` Very high	
		UINT8	Flex mount enable `0 *` Disabled `1` Enabled	
		FLOAT32	Angle Flex mount rotation angle [deg].	
		FLOAT32	Distance Flex mount offset distance [mm]. (i.e. the distance between the sensor and the reference plane measured along the z-axis)	
		INT16	Limit left Field of view left limitation [mm]. Must be smaller then "Limit right". Value range: `-62 ... 62`	
		INT16	Limit right Field of view right limitation [mm]. Must be greater then "Limit left". Value range: `-62 ... 62`	
		FLOAT32	Analog scaling start point [mm]	
		FLOAT32	Analog scaling stop point [mm]	
		UINT8	Analog output type `0 *` Current `1` Voltage	
		UINT8	Analog output slope Slope of the analog characteristic curve. Can be positive (minimum output at minimum measurement value, fullscale output at maximum measurement value) or negative (vice versa). `0 *` Positive `1` Negative	
		UINT8	Digital output type `0 *` Point	

			1 Window		
		UINT8	Digital output polarity 0 * Active high 1 Active low		
		FLOAT32	Switch point 1 Lower switch point of the digital output. Meaning and limits depend on the current measurement type selection. Value range: 0 ... 60		
		FLOAT32	Switch point 2 Upper switch point of the digital output. Meaning and limits depend on the current measurement type selection. Will be ignored with output type "Point", if output type "Window" is selected, then "Switch point 2" has to be greater then "Switch Point 1". Value range: 0 ... 60		
		FLOAT32	Offset Offset from the reference plane to the measurement field's far end [mm]. Value range: 0 ... 100		
		FLOAT32	Height Height of the measurement field (not including the offset) [mm]. Note that the sum of height and offset might not be greater than 100 mm. Value range: 5 ... 100		

205 (0xCD)	R		**Configuration 3** Values stored in configuration 3.	Stored in configuration no	
		UINT8	Measurement type selection Measurement type to be used for display, digital and analogue output. 28 * Diameter 29 * X-center position 30 * Z-center position 31 * X-left position 32 * X-right position 33 * Z-top position		
		UINT8	Object type 0 * Bright object 1 Dark object		
		UINT8	Precision 0 * Standard 1 High 2 Very high		
		UINT8	Flex mount enable 0 * Disabled 1 Enabled		
		FLOAT32	Angle Flex mount rotation angle [deg].		
		FLOAT32	Distance Flex mount offset distance [mm]. (i.e. the distance between the sensor and the reference plane measured along the z-axis)		
		INT16	Limit left Field of view left limitation [mm]. Must be smaller then "Limit right". Value range: –62 ... 62		
		INT16	Limit right Field of view right limitation [mm]. Must be greater then "Limit left".		

			Value range: `-62 ... 62`	
		`FLOAT32`	Analog scaling start point [mm]	
		`FLOAT32`	Analog scaling stop point [mm]	
		`UINT8`	Analog output type `0 *` Current `1` Voltage	
		`UINT8`	Analog output slope Slope of the analog characteristic curve. Can be positive (minimum output at minimum measurement value, fullscale output at maximum measurement value) or negative (vice versa). `0 *` Positive `1` Negative	
		`UINT8`	Digital output type `0 *` Point `1` Window	
		`UINT8`	Digital output polarity `0 *` Active high `1` Active low	
		`FLOAT32`	Switch point 1 Lower switch point of the digital output. Meaning and limits depend on the current measurement type selection. Value range: `0 ... 60`	
		`FLOAT32`	Switch point 2 Upper switch point of the digital output. Meaning and limits depend on the current measurement type selection. Will be ignored with output type "Point", if output type "Window" is selected, then "Switch point 2" has to be greater then "Switch Point 1". Value range: `0 ... 60`	
		`FLOAT32`	Offset Offset from the reference plane to the measurement field's far end [mm]. Value range: `0 ... 100`	
		`FLOAT32`	Height Height of the measurement field (not including the offset) [mm]. Note that the sum of height and offset might not be greater than 100 mm. Value range: `5 ... 100`	
206 (`0xCE`)	R		**Active configuration** Values stored in the active configuration (0).	Stored in configuration no
		`UINT8`	Measurement type selection Measurement type to be used for display, digital and analogue output. `28 *` Diameter `29 *` X-center position `30 *` Z-center position `31 *` X-left position `32 *` X-right position `33 *` Z-top position	
		`UINT8`	Object type `0 *` Bright object `1` Dark object	
		`UINT8`	Precision `0 *` Standard `1` High	

			2 Very high
		UINT8	Flex mount enable 0 * Disabled 1 Enabled
		FLOAT32	Angle Flex mount rotation angle [deg].
		FLOAT32	Distance Flex mount offset distance [mm]. (i.e. the distance between the sensor and the reference plane measured along the z-axis)
		INT16	Limit left Field of view left limitation [mm]. Must be smaller then "Limit right". Value range: –62 ... 62
		INT16	Limit right Field of view right limitation [mm]. Must be greater then "Limit left". Value range: –62 ... 62
		FLOAT32	Analog scaling start point [mm]
		FLOAT32	Analog scaling stop point [mm]
		UINT8	Analog output type 0 * Current 1 Voltage
		UINT8	Analog output slope Slope of the analog characteristic curve. Can be positive (minimum output at minimum measurement value, fullscale output at maximum measurement value) or negative (vice versa). 0 * Positive 1 Negative
		UINT8	Digital output type 0 * Point 1 Window
		UINT8	Digital output polarity 0 * Active high 1 Active low
		FLOAT32	Switch point 1 Lower switch point of the digital output. Meaning and limits depend on the current measurement type selection. Value range: 0 ... 60
		FLOAT32	Switch point 2 Upper switch point of the digital output. Meaning and limits depend on the current measurement type selection. Will be ignored with output type "Point", if output type "Window" is selected, then "Switch point 2" has to be greater then "Switch Point 1". Value range: 0 ... 60
		FLOAT32	Offset Offset from the reference plane to the measurement field's far end [mm]. Value range: 0 ... 100
		FLOAT32	Height Height of the measurement field (not including the offset) [mm]. Note that the sum of height and offset might not be greater than 100 mm. Value range: 5 ... 100

4 Example commands

Example commands with standard Device Address (01).

Command	Description
:01W010;0;E9C3\r\n	RS485 lock deactivated
:01R002;3955\r\n	Device Info (Article number, sensor type...)
:01R006;F957\r\n	Check Baud rate
:01W006;2;C1FF\r\n	Set Baud rate to 2 = 115'200
:01W011;1;85C3\r\n	Reactivate analog and digital sensor outputs
:01R021;09F4\r\n	Get the measuring value
:01W020;28;8149\r\n	Set measurement type to Diameter
:01W020;29;1148\r\n	Set measurement type to X-center position
:01W020;30;811F\r\n	Set measurement type to Z-center position
:01W020;31;111E\r\n	Set measurement type to X-left position
:01W020;32;E11E\r\n	Set measurement type to X-right position
:01W020;33;711F\r\n	Set measurement type to Z-top position
:01W032;0;91BB\r\n	Set object type bright
:01W032;1;01BA\r\n	Set object type dark
:01W035;1;75BB\r\n	Enable FLEX MOUNT
:01W037;0;5DBB\r\n	Teach-In FLEX MOUNT to actual reference surface with a correction of 0mm
:01W201;0;37FE\r\n	Store active configuration permanent to sensor
:01W202;0;73FE\r\n	Reset to factory settings

5 Appendix

5.1 Dependencies

Because some commands are dependent on one another, they can be executed only if certain settings were configured in advance. Important: Before RS485 commands can be sent, RS485 must be unlocked via the command :01W010;0;E9C3\r\n (010 RS485 lock).

Input configuration — Index description / Index no.:

Index description	Index no.
RS485 lock	10
Diagnose mode	50
Laser off data hold	34
Precision	33

Output — Index description / Index no.:

Index description	Index no.
Application error	0
Vendor info	1
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Configuration 2	204
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Active Configuration	206

Configuration rows:

RS485 lock	Diagnose mode	Laser off data hold	Precision
locked			
unlocked	off	running	Standard
			not Standard
		hold	Standard
			not Standard
	on		

Legend:

- ☐ Index locked
- ■ Index unlocked

6   History of changes

Date	Version	Description
31.08.2016	1.0	Document created
02.02.2017	1.1	Dependency matrix actualized, diameter range adjusted, minor changings
07.06.2017	1.2	Chapter example commands implemented

Baumer
Passion for Sensors