RS485 Index Command List.

OM70 laser point / laser line – Tolerance sensors.

Contents

1 Introduction

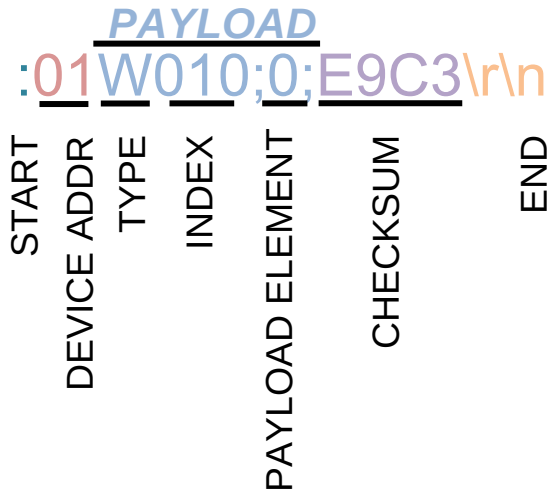
This manual supplements the manual "RS485 Protocol Structure" and is valid for the Baumer OM70 laser point / laser line sensors.

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 (RS485 unlock):

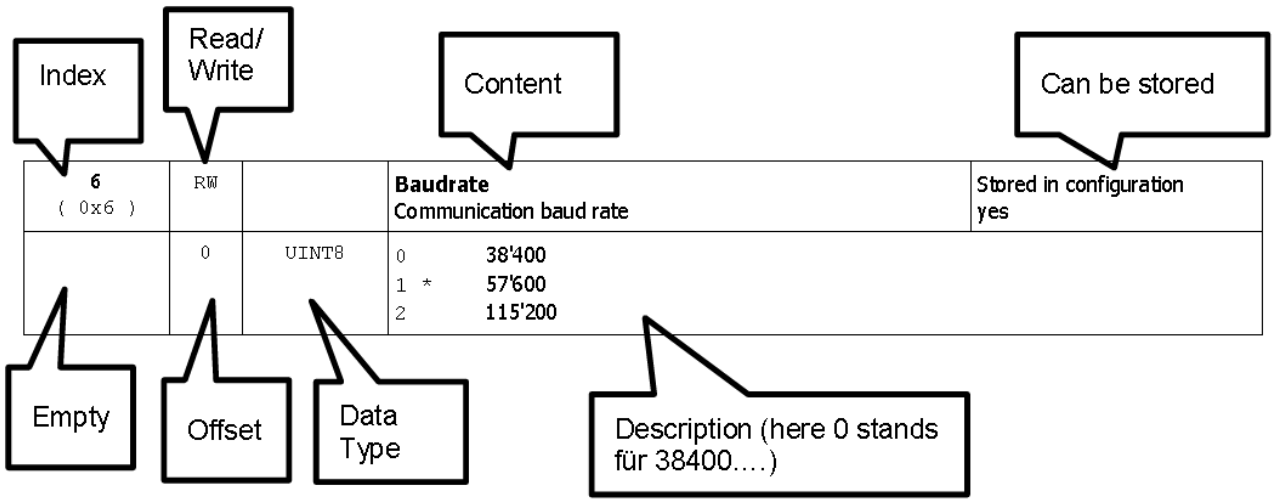


The information to be transmitted is called PAYLOAD and has to be sent in a so-called frame so that the command can be recognized and processed.
This frame always has the same structure and contains a start, a device address, a PAYLOAD, a checksum and an end.

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



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 99 argument out of range 100 distance out of range 104 analog tolerance out of range 105 digital tolerance out of range 106 teaching procedure failed	

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 Eg. 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 3 230'400 4 460'800 5 921'600 6 1'500'000	

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 (analog, switching and alarm out) and the LEDs will be set to a fixed state. Writing into this index also automatically deactivates the diagnose mode (50), if it was previously enabled.	Stored in configuration no
		UINT8	RS485 lock 0 Lock deactivated 1 * Lock activated	

11 (0xB)	RW		**Output reactivation** If enabled, the physical outputs (analog, switching and alarm out) will be re-enabled. Be aware that using physical outputs and RS485 simultaneously may lead to interferences. When RS485 lock (10) is active, the outputs are also activated regardless of this index. This index is not accessible during RS485 streaming mode (44).	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	
17 (0x11)	RW		**Touch button lock**	Stored in configuration yes
		UINT8	Touch button lock 0 * Touch buttons not locked 1 Touch buttons locked	

18 (0x12)	RW		**Trigger mode**	Stored in configuration yes
		UINT8	Trigger mode This index defines how the sensor outputs will react on changes on the trigger/Sync line. When "Triggered free running measurement" is set, the sensor outputs will be continuously updated when the trigger/Sync line is low. When "Triggered single shot measurement" is set, the outputs are updated only with falling edge on the trigger/Sync line. Trigger mode cannot be changed during RS485 streaming mode (44) and during diagnose mode (50). 0 * Triggered free running measurement 1 Triggered single shot measurement	

3.5 Measurement features

20 (0x14)	R		**Measurement type selection**	Stored in configuration no
		UINT8	Measurement type selection Measurement type to use for outputs. 27 Distance 34 * Tolerance	

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 and other additional information to measurement. 0 Valid 1 Low signal 4 No signal 6 Lost trigger 7 Poor quality and lost trigger 8 Poor quality 9 Invalid signal 10 Too much ambient light 11 Behind range 12 Before range 13 Warm-up	

33 (0x21)	RW		**Precision** Adjust the filtering of the measured values.	Stored in configuration yes
		UINT8	Precision 0 Standard 1 High 2 * Very high 3 Highest	

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. If deactivated, the measurement will continue. This index will also be activated with the trigger line being high or trigger mode (18) being set to „Triggered single shot measurement".	Stored in configuration no
		UINT8	Laser off data hold 0 * Measurement is running 1 Measurement is holding	

3.6 Output configuration

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	

44 (0x2C)	RW		**RS485 streaming mode** When enabled, measured data is pushed to the RS485 bus without request as soon as it is available (the used trigger mode (18) has to be considered). Data is sent in the format corresponding to index "measurement value" (21) with special message type - 'S' for human readable coding (instead of common 'A' for ACK), 0x08 for machine coding. During RS485 streaming mode it is only possible to configure the sensor while the trigger line is high. All other outputs (11) are deactivated when RS485 streaming mode is enabled. The reply to configuring this index may take up to t_answer_extended (200ms).	Stored in configuration no
		UINT8	Streaming mode 0 * RS485 streaming mode disabled 1 RS485 streaming mode enabled	

45 (0x2D)	RW		**Digital out hysteresis configuration** Settings of the digital output hysteresis - its width and alignment. Values for Hysteresis 1 and Hysteresis 2 must be equal.	Stored in configuration yes
		FLOAT32	Hysteresis 1 Width of hysteresis 1 [mm] (for SP1)	
		FLOAT32	Hysteresis 2 Width of hysteresis 2 [mm] (for SP2)	
		UINT8	Hysteresis alignment 4 INNER ALIGNMENT 5 * OUTER ALIGNMENT	

46 (0x2E)	W		**Teach command** Applies current distance as selected parameter. The teaching procedure takes approximately 2 seconds. During this time, the sensor indicates it is busy by using the underlying protocol. The measurement needs to be running in order to perform teaching succesfully. If a teach attempt is done when the trigger mode (18) is configured to "Triggered single shot measurement", it is temporarily switched to "Triggered free running measurement" for purpose of teaching. This automatic switching of trigger mode may take up to 1 second. This command is not accessible during RS485 streaming mode (44) and during diagnose mode (50).	Stored in configuration no
		UINT8	Parameter to teach Selection of parameter where teaching should be applied. 1 Common analog and digital out reference point	

47 (0x2F)	RW		**Reference point** The reference point for tolerance configuration.	Stored in configuration yes
		FLOAT32	Reference point Numeric value of reference point common for both analog and digital output of tolerance sensor [mm]	

48 (0x30)	RW		**Digital tolerance settings** Configuration of digital out tolerance values.	Stored in configuration yes
		FLOAT32	Digital tolerance near [mm]	
		FLOAT32	Digital tolerance far [mm]	
		UINT8	Digital output polarity Defines the active level of the digital output. 0 * Active high 1 Active low	

49 (0x31)	RW		**Analog tolerance settings** Configuration of analog out tolerance values. Values for Analog tolerance near and Analog tolerance far must be equal.	Stored in configuration yes
		FLOAT32	Analog tolerance near [mm]	
		FLOAT32	Analog tolerance far [mm]	

3.7 Diagnosis features

50 (0x32)	RW		**Diagnose mode** If diagnose mode is activated, the diagnosis features (live monitor) can be used. To activate diagnose mode, following preconditions need to be met: trigger line signal is low, trigger mode (18) is configured to "Triggered free running measurement", the RS485 streaming mode (44) is disabled and the measurement is running (34). To deactivate diagnose mode or to read its state, no preconditions need to be met.	Stored in configuration no
		UINT8	Diagnose mode 0 * Deactivated 1 Activated	

54 (0x36)	R		**Live monitor** Live monitor values	Stored in configuration no
		FLOAT32	Measuring rate [Hz]	
		FLOAT32	Current distance [mm]	
		FLOAT32	Object reflectivity exposure reserve [-] (max possible exposure divided by current exposure)	

3.8 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. This command is not accessible during RS485 streaming mode (44) and during diagnose mode (50).	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. This command is not accessible during the RS485 streaming mode (44).	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	

207 (0xCF)	R		**Configuration 1** Values stored in configuration 1.	Stored in configuration no
		UINT32	Product id Material number	
		UINT8	Measurement type selection Measurement type to use for outputs. 27 Distance 34 * Tolerance	
		UINT8	Precision 0 Standard 1 High 2 * Very high 3 Highest	
		UINT8	Trigger mode This index defines how the sensor outputs will react on changes on the trigger/Sync line. When "Triggered free running measurement" is set, the sensor outputs will be continuously updated when the trigger/Sync line is low. When "Triggered single shot measurement" is set, the outputs are updated only with falling edge on the trigger/Sync line. Trigger mode cannot be changed during RS485 streaming mode (44) and during diagnose mode (50). 0 * Triggered free running measurement 1 Triggered single shot measurement	
		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 2 * Tolerance	
		UINT8	Digital output polarity Defines the active level of the digital output. 0 * Active high 1 Active low	
		UINT8	Hysteresis alignment 4 INNER ALIGNMENT 5 * OUTER ALIGNMENT	
		FLOAT32	Analog tolerance near [mm]	
		FLOAT32	Analog tolerance far [mm]	
		FLOAT32	Digital tolerance near [mm]	
		FLOAT32	Digital tolerance far [mm]	
		FLOAT32	Reference point Numeric value of reference point common for both analog and digital output of tolerance sensor [mm]	
		FLOAT32	Hysteresis 1 Width of hysteresis 1 [mm] (for SP1)	
		FLOAT32	Hysteresis 2 Width of hysteresis 2 [mm] (for SP2)	

208 (0xD0)	R		**Configuration 2** Values stored in configuration 2.	Stored in configuration no
		UINT32	Product id Material number	
		UINT8	Measurement type selection Measurement type to use for outputs. 27 Distance 34 * Tolerance	
		UINT8	Precision 0 Standard 1 High 2 * Very high 3 Highest	
		UINT8	Trigger mode This index defines how the sensor outputs will react on changes on the trigger/Sync line. When "Triggered free running measurement" is set, the sensor outputs will be continuously updated when the trigger/Sync line is low. When "Triggered single shot measurement" is set, the outputs are updated only with falling edge on the trigger/Sync line. Trigger mode cannot be changed during RS485 streaming mode (44) and during diagnose mode (50). 0 * Triggered free running measurement 1 Triggered single shot measurement	
		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 2 * Tolerance	
		UINT8	Digital output polarity Defines the active level of the digital output. 0 * Active high 1 Active low	
		UINT8	Hysteresis alignment 4 INNER ALIGNMENT 5 * OUTER ALIGNMENT	
		FLOAT32	Analog tolerance near [mm]	
		FLOAT32	Analog tolerance far [mm]	
		FLOAT32	Digital tolerance near [mm]	
		FLOAT32	Digital tolerance far [mm]	
		FLOAT32	Reference point Numeric value of reference point common for both analog and digital output of tolerance sensor [mm]	
		FLOAT32	Hysteresis 1 Width of hysteresis 1 [mm] (for SP1)	
		FLOAT32	Hysteresis 2 Width of hysteresis 2 [mm] (for SP2)	

209 (0xD1)	R		**Configuration 3** Values stored in configuration 3.	Stored in configuration no
		UINT32	Product id Material number	
		UINT8	Measurement type selection Measurement type to use for outputs. 27 Distance 34 * Tolerance	
		UINT8	Precision 0 Standard 1 High 2 * Very high 3 Highest	
		UINT8	Trigger mode This index defines how the sensor outputs will react on changes on the trigger/Sync line. When "Triggered free running measurement" is set, the sensor outputs will be continuously updated when the trigger/Sync line is low. When "Triggered single shot measurement" is set, the outputs are updated only with falling edge on the trigger/Sync line. Trigger mode cannot be changed during RS485 streaming mode (44) and during diagnose mode (50). 0 * Triggered free running measurement 1 Triggered single shot measurement	
		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 2 * Tolerance	
		UINT8	Digital output polarity Defines the active level of the digital output. 0 * Active high 1 Active low	
		UINT8	Hysteresis alignment 4 INNER ALIGNMENT 5 * OUTER ALIGNMENT	
		FLOAT32	Analog tolerance near [mm]	
		FLOAT32	Analog tolerance far [mm]	
		FLOAT32	Digital tolerance near [mm]	
		FLOAT32	Digital tolerance far [mm]	
		FLOAT32	Reference point Numeric value of reference point common for both analog and digital output of tolerance sensor [mm]	
		FLOAT32	Hysteresis 1 Width of hysteresis 1 [mm] (for SP1)	
		FLOAT32	Hysteresis 2 Width of hysteresis 2 [mm] (for SP2)	

210 (0xD2)	R		**Active configuration** Values stored in active configuration.	Stored in configuration no
		UINT32	Product id Material number	
		UINT8	Measurement type selection Measurement type to use for outputs. 27 Distance 34 * Tolerance	
		UINT8	Precision 0 Standard 1 High 2 * Very high 3 Highest	
		UINT8	Trigger mode This index defines how the sensor outputs will react on changes on the trigger/Sync line. When "Triggered free running measurement" is set, the sensor outputs will be continuously updated when the trigger/Sync line is low. When "Triggered single shot measurement" is set, the outputs are updated only with falling edge on the trigger/Sync line. Trigger mode cannot be changed during RS485 streaming mode (44) and during diagnose mode (50). 0 * Triggered free running measurement 1 Triggered single shot measurement	
		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 2 * Tolerance	
		UINT8	Digital output polarity Defines the active level of the digital output. 0 * Active high 1 Active low	
		UINT8	Hysteresis alignment 4 INNER ALIGNMENT 5 * OUTER ALIGNMENT	
		FLOAT32	Analog tolerance near [mm]	
		FLOAT32	Analog tolerance far [mm]	
		FLOAT32	Digital tolerance near [mm]	
		FLOAT32	Digital tolerance far [mm]	
		FLOAT32	Reference point Numeric value of reference point common for both analog and digital output of tolerance sensor [mm]	
		FLOAT32	Hysteresis 1 Width of hysteresis 1 [mm] (for SP1)	
		FLOAT32	Hysteresis 2 Width of hysteresis 2 [mm] (for SP2)	

4 Appendix

4.1 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: RS485 lock, Laser off data hold *, Diagnose mode, RS485 Streaming mode

Index description	RS485 lock	Laser off data hold *	Diagnose mode	RS485 Streaming mode	Application error	Vendor info	Device info	Bus address	Baudrate	RS485 lock	Output reactivation	Display language	Display backlight	Touch button lock	Trigger mode	Measurement type selection	Measurement value	Precision	Laser off data hold *	Digital out configuration	Analog out configuration	Analog out scale	Set analog out scale to max command	RS485 Streaming mode	Digital out hysteresis configuration	Teach command	Reference point configuration	Digital tolerance settings	Analog tolerance settings	Diagnose mode	Live monitor	Load configuration command	Store configuration command	Reset to factory settings command	Configuration 1	Configuration 2	Configuration 3	Active Configuration	Diagnose data	Measurement value with meas. status
Index no.	10	34	50	44	0	1	2	5	9	10	11	15	16	17	18	20	21	33	34	40	41	42	43	44	45	46	47	48	49	50	54	200	201	202	207	208	209	210	253	254
Configuration	locked									R/W																														
Configuration	unlocked	laser on (0)	on	off	R	R	R	R/W	R/W	R/W	R/W	R/W		R/W		R	R	R/W			R/W				R/W	W	R/W	R/W	R/W	R/W	R		W	W	R	R	R	R	Ri	Ri
Configuration	unlocked	laser on (0)	off	off	R	R	R	R/W	R/W	R/W	R/W	R/W		R/W	R/W	R	R	R/W	R/W		R/W			R/W	R/W	W	R/W	R/W	R/W	R/W		W	W	W	R	R	R	R	Ri	Ri
Configuration	unlocked	laser on (0)	off	on	R	R	R	R/W	R/W			R/W		R/W		R	R	R/W			R/W			R/W	R/W		R/W	R/W	R/W					W	R	R	R	R	Ri	Ri
Configuration	unlocked	laser off			R	R	R	R/W	R/W	R/W	R/W	R/W		R/W	R/W	R	R	R/W	R/W		R/W				R/W		R/W	R/W	R/W	R		W	W	W	R	R	R	R	Ri	Ri

Legend

W	Index unlocked for write access
R	Index unlocked for read access
Ri	Index with read access, only for internal use inside Baumer (accessible if parameter ProductionBlock->RS485Settings->b_Rs485_EnableInternalIndices = 1)
R/W	Index unlocked for read/write access
	Index locked

* Laser of data hold command (34) has similar impact as pulling the trigger/sync signal line. If set to 1, the laser is switched off regardless the trigger line state and current trigger mode (18). If set to 0, the laser state is controller by trigger line depending on current trigger mode (18). Reading from this index always returns the actual state of the laser.

**Diagnose mode (50) can be activated (by writing 1 into it) only when following preconditions are met: RS485 streaming mode (44) disabled, trigger mode (18) set to "Triggered free running measurement", Laser on (34) and trigger line signal being low. No preconditions have to be met to disable the diagnose mode (by writing 0 into it). If not specified otherwise by the table above, the diagnose mode index is unlocked for read access.

5 History of changes

Date	Version	Description
10.11.2017	1.0	Document created

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