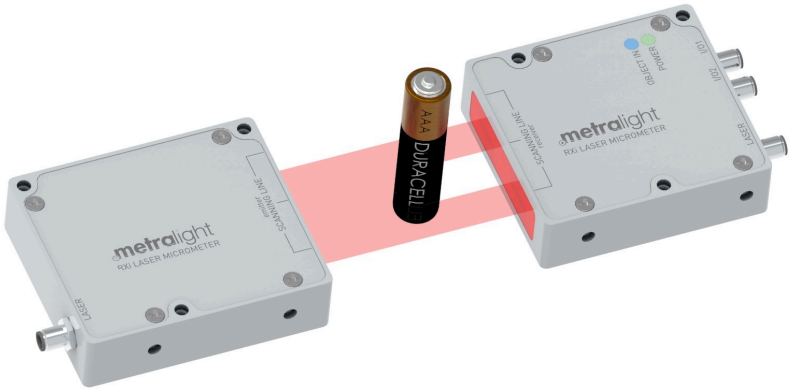
metralight

RXi Sensor

Technical specification (rev.A, February 2020), sensor firmware: 111 3v5



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1. Introduction

The RXi sensor is smallest high accuracy laser micrometer intended for industrial applications. It provides serial (RS232) or analog interface. Custom options (special measuring modes, vibration) are available upon request.

RXi sensor specification	
Detection method	Laser through-beam with CMOS element
Light source	670nm Class I Laser diode
Output	Serial (RS232) or Analog Voltage
Measurement Range	140 µm to 28 mm
Resolution	0.4375 µm
Response Time	0.391 ms
Non-Linearity	0.1% of full range
Power	12 to 24 VDC / 80mA
Connections	2x M5 (4pin) connector (Bulgin: PXMBNI05FPM04AFL001, PXPTPU05RAF04ACL010PUR)
Overall Dimensions	emitter: 58x50x15mm, receiver:54x50x15mm
Weight	200 g

Table 1: Sensor specifications

2. Dimensions

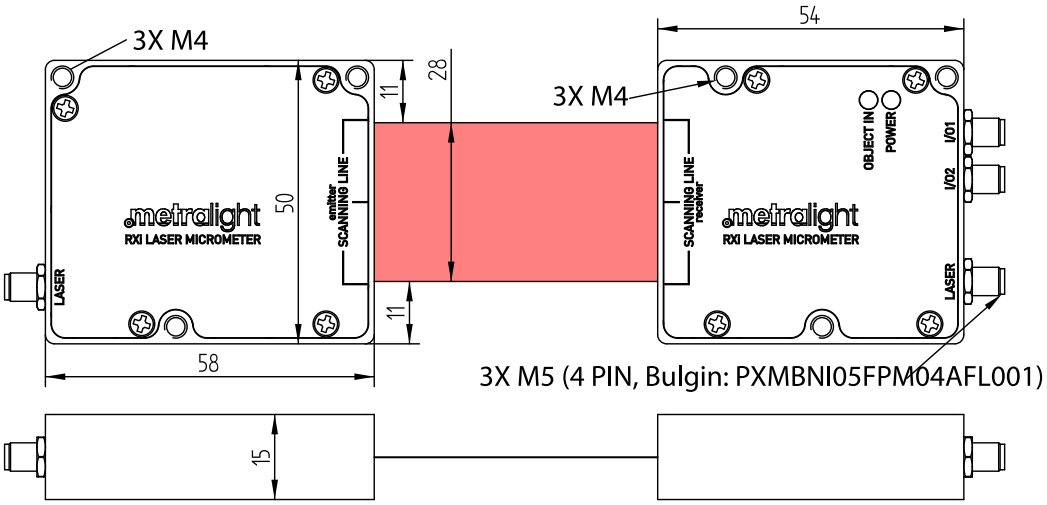

Image 1: RXi sensor dimensions (mm)

3. Measuring principle

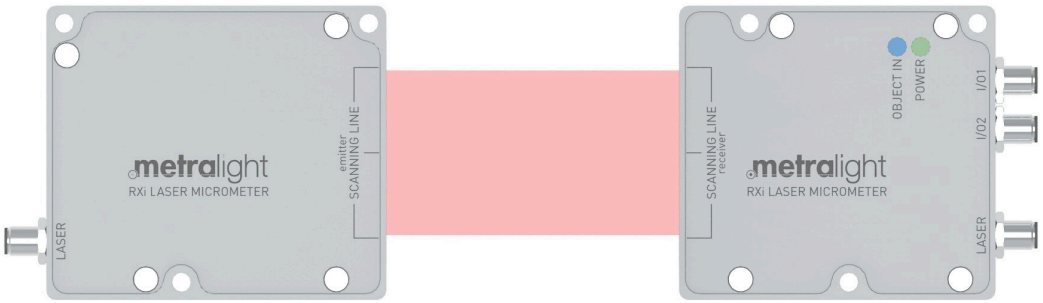

Image 2: RXi sensor, no object

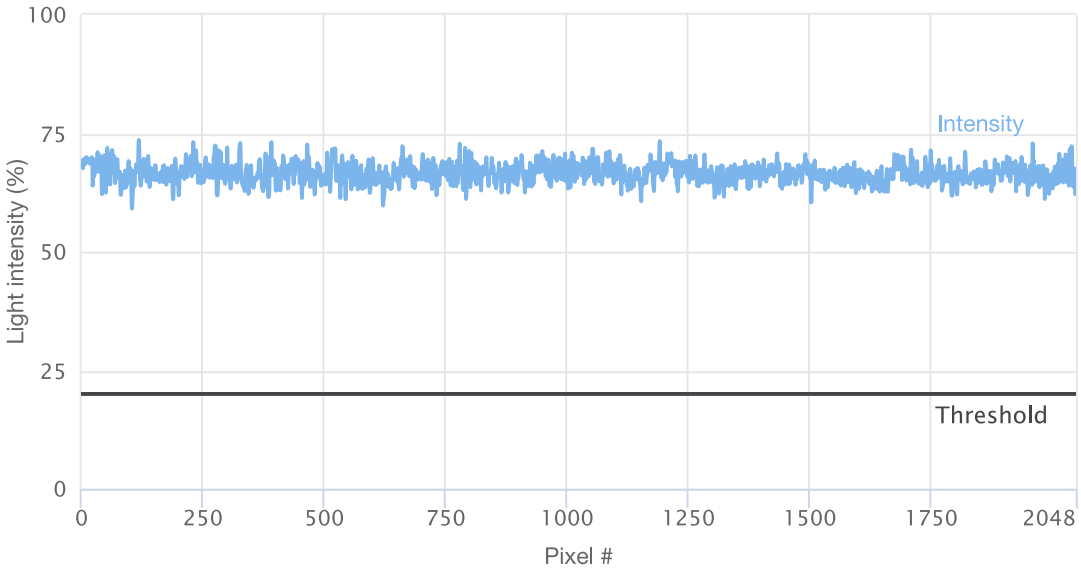

Image 3: Pixels intensity profile, no object

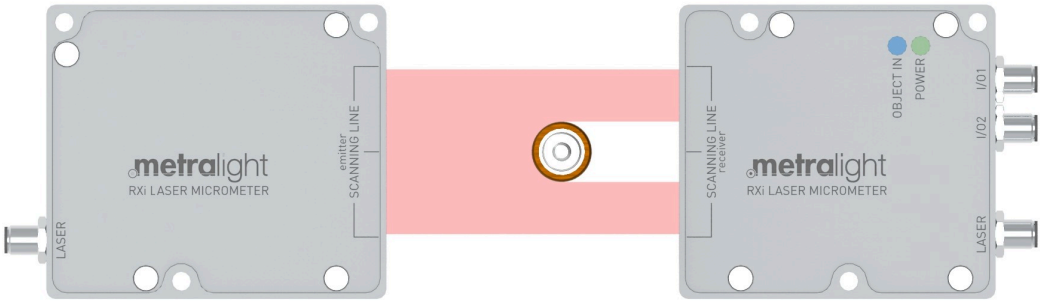

Image 4: Example of AAA battery in measuring field of RXi sensor

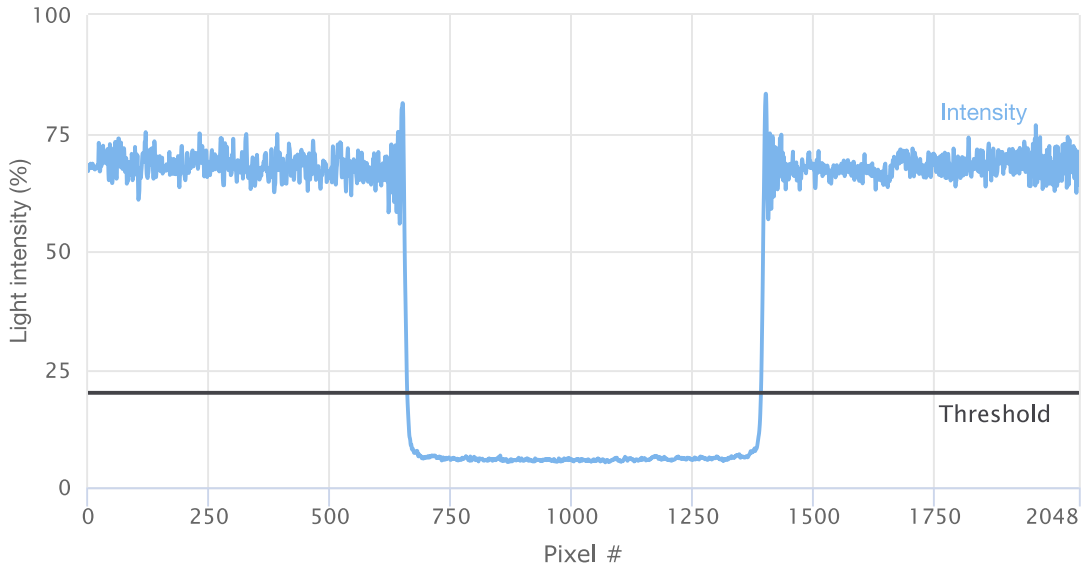

Image 5: Pixels intensity profile for the AAA battery

Object inserted in parallel light beam between emitter and receiver, creates shadow on the image sensor. Processing of light-dark edges determines position or size of an object. Examples above illustrates change of pixels light intesity on the image sensor when AAA battery is inserted.

4. Connection

4.1 Emitter-receiver interconnection

Cable (BULGIN PXPTPU05RAF04ACL010PUR) with M5 right angle connectors is used to connect emitter and receiver (marked as LASER on sensor housing).

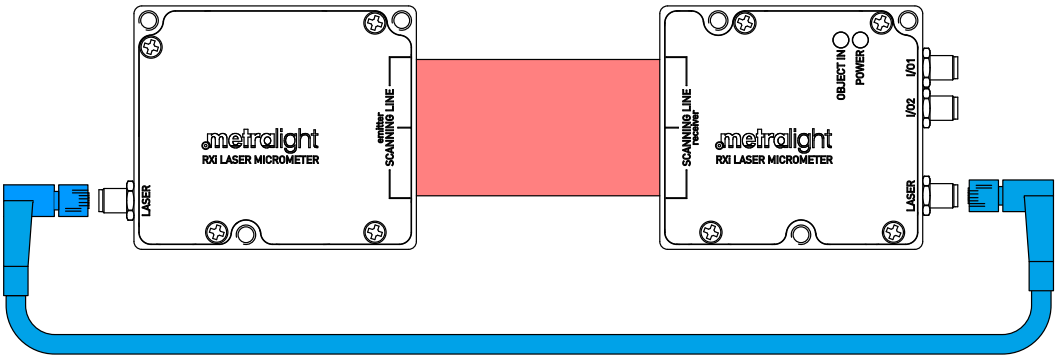

Image 6: Laser Interconnect

4.2 PWR & I/O connection

Two I/O M5 connectors (I/O1 and I/O2) with identical pinout are used to connect power and RS232 (TXD,RXD) signals. Recommended cable: Bulgin (PXPPVC05FBF04ACL010PVC or PXPPVC05RAF04ACL010PVC).

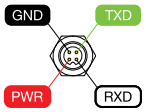

Image 7: M5 connector pinout

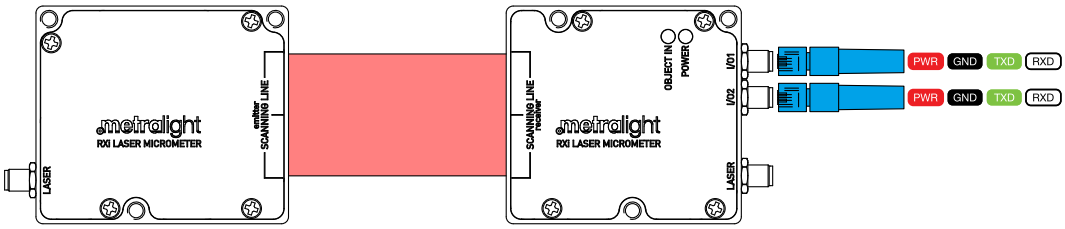

Image 8: PWR and I/O connection

RS232 settings:

Baud rate	115200 b/s
Data bits	8
Parity	None
Flow control	None

4.3 Object In Led | Power Led

- Green LED indicates sensor power
- Blue LED indicates presence of an object in sensor measuring range

5. Measuring modes

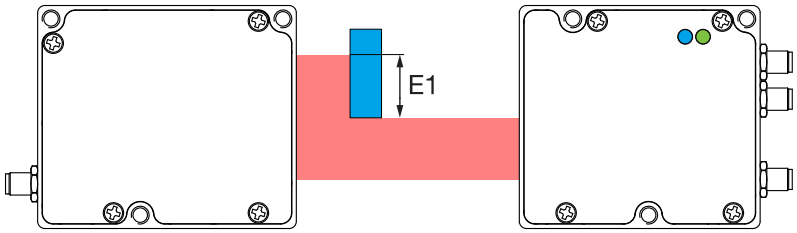

Image 9: Edge 1 measuring mode

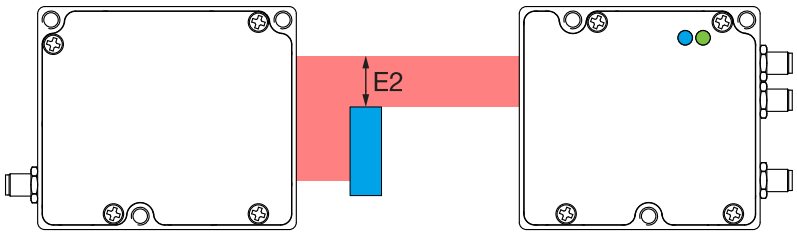

Image 10: Edge 2 measuring mode

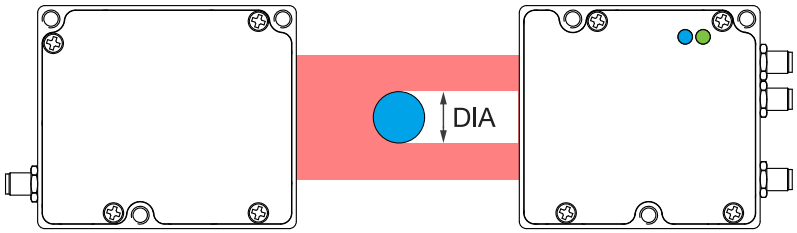

Image 11: Diameter measuring mode

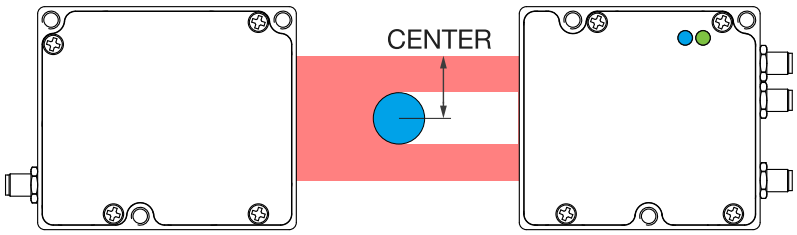

Image 12: Center measuring mode

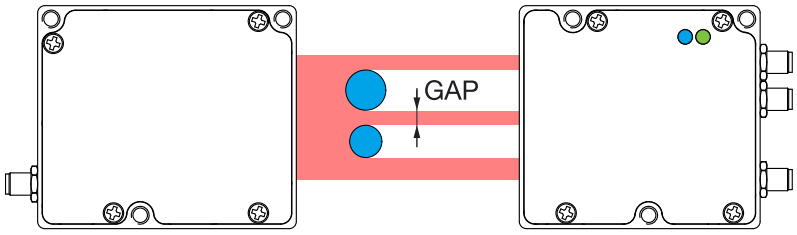

Image 13: GAP measuring mode

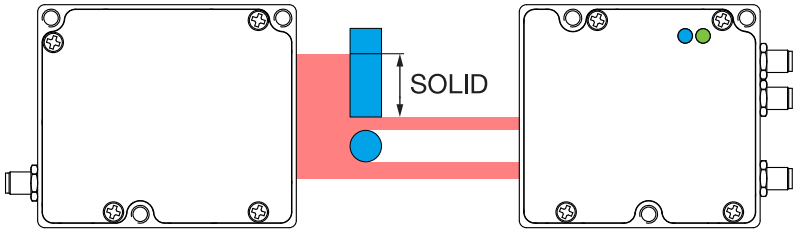

Image 14: SOLID measuring mode

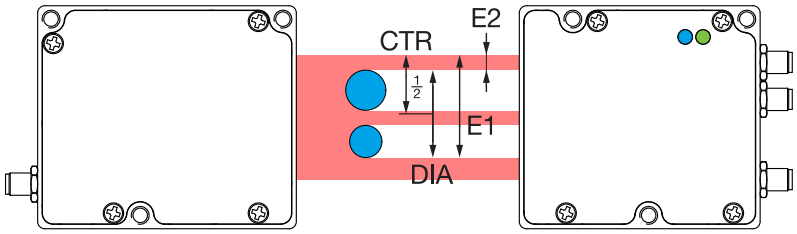

Image 15: Multiple objects E1,E2,DIA,CENTER measuring modes

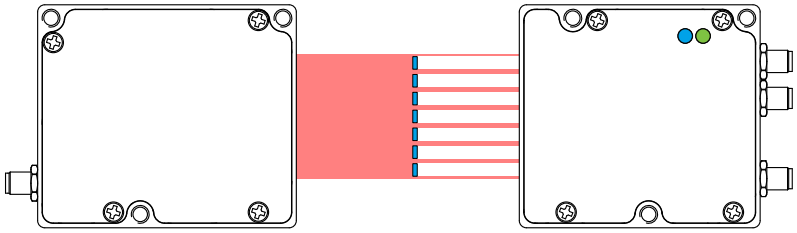

Image 16: CUSTOM measuring mode (e.g. IC PINS bent detect)

6. Communication

Communication between sensor and the host (PC, PLC) is in binary format.

6.1 DATA command 0x10

Host send: 0x10
Sensor data response (3 bytes). See chapter Data format (page 14) for more details.

6.2 Multiple DATA command 0x11 to 0x1F

Host send: 0x1X where X specifies amount of requested data.

Sensor responses with 2^X × consecutive data responses. See chapter Data format (page 14) for more details.

Multiple DATA command variations			
Command	**Data returned**	**Response length**	**Approx. time(s)**
0x11	2	6	0.001
0x12	4	12	0.002
0x13	8	24	0.003
0x14	16	48	0.006
0x15	32	96	0.013
0x16	64	192	0.025
0x17	128	384	0.05
0x18	256	768	0.1
0x19	512	1536	0.2
0x1A	1024	3072	0.4
0x1B	2048	6144	0.8
0x1C	4096	12288	1.6
0x1D	8192	24576	3.2
0x1E	16384	49152	6.4
0x1F	32768	98304	12.8

Table 2: Multiple DATA command variations

6.3 STREAM start command 0x20

Host send: 0x20
Sensor starts sending 3 byte data response repeatedly until stream stop command is sent. See chapter Data format (page 14) for more details.

6.4 STREAM stop command 0x21

Host send: 0x21
Sensor stops sending data. No response is sent.

6.5 MODE command 0x3X

Host send: 0x2X where X contains mode number (see mode table)
Sensor response: echo back sent byte

Measuring mode numbers			
Mode	**Number**	**Binary representation**	**Command usage**
Edge 1	0	000b	0x30
Edge 2	1	001b	0x31
Dia	2	010b	0x32
Gap	3	011b	0x33
Center	4	100b	0x34
Solid edge	5	101b	0x35
Custom	6	110b	0x36
Custom	7	110b	0x37

Table 3: Measuring mode numbers

6.6 Data format

Single data response is 3 bytes long:
<high_data_byte> <low_data_byte> <aux_byte>
Measuring result = high_data_byte * 255 + low_data_byte

AUX_BYTE format		
Bit #	**Bit name**	**Description**
7 (MSB)	OBJ_IN	Object detected in measurement range
6	0	unused
5	AVER_VALID	Average not valid (if 0 then data average valid)
4	0	unused
3	0	unused
2…0	MODES	Measuring mode number, see table Measuring modes numbers (page 14)

Table 4: AUX_BYTE format

7. Installation notes

- USE APPROPRIATE MOUNTING SCREWS (SEE MECHANICAL DRAWING)
- AVOID DIRECT SUNLIGHT! AND OTHER LIGHT SOURCES WITH WAVELENGTH NEAR 670nm

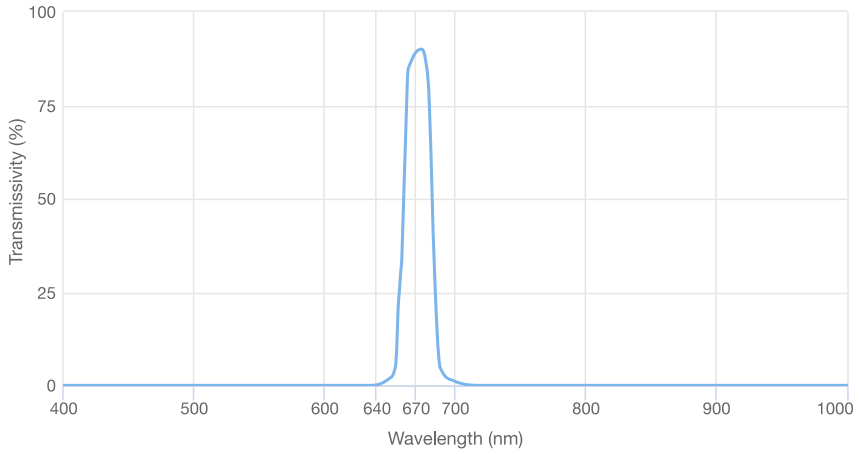

Image 17: Bandpass filter used in RXi receiver

- ALWAYS KEEP OPTICAL WINDOWS CLEAN, FREE FROM DUST AND FINGERPRINTS , AVOID SCRATCHES ON THE OPTICAL WINDOWS
- APPLY CORRECT VOLTAGE - SEE ELECTRICAL SPECIFICATION

8. Warranty, contacts

Warranty

METRALIGHT provides a ONE YEAR manufacturer's limited warranty against defective materials and workmanship. Please do not attempt to open the unit, as this will void all warranties.

Contacts

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