metralight

MicroXY laser micrometer

User guide

Sensor Gen. 2

Version: 1.0.0, April 2026

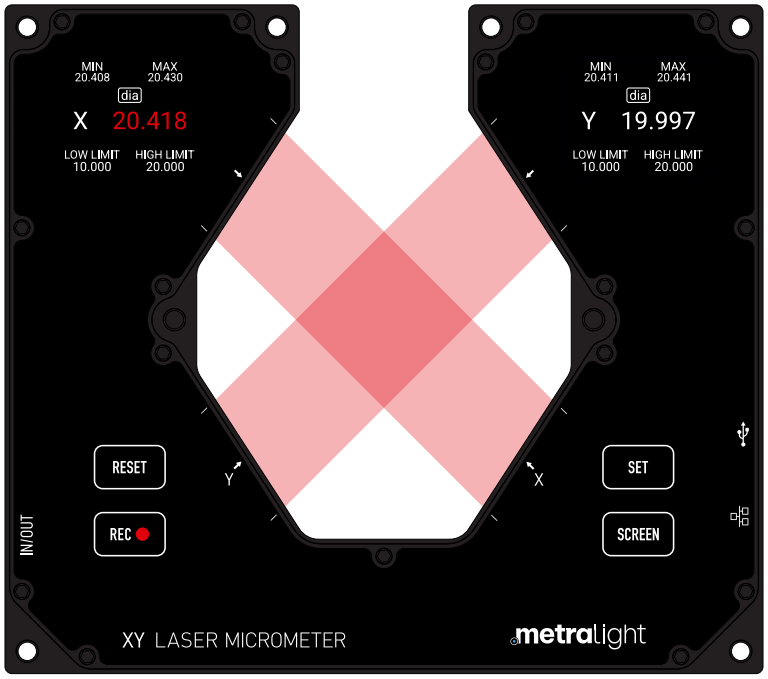

Table of contents

List of figures

List of tables

Document revisions

Version	Date	Sensor firmware	Description
1.0.0	2026-04-17	1.0.0	First document version

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1. Introduction

MicroXY is a dual-axis laser micrometer powered by a computing module with custom embedded Linux OS. Sensor is equipped with multiple communication interfaces, integrated web interface optmised for mobile devices, and two OLED displays and keypad.

Typical applications

- Non-contact measurement for online or offline checking of outside diameter, position, and ovality.
- Measurement of various types of materials across a wide range of industries (metal, plastic, glass, ceramics, wood, and others).
- Simultaneous position and diameter measurement on both axes.
- Checking of size and tension of wire and cable on automated lines.
- Diameter measurement of tube and pipe, both in-process and sampling.
- Measurement insensitivity to product positioning or movement guarantees reliability.
- Process and line-control applications include continuous fiber drawing, loose tubing, glass pre-forming, and glass tubes and bars.

Main device features:

- Embedded Linux OS including web server
- Multiple connection options: USB/Ethernet/Wi-Fi/IO
- Integrated web measuring application – remote access using mobile phone available (using Wi-Fi)
- 4 GB memory
- 2200 samples per second
- High-resolution color OLED displays
- Capacitive keypad

2. Device description

2.1 Specification

Measurement Range (each axis)	28 mm (1.10″)
Resolution	0.4375 µm
Repeatability	3 µm (Edge Position, Calibrated Distance)
Response Time	0.454 ms
Non-Linearity	< 10 µm (Edge Position, Calibrated Distance)
Measuring Modes	Edge 1, Edge 2, Diameter, Gap, Center, Solid
Power	USB (5 V) / Active PoE over Ethernet / I/O connector (12-24 VDC)
Wired Connection	Micro USB B connector / Ethernet / I/O connector
Communication protocol	Modbus TCP (measured values only), full-featured custom ASCII protocol over TCP or HTTP
Wireless connection	Wi-Fi 802.11b/g client or AP
Display	2 × OLED, 448 × 368 px
Memory	4 GB
Overall Dimensions	170 × 150 × 25 mm (6.70″ × 5.91″ × 0.99″)
Weight	610 g (21.52 oz)
Operating temperature	0°C to 50°C (32°F to 122°F)
Storage temperature	-20°C to 70°C (-4°F to 158°F)
Device Class	Laser Device (Laser Diode 670 nm Class I)

Table 1: Sensor specification

Power source	Power consumption
USB (5 V)	440 mA
I/O 12 V	190 mA
I/O 24 V	100 mA
Active POE (48 V)	60 mA

Table 2: Power consumption

2.2 Dimensions

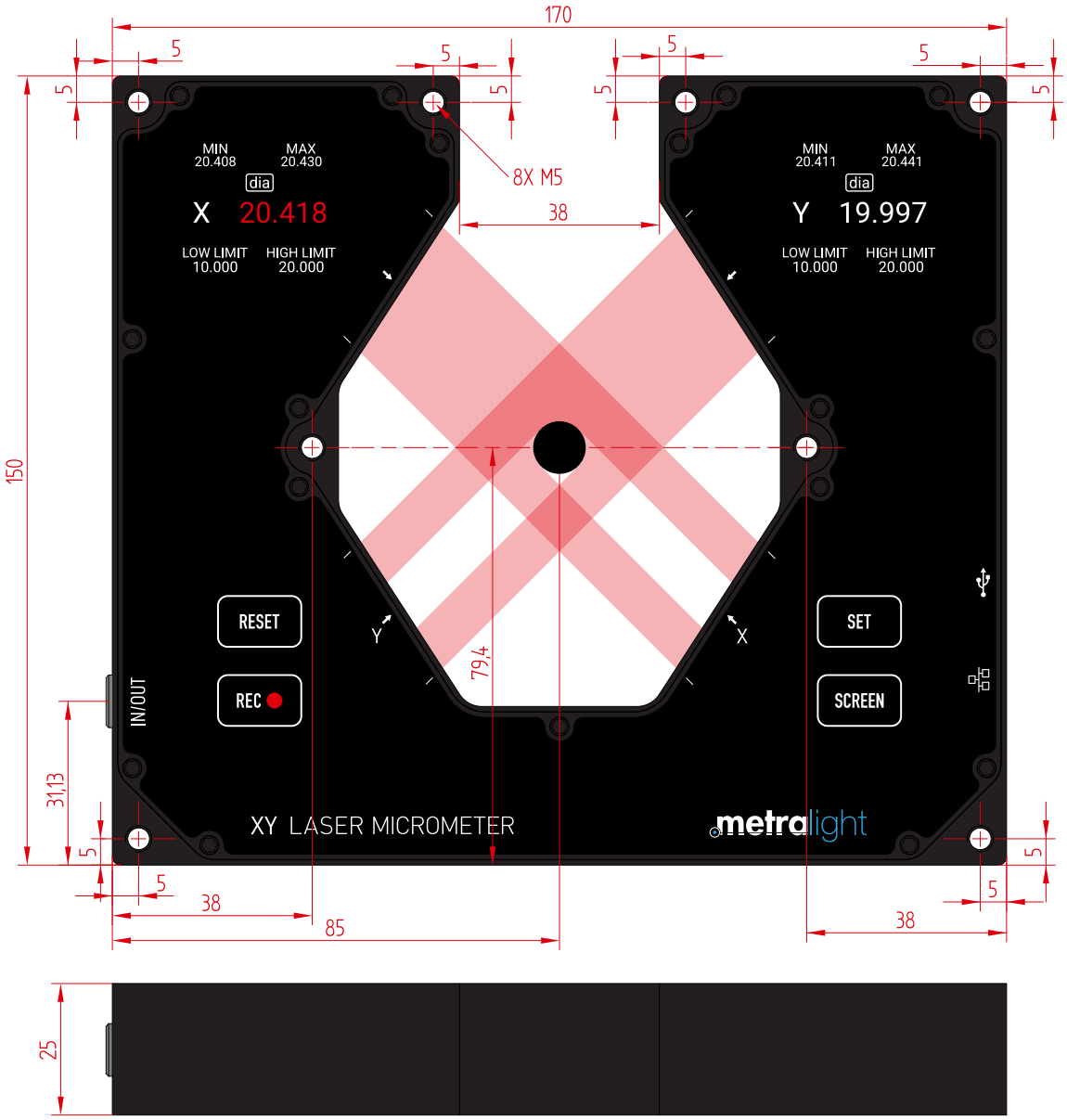


Image 1: MicroXY sensor dimensions (mm)

2.3 Communication and power interfaces

Sensor provides multiple interfaces for power and communication. An overview is shown in the following table:

Interface	Power	Communication
USB	yes	Modbus TCP, custom API via TCP, custom API via HTTP
Ethernet	yes, using active POE	
Wi-Fi	no	
IO	yes, 12-24 VDC	no (analog value per axis to be implemented in future firmware updates)

! Interfaces can be combined to interact with sensor, i.e. USB can be used just to power the sensor, while Ethernet without active PoE can be used for communication.

2.3.1 Ethernet

Ethernet interface can be used both for communication and powering using active PoE.

2.3.2 USB 2.0

Powering and communication with the sensor are provided by USB Micro B connector. Driver installation may be needed for network over USB usage (see chapter Driver installation (page 21) for details).

2.3.3 Wi-Fi

The sensor's Wi-Fi interface supports two operating modes (refer to chapter Settings (page 16) for details). In Access Point (AP) mode, the sensor creates its own wireless network. In Client mode, the sensor connects to an existing wireless network in the area.

2.4 User interface

The user interface consists of two OLED displays and four capacitive buttons, enabling measurement readout and configuration.

Button functions:

Cycles through screens.
Long press displays main measuring screen.

Measuring screen: long press saves current value as offset and activates relative value mode.
Settings screens: cycles through setting options.
Normalization screens: starts normalization.

Measuring screen: long press clears offsets and activates absolute value mode, short press resets min/max.

Measuring screen: activates data recording (one sample or stream) according to sensor configuration.

The built-in web interface, accessible via Ethernet, USB, or Wi-Fi, provides full sensor configuration and control.

2.5 Display screens

Display screens are changed using SCREEN button.

! Contents of displays can be swapped and rotated 180° using Settings page of Web interface.

2.5.1 Measuring

Each main measuring screen displays information associated with its corresponding axis.

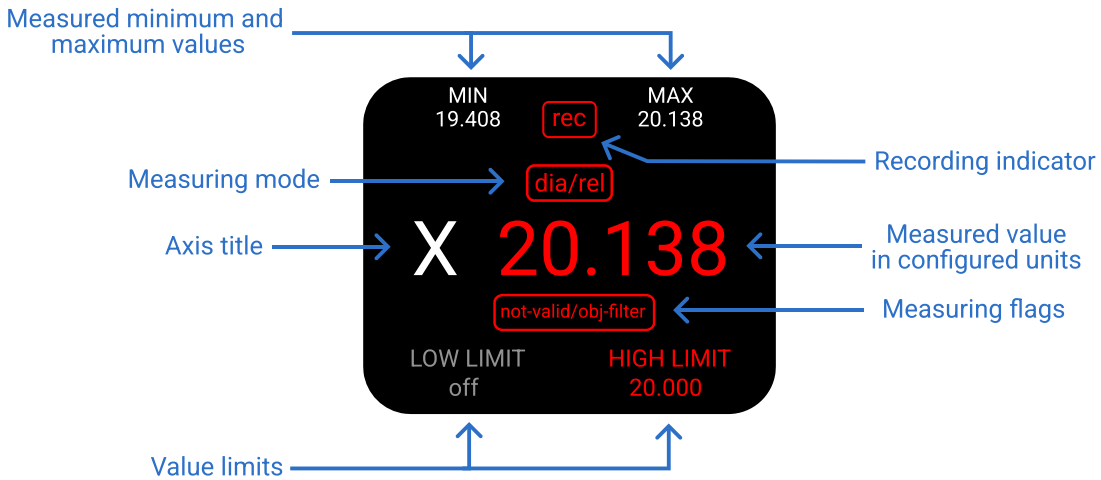


Image 2: Device measuring screen

Screen parts:

- **Measured minimum and maximum values:** Minimum and maximum of all measured values since last reset. RESET button clears stored values. Values are compared against the defined limits — if any falls outside the defined range, the corresponding min or max value turns red and a flag is set in the API response.
- **Recording indicator:** Indicator is shown when sample or stream is being recorded by the sensor. Can be triggered using REC button.
- **Measured value:** Displays currently measured value in configured units. Value is compared against the defined limits. If it falls outside the defined range, it turns red, and a flag is set in the API response.
- **Measuring mode:** Measuring mode of the sensor — diameter, center, gap, etc. In relative mode (offset is non-zero), the suffix "/rel" is appended to indicate relative mode.
- **Measuring flags:** Flags indicating measurement status - visible only when active. Possible flags are:
  - not-valid: measurement not valid - no object detected or invalid number of edges for the current mode
  - obj-filter: object filter is actively filtering small objects.

  Refer to Flags (page 26) section for more information about flags value and meaning in API and Modbus TCP.
- **Value limits:** Low and high limits defined per measuring mode. Applied to the currently measured value and to tracked min/max values. If current value falls outside the defined range, corresponding limit turns red, and a flag is set in the API response.

2.5.2 Status and info

Displays sensor status — IP addresses of connected interfaces, serial number, firmware version and date.

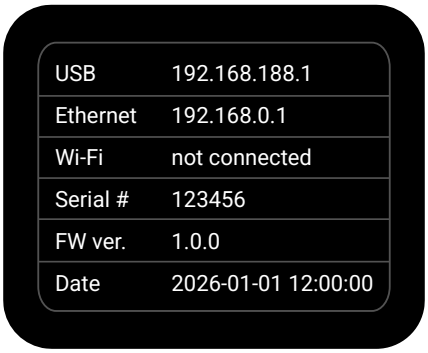


Image 3: Device status screen

2.5.3 Settings

Following screens provide basic sensor settings:

- Measuring mode: Edge 1 | Edge 2 | Diameter | Gap | Center | Solid
- Units: mm | inch
- Average filter size: 1 | 10 | 50 | 100
- Normalization
- Web enable: on | off | auth

3. Value mode

The sensor can operate in two value modes, indicated on the main measuring screen.

3.1 Absolute

The value measured by the sensor — such as the diameter of an object — is displayed directly. The number is always zero or greater.

3.2 Relative

Relative mode is indicated by the `/rel` suffix after the mode name.

When entering relative mode, the sensor saves the current measured value as a reference standard. All subsequent readings display the deviation of the current measurement from this reference:

```
displayed value = current measurement − reference standard
```

The result is positive when the current measurement exceeds the reference, and negative when it falls below it.

The reference standard is specific to each measuring mode and is retained across mode changes and power cycles. Relative values are also present in recorded measurements and via the API.

The reference value can be modified through the Settings page of the integrated web interface, or by long-pressing the SET button on the measurement screen. Adjusting the reference value shifts the displayed deviation by a known amount — useful for compensating a systematic measurement error or for establishing a custom zero point.

> **!** **When in relative mode with no object within the measuring range, the sensor displays zero — the same value as when an object is present and its measurement equals the reference standard. To distinguish between these two situations, the not-valid flag must be taken into account. Refer to Main measuring screen (page 13) section for more information about flags indication on main screen. Refer to Flags (page 26) section for more information about flags.**

3.3 Switching between modes

3.3.1 Switching to relative mode

Relative mode can be activated by two methods:

1. Using the SET button on the main measuring screen:
    - Place an object within the measuring range.
    - Press and hold the SET button.
    - Wait until the `/rel` suffix appears and the displayed value resets to zero.
2. Through the Settings page of the integrated web interface, by entering a non-zero reference value manually.

3.3.2 Switching to absolute mode

Absolute mode can be activated by two methods:

1. Using the RESET button on the main measuring screen:
    - Press and hold the RESET button.
    - Wait until the `/rel` suffix disappears.
2. Through the Settings page of the integrated web interface, by setting the reference value to zero.

4. Integrated web interface

Sensor provides integrated web interface for making measurements, saving data streams, and modifying sensor settings. Web interface is responsive and optimized for mobile devices.

4.1 Main measuring page

The measurement page displays live readings from both sensor axes (X and Y), MIN/MAX values and provides controls for measurement configuration.

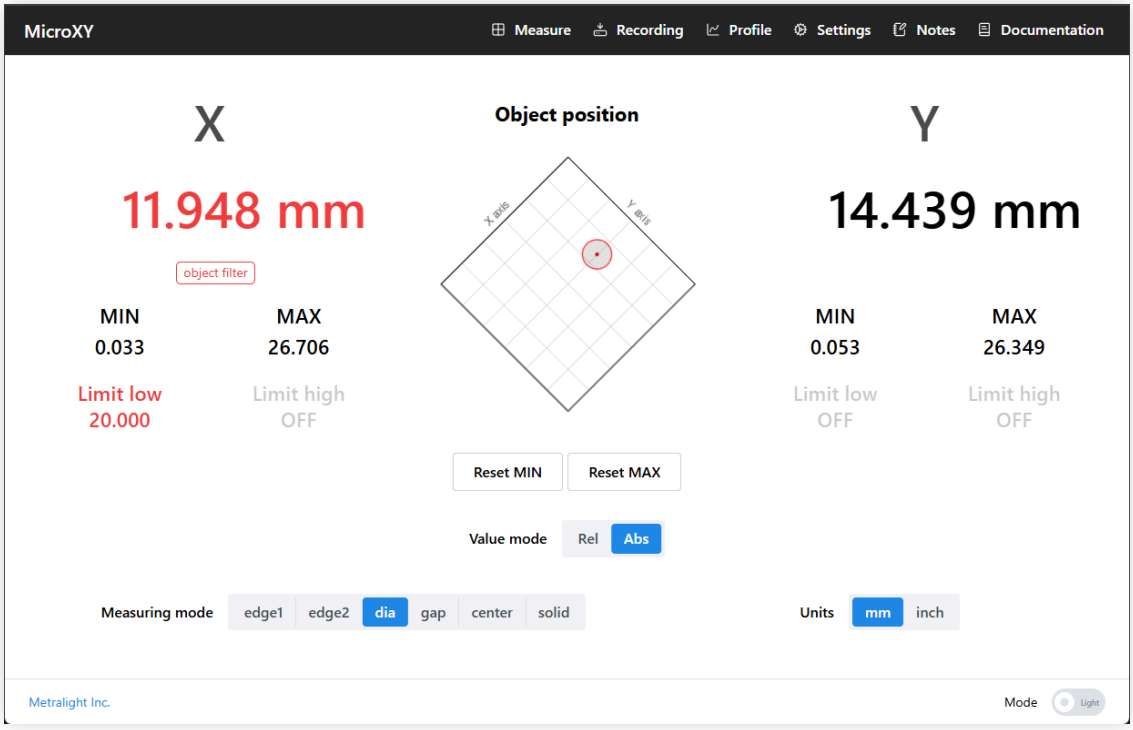


Image 4: Main measuring page

Displayed values — Each axis shows the current measured value along with the minimum and maximum values recorded since the last reset. The MIN and MAX values can be reset independently using the **Reset MIN** and **Reset MAX** buttons. Values are compared against the defined limits — if any falls outside the defined range, the corresponding value turns red and a flag is set in the API response.

Flags — Status flags appear below the measured values, visible only when respective flags are active. Possible flags are: `not valid` and/or `object filter`. Refer to Flags (page 26) section for more information about flags value and meaning. Both flags are also indicated on the main measuring screen of the device itself as described in Measuring (page 9) section.

Object position — In middle part of screen, an indicator shows the object position inside the measuring range. Object position is displayed when at least one of measured values is valid (object is detected).

Measuring mode — The measuring mode determines how the sensor interprets the raw measurement. Available modes: `Edge 1`, `Edge 2`, `Diameter`, `Gap`, `Center`, `Solid`. The active mode is highlighted.

Value mode — The Value mode toggle switches between absolute and relative measurement. Refer to Value mode (page 12) chapter for details on value modes.

Units — Displayed values can be switched between **mm** and **inch** using the Units selector. The change applies to all displayed values immediately.

Measurement limits — Each axis supports a configurable lower and upper limit (**Limit low** and **Limit high**). Clicking a limit value opens an input

field where the threshold can be set. Limits can be disabled by leaving the value empty. When a measured value falls outside the configured limits, both the value and the corresponding limit label are highlighted in red. Limit violations are also exposed as flags in the API, allowing a connected system to read the status programmatically.

4.2 Recording page

The Recording page provides controls for capturing measurement data to files and managing previously recorded files.

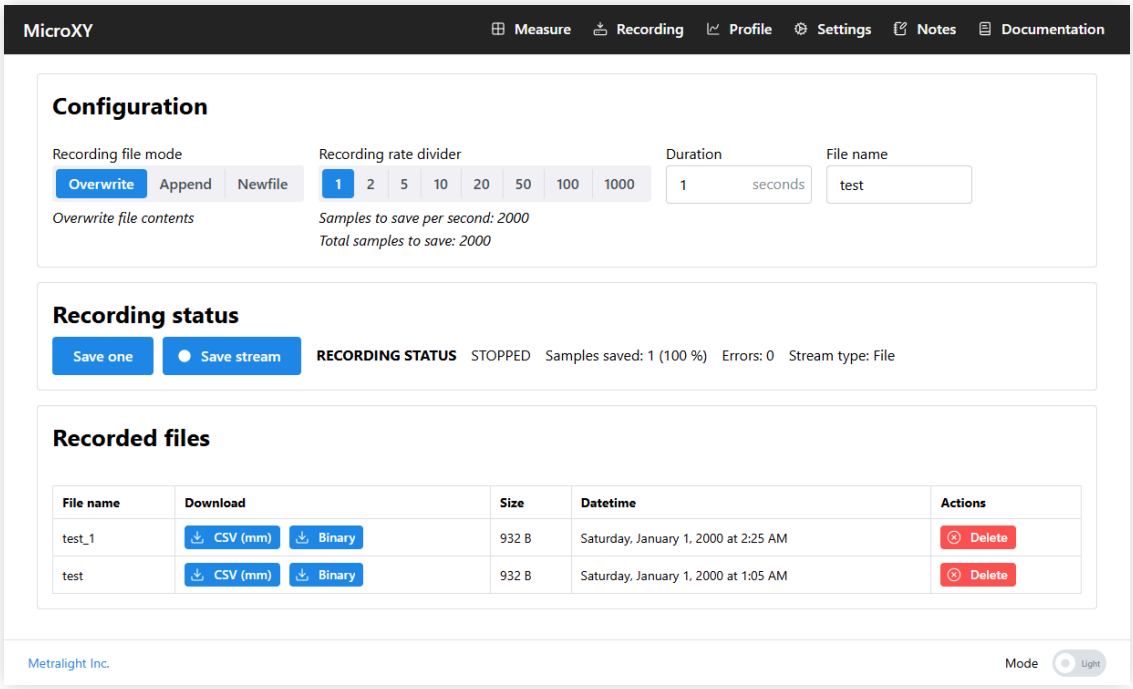


Image 5: Recording page

Recording file mode — Determines how the output file is handled when a recording starts:

- **Overwrite** — existing file with the same name is replaced by the new recording.
- **Append** — new data is added to the end of an existing file. If the file does not exist, it is created.
- **New file** — a new file is created for each recording by appending an incrementing numeric suffix to the filename (e.g. `test_1`, `test_2`, …).

File name — Base name of the output file. The actual filename may be extended depending on the selected file mode.

Recording rate divider — Divides the internal sensor sampling rate to reduce the number of samples written per second. Available dividers: 1, 2, 5, 10, 20, 50, 100, 1000. The resulting sample rate and total sample count for the configured duration are shown below the selector.

Duration — Length of the recorded stream in seconds. Applies only to stream recording — has no effect when saving a single sample.

Recording status — Displays the current state of the recording process, including the number of samples saved, error count, and stream type.

Save One — saves a single measurement sample immediately. Rate divider and duration settings have no effect in this mode.

Save Stream — starts a continuous recording according to the configured file mode, rate divider, and duration. Recording stops automatically when the specified duration elapses, or can be stopped manually.

Recorded files — Lists all files stored on the device, showing the file name, size, and date and time of creation. Each file can be:

- **Downloaded as CSV** — exports the measurement data as a comma-separated file with values in the currently selected unit.
- **Downloaded as Binary** — downloads the raw binary stream data.
- **Deleted** — permanently removes the file from the device.

4.3 Profile page

The Profile page displays the raw pixel intensity profile of the sensor's optical array for both axes (X and Y). It serves as a diagnostic tool to inspect the optical signal and understand why the sensor produces a given measurement.

Image 6: Pixel profile page

Profile type — Selects how the pixel intensity data is processed before display:

- **Raw** — unprocessed pixel intensities directly from the sensor array.
- **Norm** — normalized profile with per-pixel equalization applied.
- **Avg** — smoothed profile with averaging applied between neighboring pixels.

Detection threshold — The horizontal blue line indicates the intensity threshold used for edge detection. Pixels with intensity below this threshold are considered shadowed by the measured object. The positions where the signal crosses the threshold determine the detected edges.

Normalize — The Normalize button performs an equalization of the pixel array.

> **! No object must be present within the measuring range when performing normalization. Obstruction of the optical path during this procedure will raise an error and normalization will not be performed.**

4.4 Settings page

The Settings page is divided into several sections covering main sensor configuration, measurement limits, security, recording, and network interfaces.

4.4.1 General

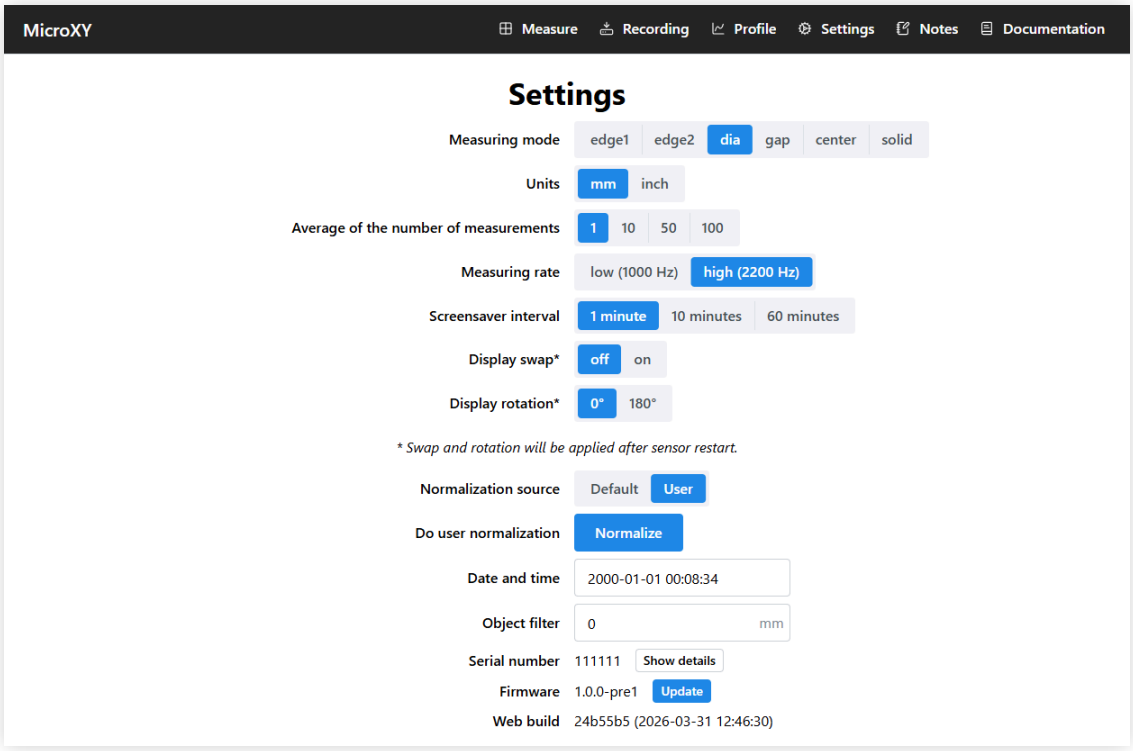


Image 7: General settings

Measuring mode — The measuring mode determines how the sensor interprets pixel profile. Available modes: `Edge 1`, `Edge 2`, `Diameter`, `Gap`, `Center`, `Solid`. The active mode is highlighted. See Measuring Mode (page 28) for a detailed description of each mode.

Units — selects the unit for all displayed and recorded values: `mm` or `inch`.

Average of the number of measurements — number of consecutive samples averaged into a single displayed value. Available options: 1, 10, 50, 100.

Measuring rate — sets the internal sensor acquisition rate. `High (2200 Hz)` provides faster sampling; `Low (1000 Hz)`.

Screensaver interval — duration of inactivity after which screensaver is displayed. Available options: 1 minute, 10 minutes, 60 minutes. Screensaver cannot be disabled to avoid OLED burn-in.

Display swap — when enabled, swaps the contents of displays. Settings will take effect after restarting the sensor.

Display rotation — enables rotation of the displays by 180° for mounting the sensor upside down. Settings will take effect after restarting the sensor.

Normalization source — selects normalization data source. `Default` uses the factory-calibrated normalization; `User` normalization measured by user.

Do user normalization — clicking **Normalize** captures the current illumination profile and stores it as the user normalization reference. No object must be present within the measuring range during this procedure.

Object filter — minimum object size in mm that the sensor will report. Objects smaller than this threshold are ignored, suppressing spurious detections caused by dust or optical noise. Set to 0 to disable filtering.

Date and time — sets the system clock used for timestamping recorded files.

Serial number — displays the device serial number. Clicking **Show details** reveals extended hardware identification information.

Firmware — displays the currently installed firmware version. Clicking **Update** leads to the firmware update page where new firmware can be uploaded to the device.

Web build — version and build timestamp of the integrated web application.

4.4.2 Network interfaces

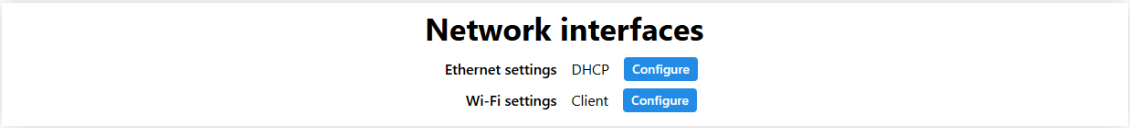


Image 8: Network settings

Ethernet settings — clicking **Configure** opens the network configuration page. Ethernet interface can be configured to OFF state, DHCP, or static IP mode. In static IP mode, the IP address and subnet mask, and gateway can be set manually.

Wi-Fi settings — clicking **Configure** opens the wireless network configuration page. Wi-Fi can be configured to OFF state, AP mode, or Client mode. In AP mode, the SSID and password of the created wireless network can be set. In Client mode, the sensor can connect to any available wireless network in the area. The desired network can be selected from the list of detected networks.

> **! Default Wi-FI AP name is configured to: `XY-123456`, where 123456 is placeholder for serial number. Default Wi-FI password is configured to: `metral20`.**

4.4.3 Security

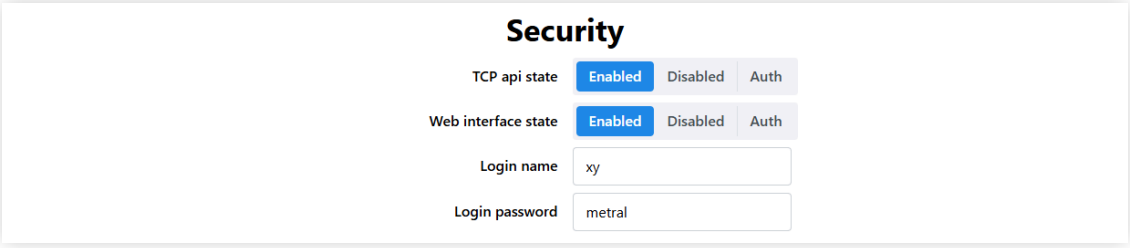


Image 9: Security settings

TCP API state — controls access to the TCP API interface. `Enabled` allows unrestricted access; `Disabled` disables the interface entirely; `Auth` requires authentication using the configured login credentials.

Web interface state — controls access to the integrated web application. `Enabled` allows unrestricted access; `Disabled` disables the web interface entirely; `Auth` requires authentication using the configured login credentials.

Login name and **Login password** — credentials used when either interface is set to `Auth` mode.

4.4.4 Limits and reference values

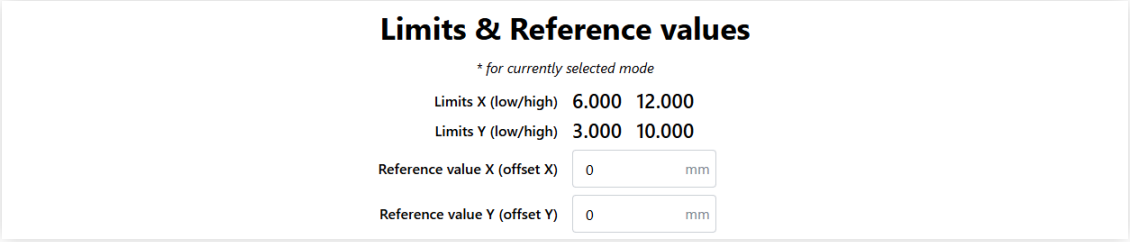


Image 10: Limits and reference values

All values in this section apply to the currently selected measuring mode.

Limits X / Limits Y (low / high) — lower and upper measurement limits for each axis. Applied to the currently measured value and to tracked min/max values. If current value falls outside the defined range, corresponding limit turns red, and a flag is set in the API response

Reference value X / Reference value Y — reference standard value for each axis used in relative measurement mode. Refer to Value mode (page 12) for details.

4.4.5 Recording

Recording mode — selects between `One` (single sample) and `Stream` (continuous recording). Configures the keypad REC button behavior. Web interface uses dedicated Save One and Save Stream buttons instead.

Recording file mode — determines how the output file is handled when a recording starts. Refer to Recording File Mode (page 0) for a detailed description of each option.

Recording rate divider — divides the internal sensor sampling rate to reduce the number of samples written per second. The resulting sampling rate is displayed next to the selector.

Recording duration — length of the recorded stream in seconds. Applies to stream recording only.

Managed storage — when enabled:

- oldest files are removed, when not enough space is available for new record
- if in `Append` mode and existing file exceeds file size limit configured by `Managed storage max file size`, older file is renamed and new file is created.

Managed storage max file size — maximum total storage size in bytes used by recorded files when managed storage is enabled.

Recording file name — base name of the output file.

CSV decimal separator and **CSV item separator** — override the decimal and field delimiters used in exported CSV files. By default these are inferred from the browser locale. Allowed combinations:

- `.` as decimal separator with `,` as item separator
- `,` as decimal separator with `;` as item separator

4.5 Notes

Page is used to save custom text notes inside sensor — i.e. custom name or description of the sensor in multi-sensor application. Notes support markdown syntax.

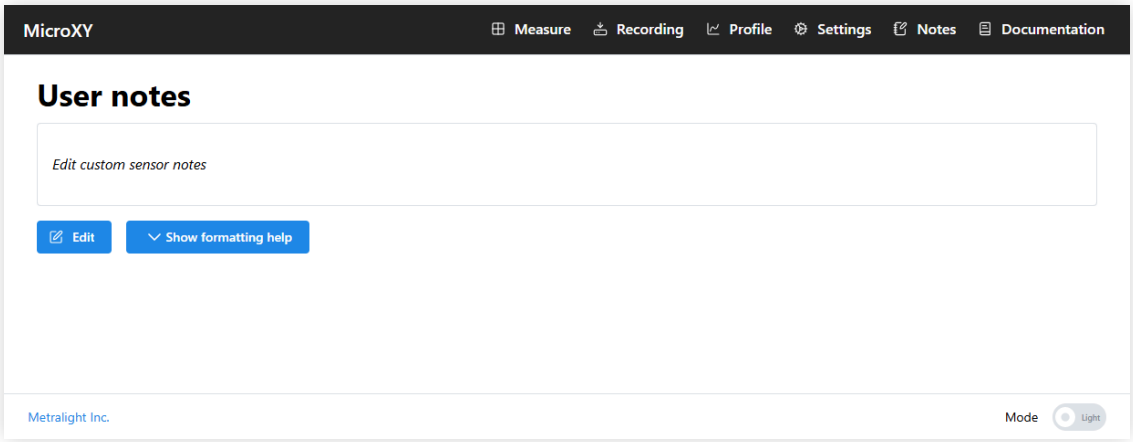


Image 11: Notes page

4.6 Documentation

Using submenu on left side of screen, user can access multiple pages with information about sensor usage:

- **Downloads**: user guide, Python examples and user support files.
- **Modbus**: Modbus TCP register map and configuration.
- **API description**: detailed documentation of main API commands, parameters, and error codes.
- **API tester**: interactive tool for testing API commands.

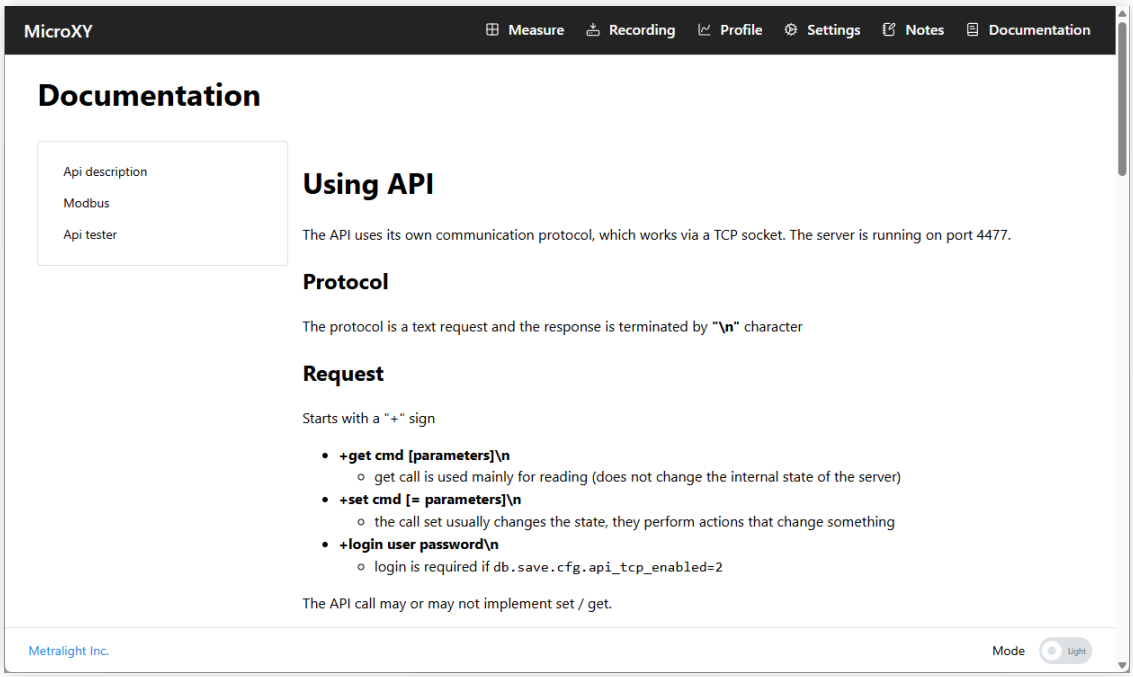


Image 12: Documentation page

4.6.1 API Tester

Screen contains information about sensor usage - API, error codes, modbus configuration, etc. API commands and specific command documentation can be tested and viewed at API tester page.

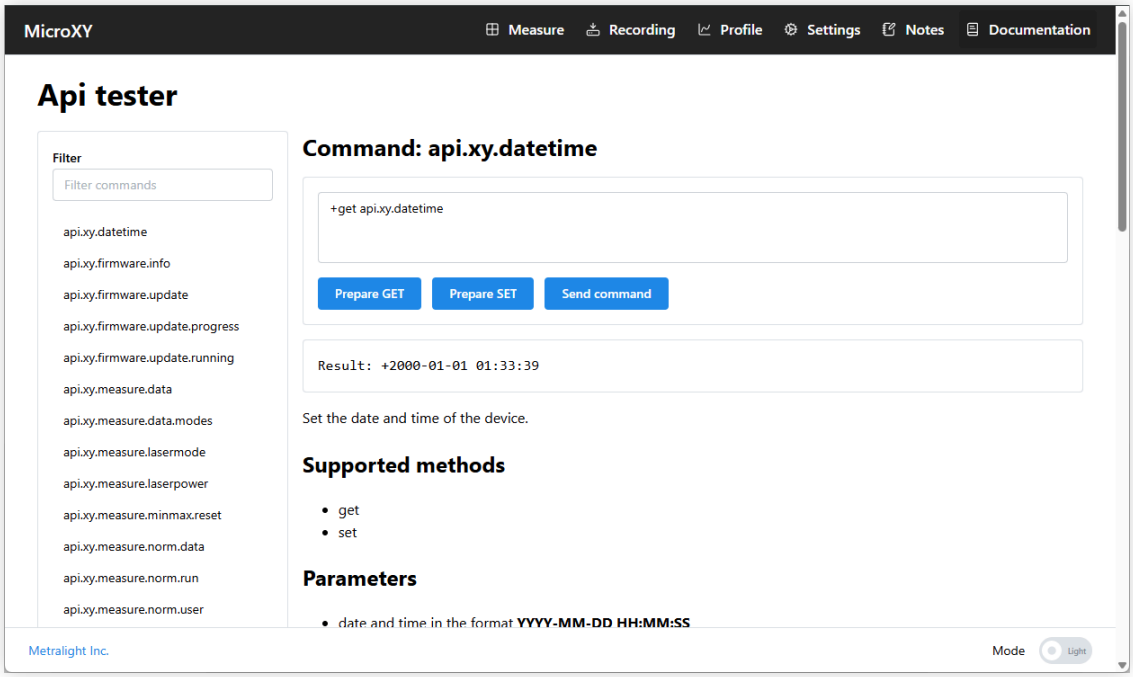


Image 13: Documentation — API Tester screen

The left panel lists all available API commands. The filter field at the top narrows the list by command name. Clicking a command selects it and displays its documentation in the main panel.

The right panel shows the documentation for the selected command, including a description, supported methods (`get` , `set`), and accepted parameters.

Prepare GET and **Prepare SET** — populate the command input field with the appropriate syntax for the selected command. Parameters can be filled in manually before sending.

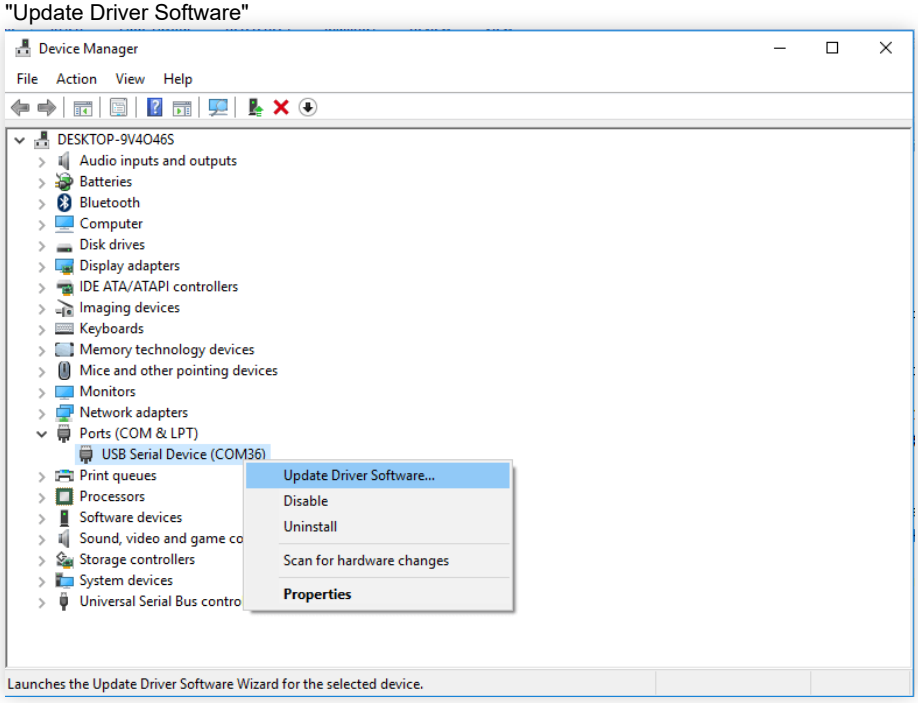
Send command — transmits the command to the device and displays the response in the result field below the input.

Result — displays returned string result.

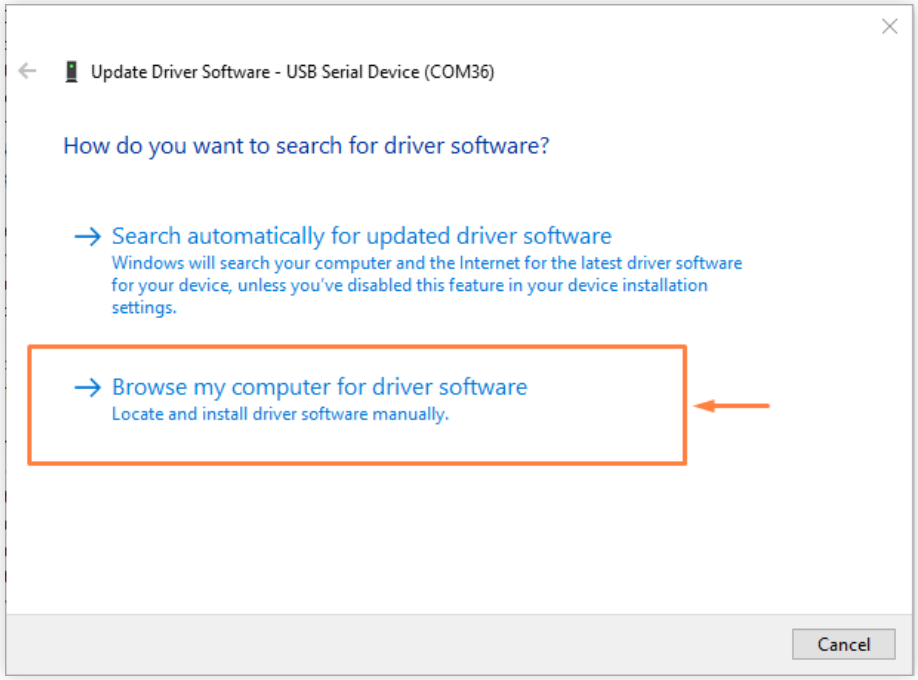
5. Driver installation

If the RNDIS driver installs automatically then the USB network will work. If it installs as USB Serial Device (as in Windows 10 for example) then continue using following steps:

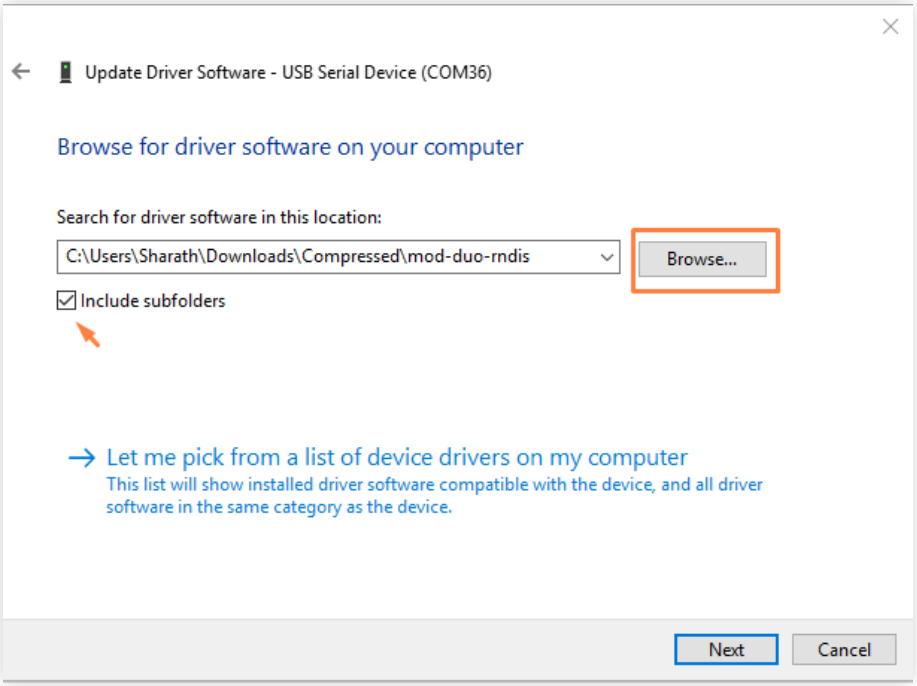
1. Click here to download the RNDIS Driver. Extract the downloaded zip files.
2. Open Device Manager. MicroXY is detected as USB Serial Device at COM port under the PORTS & LPT. Right-click on it and select "Update Driver Software"



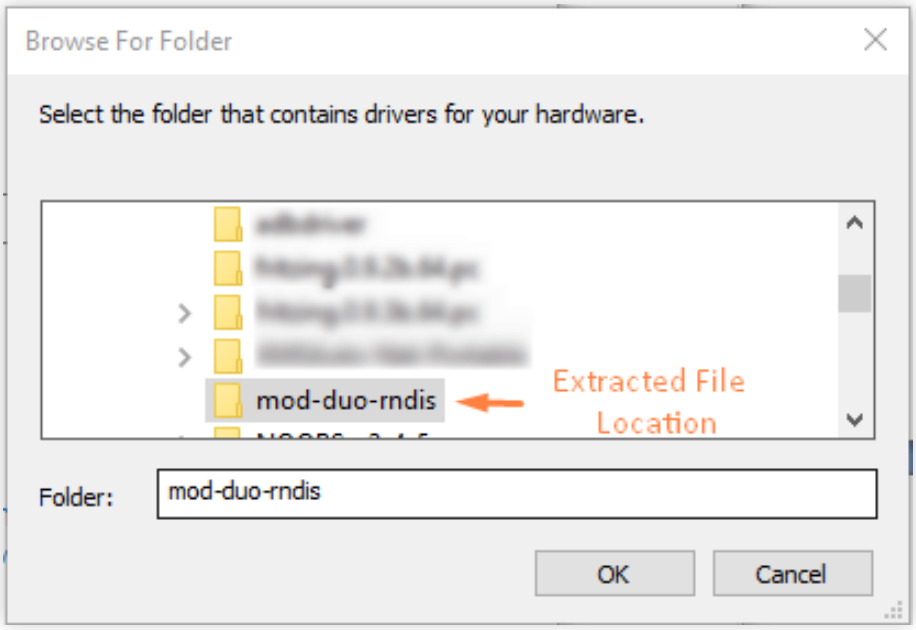
3. Select "Browse my computer for driver software".

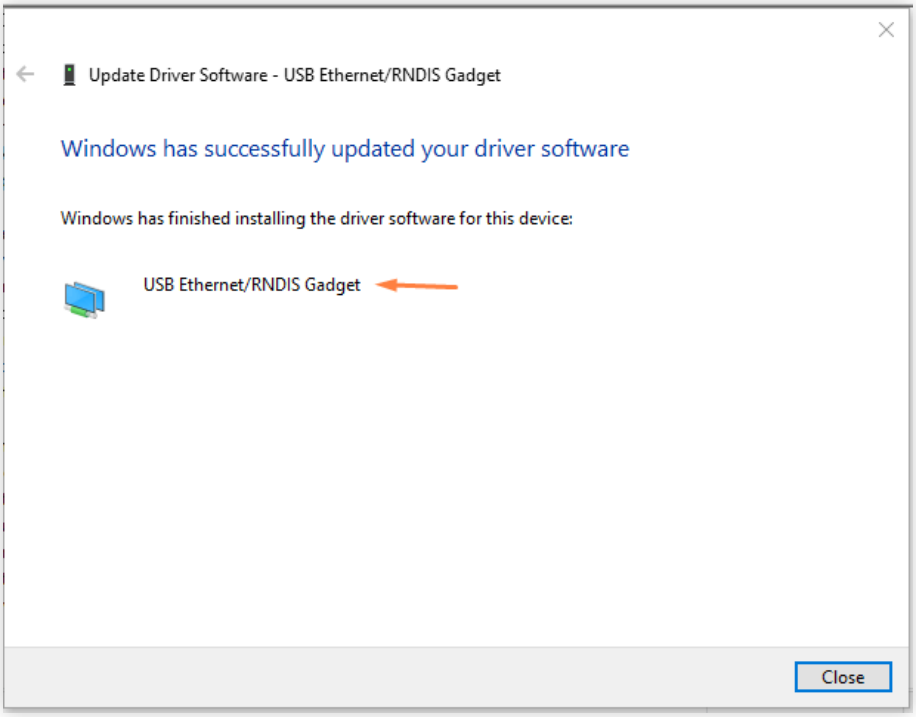


4. Choose the location where you extracted the driver files on your PC.

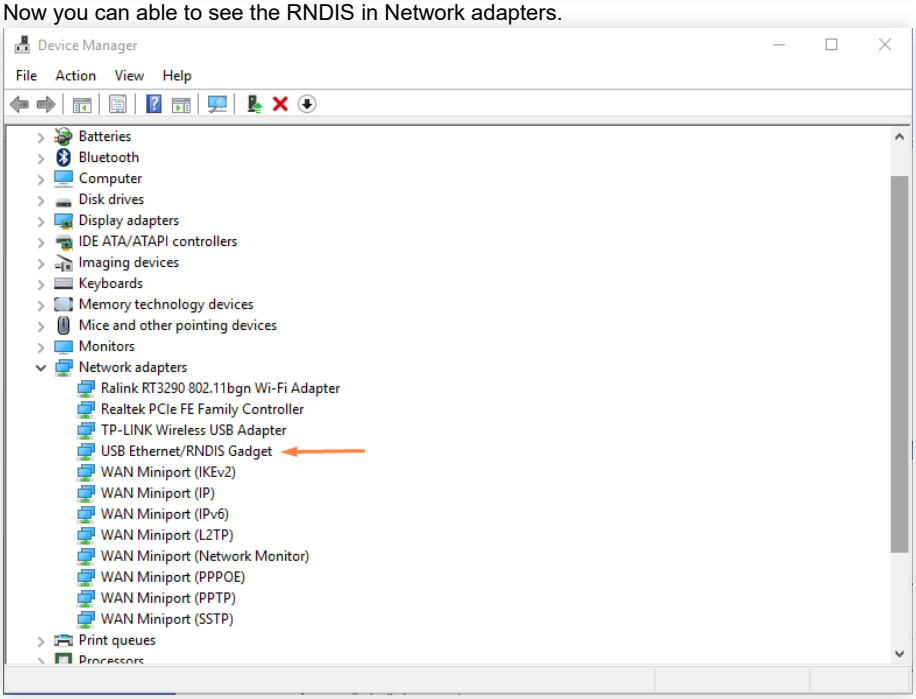


5. Select the Extracted driver folder which is mod-duo-rndis. Click ok and click Next. This will install the driver.





6. Now you can able to see the RNDIS in Network adapters.



6. Communication interfaces

Sensor can communicate with external applications using TCP or HTTP API. Both can be turned ON/OFF using sensor settings menu. Values can be also read using Modbus TCP protocol, see details in documentation screen of integrated web interface.

6.1 Custom API

TCP api server is running on port 4477. HTTP api is available on address /api/cmd or /api/cmdmulti, see details below.

Commands and responses are always escaped using newline (\n). All commands are documented and can be tested using api tester on documentation page of integrated web interface.

6.1.1 Request

Starts with a "+" sign. The specific API command may or may not implement set/get command - some only work as get, some as set.

Get

Get call is used mainly for reading (does not change the internal state of the server)

```
+get cmd [parameters]\n
```

Set

The call set usually changes the state, they perform actions that change something

```
+set cmd [= parameters]\n
```

6.1.2 Response

First character defines the type of response.

- Character `"+"` indicates a success response; the response body follows.
- Character `"-"` indicates an error response; the error message follows.

6.1.3 Examples

Get / Ok

Request: `+get api.xy.datetime\n`

Response: `+2026-01-01 00:00:00\n`

Set / Error

Request: `+set api.xy.measure.data.modes\n`

Response: `-not allowed\n`

6.2 API call via http

Each call forwards the command to the device and returns the response to the client. Two endpoints are available:

- `/api/cmd` — single command per request.
- `/api/cmdmulti` — multiple commands in a single request.

6.2.1 Single command

Send to /api/cmd using POST method.

Call example:

```
curl -X POST -H "Content-Type: application/json" \
-d '{
"cmd":"get api.xy.datetime",
}
' \
http://192.168.188.1/api/cmd
```

Response:

```
{
"data": "+2026-01-01 00:00:00\n"
}
```

6.2.2 Multiple command

Send to /api/cmdmulti using POST method.

Call example:

```
curl -X POST -H "Content-Type: application/json" \
-d '{
"unitset":"+set db.save.cfg.units=1",
"datetime":"+get api.xy.datetime"
}
' \
http://192.168.188.1/api/cmdmulti
```

Response:

```
{
        "data": {
                "unitset": "+ok\n",
                "datetime": "+2026-01-01 00:00:00\n"
        }
}
```

6.3 Measure data command

Most important measure data read command is described in detail below. All other commands are described in documentation screen of integrated web application.

Command name: `api.xy.measure.data`

Supported methods

- `get`

Parameters

- `fmt` — format selector [0 = base]
- `units` — unit selector [0 = mm, 1 = inch, 2 = raw]

6.3.1 Return value

Values are separated by `;`. The response consists of two axis blocks. Each axis block contains a header followed by six measurement mode

blocks.

Axis header — repeated 2× (once per axis):

- Axis identifier
- Sequence number
- Units
- Object count

Measurement block — repeated 6× per axis (one per measuring mode):

- Mode
- Value
- Min
- Max
- Flags

6.3.2 Flags

Bitmask — each bit has an independent meaning:

Bit	Meaning	Detailed description
0	Value is valid	Set when the measurement is valid. If cleared, no object is detected, invalid number of edges detected for current mode or an internal readout error occurred. Should always be verified.
1	Value is imprecise	When average filtering is used, indicates that fewer than the required number of valid samples is present in the averaging window.
2	Value was modified by object filter	—
3	—	—
4	Min below low limit	Since last min value reset, the minimal measured value fell under min limit for at least one sample. Usefull for measuring fast phenomena.
5	Max above high limit	Since last max value reset, the maximum measured value exceeded high limit for at least one sample. Usefull for measuring fast phenomena.
6	Current value exceeds one of the limits	—
7	Value / MIN / MAX are relative	Relative mode is active — displayed values are computed against the reference standard.

Refer to General settings (page 16) section for more information about Object filter.

6.3.3 Example

```
Command:  +get api.xy.measure.data 0 0
Response: +0;31383803;0;1;0;19.196;13.495;28.000;97;1;0.000;0.000;22.891;1;2;0.000;
0.637;26.122;0;3;0.000;0.000;0.370;0;4;0.000;8.809;24.662;0;5;19.196;
0.014;27.580;1;1;31383804;0;1;0;16.430;10.220;28.000;1;1;6.962;0.476;
14.059;1;2;9.468;0.059;16.055;1;3;0.000;0.042;4.586;0;4;11.696;6.092;
15.818;1;5;0.000;0.422;27.909;0
```

Axis header fields (4 fields):

Field	Example	Description
Axis	`0`	Axis identifier (0 = X, 1 = Y)
Sequence number	`31383803`	Increments with each measurement
Units	`0`	0 = mm, 1 = inch, 2 = raw

Field	Example	Description
Object count	`1`	Number of detected objects

Measurement block fields (5 fields, repeated 6× per axis):

Field	Example	Description
Mode	`0`	0=edge1, 1=edge2, 2=dia, 3=gap, 4=center, 5=solid
Value	`19.196`	Current measured value
Min	`13.495`	Minimum recorded value
Max	`28.000`	Maximum recorded value
Flags	`97`	Bitmask — see Flags table above

Full response breakdown:

Field #	Value	Meaning
0	`0`	Axis X
1	`31383803`	Sequence number
2	`0`	Units: mm
3	`1`	Object count
4–8	`0;19.196;13.495;28.000;97`	edge1: value=19.196, flags=97
9–13	`1;0.000;0.000;22.891;1`	edge2: value=0.000, flags=1
14–18	`2;0.000;0.637;26.122;0`	dia: value=0.000, flags=0
19–23	`3;0.000;0.000;0.370;0`	gap: value=0.000, flags=0
24–28	`4;0.000;8.809;24.662;0`	center: value=0.000, flags=0
29–33	`5;19.196;0.014;27.580;1`	solid: value=19.196, flags=1
34	`1`	Axis Y
35–38	`31383804;0;1`	Sequence, units, object count
…	…	Same structure repeats for Y axis

6.4 Modbus TCP

Sensor supports Modbus TCP protocol via Ethernet or Wi-fi. Modbus TCP documentation is available in documentation screen of integrated web application or refer to Modbus registers (page 31) appendix for details.

7. Measuring modes

The measuring mode determines how the sensor interprets pixel profile. MicroXY laser micrometer can measure edge position of an object (Edge 1, Edge 2 modes), diameter (Diameter mode), center position (Center mode), gap between more objects (Gap mode), and edge position of solid object (Solid mode). Other custom measuring modes, e.g. number of objects, vibration, etc., are available upon customer request. Measuring mode can be set via sensor buttons, web interface or API.

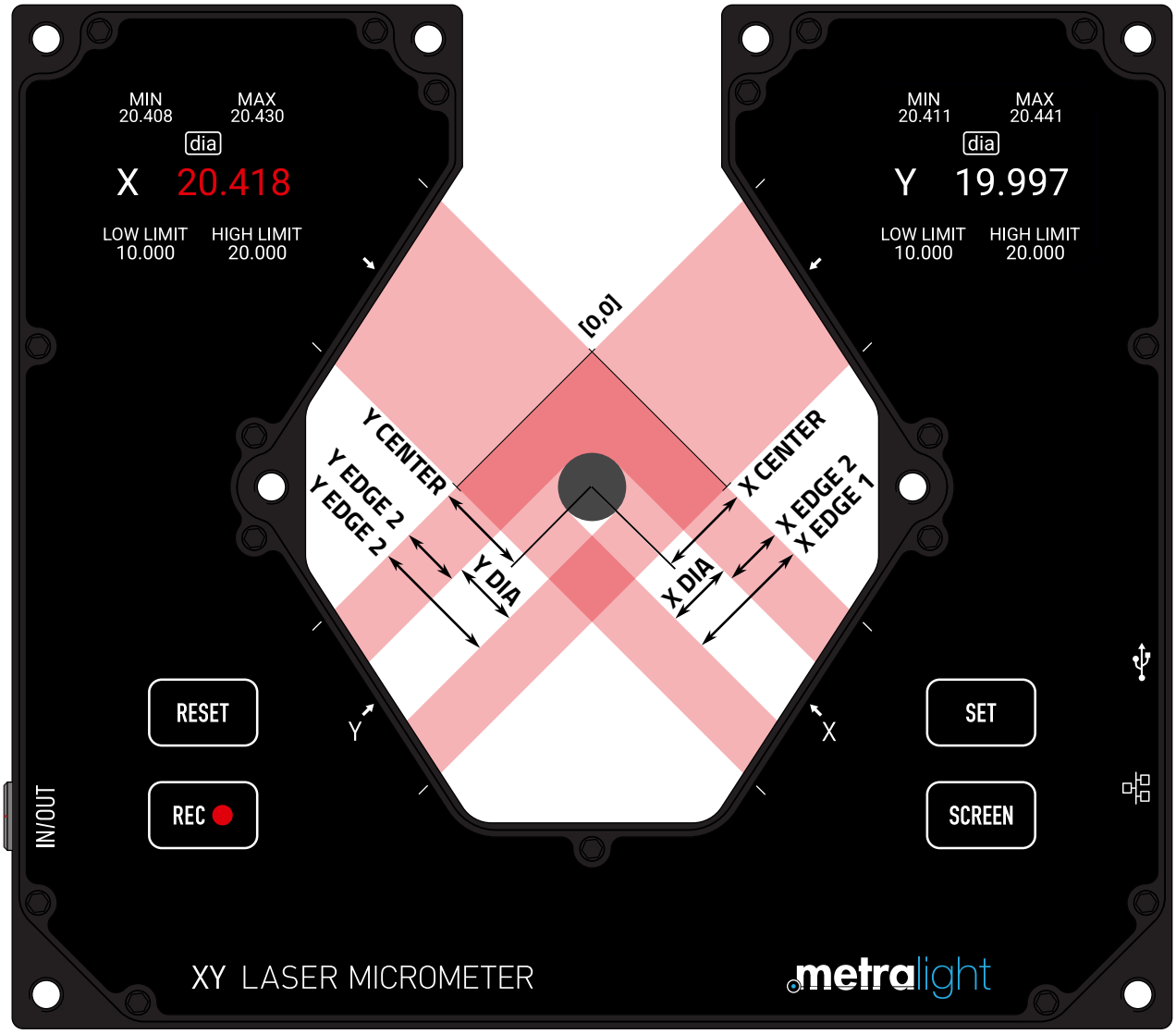


Image 14: Measuring modes visualization

8. Installation

USE APPROPRIATE MOUNTING SCREWS (SEE MECHANICAL DRAWING)
AVOID ESPECIALLY DIRECT SUNLIGHT AND ALL OTHER LIGHT SOURCES WITH WAVELENGTH CLOSE TO 670nm (see Optical filter transmittance on figure below).
ALWAYS KEEP OPTICAL WINDOWS CLEAN, FREE FROM DUST AND FINGERPRINTS, AVOID SCRATCHES ON THE OPTICAL WINDOWS.

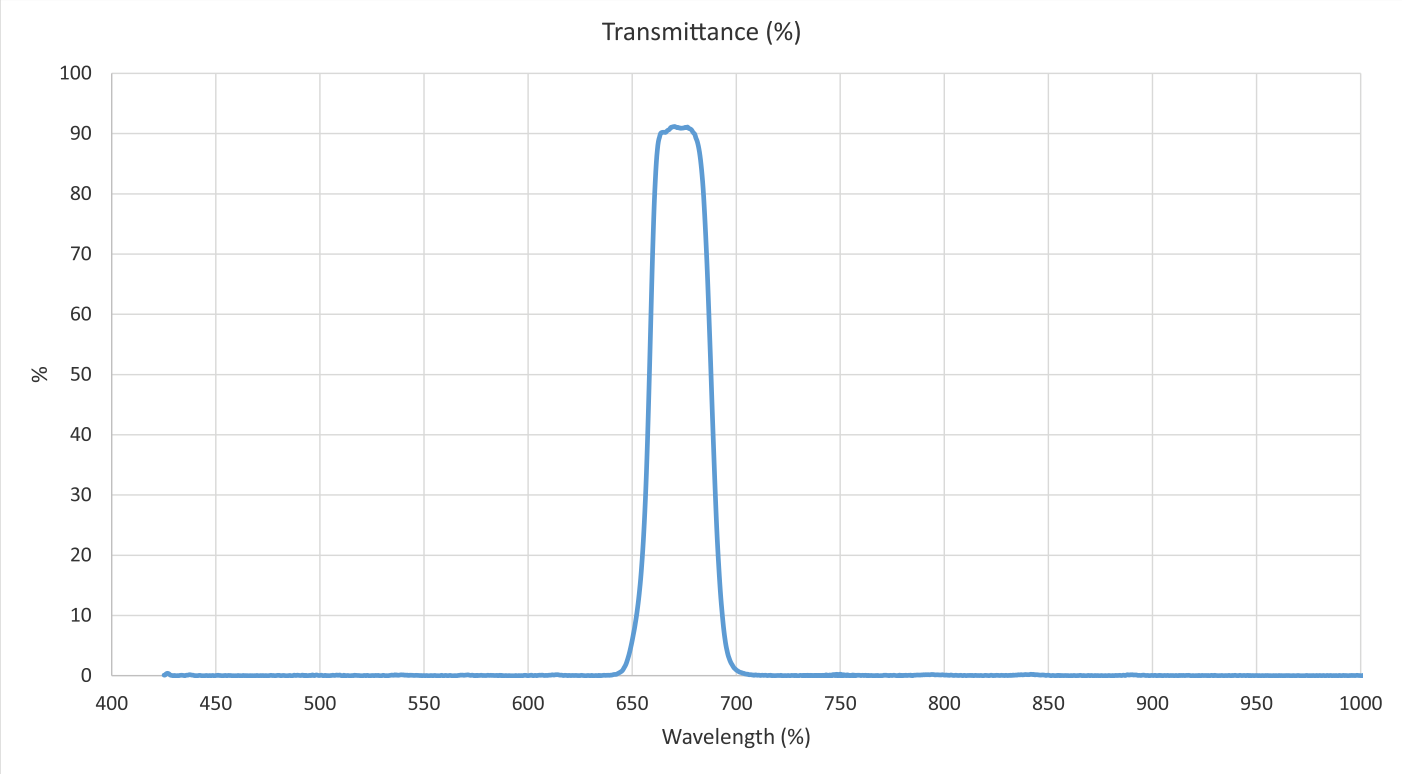


Image 15: Ambient light optical filter transmittance

Laser Safety

MicroXY sensor is classified as Class 1 Laser device. A Class 1 laser is safe for all conditions of use.

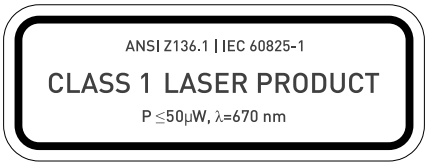


Image 16: Class 1 Laser safety label

9. Package, warranty, contacts

Package components:

- MicroXY laser micrometer
- USB cable
- I/O cable

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

METRALIGHT, Inc.
533 Airport Blvd. Suite # 400
Burlingame, CA 94010
phone: (650) 581 3088
fax: (650) 808 9830
email: sales@metralight.com
technical support: support@metralight.com
web site: http://www.metralight.com

Appendix A. Modbus TCP Register Map

A.1 General

Units

- **µm** — micrometer (Axis X/Y micrometers sections)
- **µin × 10** — microinch scaled by 10 (Axis X/Y microinches sections)

All registers are read-only (RO). Each measuring mode occupies a block of 10 consecutive registers: Value, Min, Max, Flags, followed by 6 reserved registers.

For more information about Flags structure and meaning, refer to the Flags (page 26) section of the document.

A.2 Axis X — micrometers

PLC Register	Raw Register	Property	Description	Unit
41010	1009	RO	Axis X: Mode EDGE 1 — Value	µm
41011	1010	RO	Axis X: Mode EDGE 1 — Min	µm
41012	1011	RO	Axis X: Mode EDGE 1 — Max	µm
41013	1012	RO	Axis X: Mode EDGE 1 — Flags	bitmask
41014–41019	1013–1018	RO	Reserved	—
41020	1019	RO	Axis X: Mode EDGE 2 — Value	µm
41021	1020	RO	Axis X: Mode EDGE 2 — Min	µm
41022	1021	RO	Axis X: Mode EDGE 2 — Max	µm
41023	1022	RO	Axis X: Mode EDGE 2 — Flags	bitmask
41024–41029	1023–1028	RO	Reserved	—
41030	1029	RO	Axis X: Mode DIAMETER — Value	µm
41031	1030	RO	Axis X: Mode DIAMETER — Min	µm
41032	1031	RO	Axis X: Mode DIAMETER — Max	µm
41033	1032	RO	Axis X: Mode DIAMETER — Flags	bitmask
41034–41039	1033–1038	RO	Reserved	—
41040	1039	RO	Axis X: Mode GAP — Value	µm
41041	1040	RO	Axis X: Mode GAP — Min	µm
41042	1041	RO	Axis X: Mode GAP — Max	µm
41043	1042	RO	Axis X: Mode GAP — Flags	bitmask
41044–41049	1043–1048	RO	Reserved	—
41050	1049	RO	Axis X: Mode CENTER — Value	µm
41051	1050	RO	Axis X: Mode CENTER — Min	µm
41052	1051	RO	Axis X: Mode CENTER — Max	µm
41053	1052	RO	Axis X: Mode CENTER — Flags	bitmask
41054–41059	1053–1058	RO	Reserved	—
41060	1059	RO	Axis X: Mode SOLID — Value	µm
41061	1060	RO	Axis X: Mode SOLID — Min	µm
41062	1061	RO	Axis X: Mode SOLID — Max	µm
41063	1062	RO	Axis X: Mode SOLID — Flags	bitmask
41064–41069	1063–1068	RO	Reserved	—

A.3 Axis Y — micrometers

PLC Register	Raw Register	Property	Description	Unit
41510	1509	RO	Axis Y: Mode EDGE 1 — Value	µm
41511	1510	RO	Axis Y: Mode EDGE 1 — Min	µm
41512	1511	RO	Axis Y: Mode EDGE 1 — Max	µm
41513	1512	RO	Axis Y: Mode EDGE 1 — Flags	bitmask
41514–41519	1513–1518	RO	Reserved	—
41520	1519	RO	Axis Y: Mode EDGE 2 — Value	µm
41521	1520	RO	Axis Y: Mode EDGE 2 — Min	µm
41522	1521	RO	Axis Y: Mode EDGE 2 — Max	µm
41523	1522	RO	Axis Y: Mode EDGE 2 — Flags	bitmask
41524–41529	1523–1528	RO	Reserved	—
41530	1529	RO	Axis Y: Mode DIAMETER — Value	µm
41531	1530	RO	Axis Y: Mode DIAMETER — Min	µm
41532	1531	RO	Axis Y: Mode DIAMETER — Max	µm
41533	1532	RO	Axis Y: Mode DIAMETER — Flags	bitmask
41534–41539	1533–1538	RO	Reserved	—
41540	1539	RO	Axis Y: Mode GAP — Value	µm
41541	1540	RO	Axis Y: Mode GAP — Min	µm
41542	1541	RO	Axis Y: Mode GAP — Max	µm
41543	1542	RO	Axis Y: Mode GAP — Flags	bitmask
41544–41549	1543–1548	RO	Reserved	—
41550	1549	RO	Axis Y: Mode CENTER — Value	µm
41551	1550	RO	Axis Y: Mode CENTER — Min	µm
41552	1551	RO	Axis Y: Mode CENTER — Max	µm
41553	1552	RO	Axis Y: Mode CENTER — Flags	bitmask
41554–41559	1553–1558	RO	Reserved	—
41560	1559	RO	Axis Y: Mode SOLID — Value	µm
41561	1560	RO	Axis Y: Mode SOLID — Min	µm
41562	1561	RO	Axis Y: Mode SOLID — Max	µm
41563	1562	RO	Axis Y: Mode SOLID — Flags	bitmask
41564–41569	1563–1568	RO	Reserved	—

A.4 Axis X — microinches

PLC Register	Raw Register	Property	Description	Unit
42010	2009	RO	Axis X: Mode EDGE 1 — Value	µin×10
42011	2010	RO	Axis X: Mode EDGE 1 — Min	µin×10
42012	2011	RO	Axis X: Mode EDGE 1 — Max	µin×10
42013	2012	RO	Axis X: Mode EDGE 1 — Flags	bitmask
42014–42019	2013–2018	RO	Reserved	—
42020	2019	RO	Axis X: Mode EDGE 2 — Value	µin×10
42021	2020	RO	Axis X: Mode EDGE 2 — Min	µin×10
42022	2021	RO	Axis X: Mode EDGE 2 — Max	µin×10
42023	2022	RO	Axis X: Mode EDGE 2 — Flags	bitmask
42024–42029	2023–2028	RO	Reserved	—
42030	2029	RO	Axis X: Mode DIAMETER — Value	µin×10
42031	2030	RO	Axis X: Mode DIAMETER — Min	µin×10
42032	2031	RO	Axis X: Mode DIAMETER — Max	µin×10
42033	2032	RO	Axis X: Mode DIAMETER — Flags	bitmask
42034–42039	2033–2038	RO	Reserved	—
42040	2039	RO	Axis X: Mode GAP — Value	µin×10
42041	2040	RO	Axis X: Mode GAP — Min	µin×10
42042	2041	RO	Axis X: Mode GAP — Max	µin×10
42043	2042	RO	Axis X: Mode GAP — Flags	bitmask
42044–42049	2043–2048	RO	Reserved	—
42050	2049	RO	Axis X: Mode CENTER — Value	µin×10
42051	2050	RO	Axis X: Mode CENTER — Min	µin×10
42052	2051	RO	Axis X: Mode CENTER — Max	µin×10
42053	2052	RO	Axis X: Mode CENTER — Flags	bitmask
42054–42059	2053–2058	RO	Reserved	—
42060	2059	RO	Axis X: Mode SOLID — Value	µin×10
42061	2060	RO	Axis X: Mode SOLID — Min	µin×10
42062	2061	RO	Axis X: Mode SOLID — Max	µin×10
42063	2062	RO	Axis X: Mode SOLID — Flags	bitmask
42064–42069	2063–2068	RO	Reserved	—

A.5 Axis Y — microinches

PLC Register	Raw Register	Property	Description	Unit
42510	2509	RO	Axis Y: Mode EDGE 1 — Value	µin×10
42511	2510	RO	Axis Y: Mode EDGE 1 — Min	µin×10
42512	2511	RO	Axis Y: Mode EDGE 1 — Max	µin×10
42513	2512	RO	Axis Y: Mode EDGE 1 — Flags	bitmask
42514–42519	2513–2518	RO	Reserved	—
42520	2519	RO	Axis Y: Mode EDGE 2 — Value	µin×10
42521	2520	RO	Axis Y: Mode EDGE 2 — Min	µin×10
42522	2521	RO	Axis Y: Mode EDGE 2 — Max	µin×10
42523	2522	RO	Axis Y: Mode EDGE 2 — Flags	bitmask
42524–42529	2523–2528	RO	Reserved	—
42530	2529	RO	Axis Y: Mode DIAMETER — Value	µin×10
42531	2530	RO	Axis Y: Mode DIAMETER — Min	µin×10
42532	2531	RO	Axis Y: Mode DIAMETER — Max	µin×10
42533	2532	RO	Axis Y: Mode DIAMETER — Flags	bitmask
42534–42539	2533–2538	RO	Reserved	—
42540	2539	RO	Axis Y: Mode GAP — Value	µin×10
42541	2540	RO	Axis Y: Mode GAP — Min	µin×10
42542	2541	RO	Axis Y: Mode GAP — Max	µin×10
42543	2542	RO	Axis Y: Mode GAP — Flags	bitmask
42544–42549	2543–2548	RO	Reserved	—
42550	2549	RO	Axis Y: Mode CENTER — Value	µin×10
42551	2550	RO	Axis Y: Mode CENTER — Min	µin×10
42552	2551	RO	Axis Y: Mode CENTER — Max	µin×10
42553	2552	RO	Axis Y: Mode CENTER — Flags	bitmask
42554–42559	2553–2558	RO	Reserved	—
42560	2559	RO	Axis Y: Mode SOLID — Value	µin×10
42561	2560	RO	Axis Y: Mode SOLID — Min	µin×10
42562	2561	RO	Axis Y: Mode SOLID — Max	µin×10
42563	2562	RO	Axis Y: Mode SOLID — Flags	bitmask
42564–42569	2563–2568	RO	Reserved	—