WELLAIR

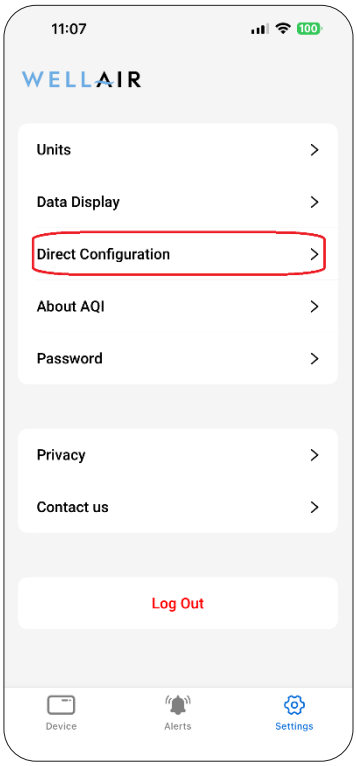
NanoDetect PRO

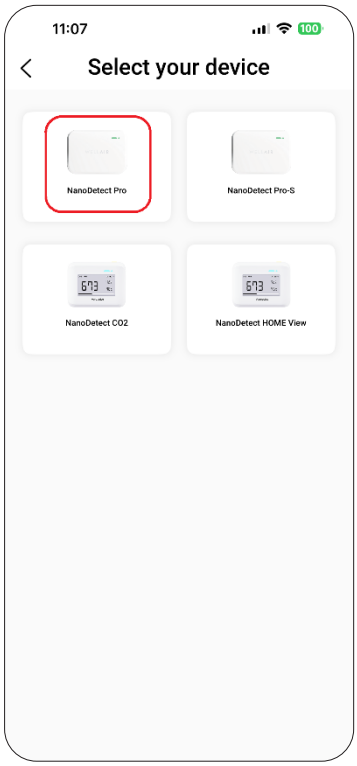
Modbus RTU (RS-485) Communication Guide

The NanoDetect PRO sensor supports Modbus RTU communication over an RS-485 serial interface. Configuration is performed using the mobile application.

Open the mobile application and select “Settings” (bottom right of the screen).

Select “Direct Configuration.”

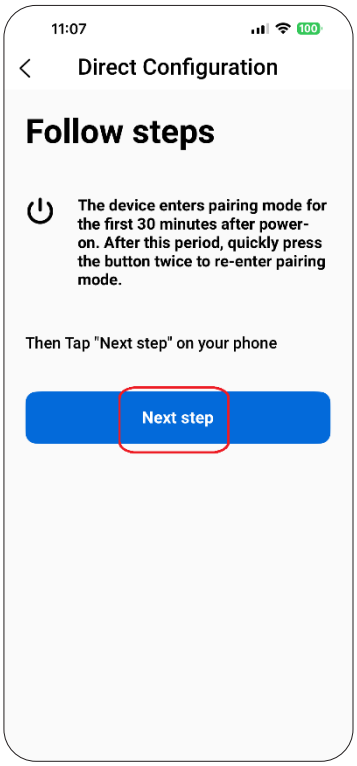




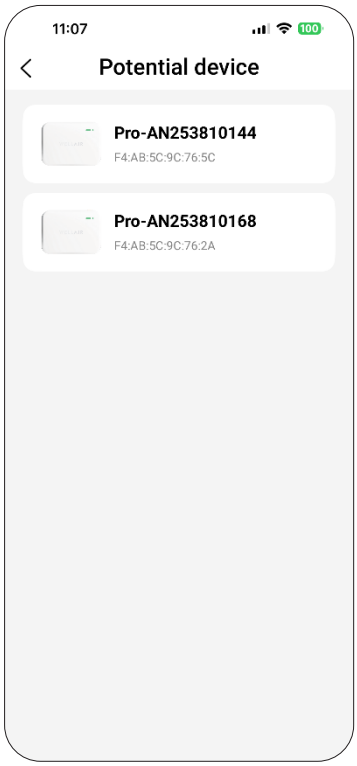
Select the sensor type “NanoDetect PRO.”

Follow the on-screen instructions to place the device in configuration mode. This is achieved either by power cycling the sensor (disconnect and reconnect the power supply) or by pressing the sensor button twice.

Select “Next Step” to continue.



A list of available devices will be displayed. Devices are identified by MAC address and device name. Select the appropriate NanoDetect PRO from the list.

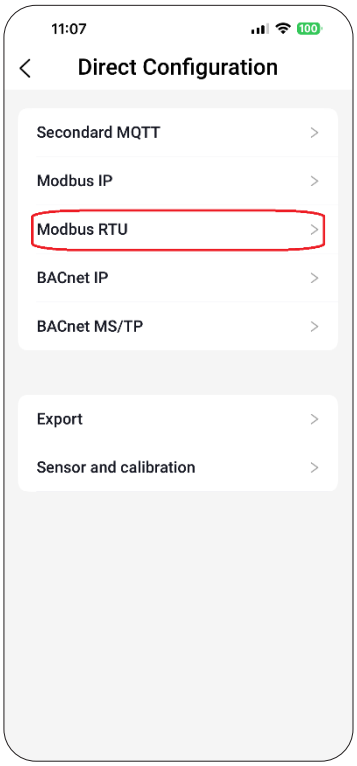


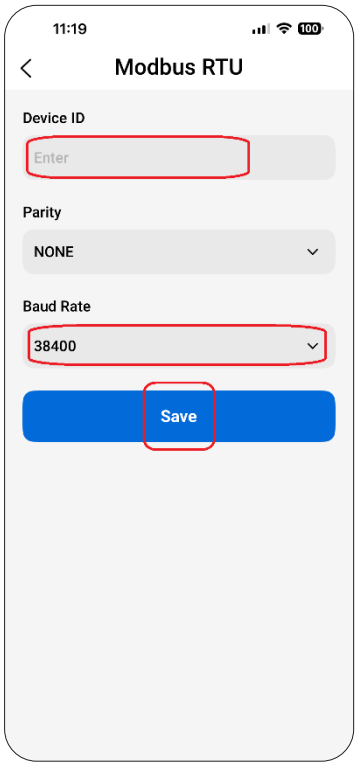
From the communication options, select “Modbus RTU.”

Enter the required Modbus parameters:

- Device ID (Slave Address)
- Parity (None, Even, or Odd)
- Baud Rate

Select “Save” to apply the settings. A long audible beep confirms successful configuration.





Communication Parameters

The Device ID (Modbus slave address) must be unique within the same RS-485 segment to prevent address conflicts.

The Baud Rate and Parity settings must match all other devices on the same RS-485 bus. Mismatched serial parameters will prevent successful communication.

RS-485 Wiring

The NanoDetect PRO provides an RS-485 two-wire differential interface. Connect the twisted pair conductors to the designated A and B terminals on the rear of the device (RS-485 non-isolated differential pair).

Maintain correct polarity across the entire bus (A-to-A and B-to-B). Reversed polarity will prevent communication.

The RS-485 network shall be wired in a linear daisy-chain topology. Star or branched configurations are not recommended.

If the NanoDetect PRO is installed at the physical end of the RS-485 bus, a 120 Ω termination resistor shall be installed across terminals A and B to provide proper line termination. Termination should only be applied at the two extreme ends of the bus, in accordance with standard RS-485 / Modbus RTU installation practice.

Modbus Protocol

Data Type

Data length = 8

Stop bits = 1

Parity = none / even / odd

Baud Rate = 1200 / 2400 / 4800 / 9600 / 19200 / 38400 / 57600

Commands

1. Read holding register

Addr	Fun	Data start addr hi	Data start addr lo	Data #of regs hi	Data #of regs lo	CRC16 hi	CRC16 lo
01H	03H	00H	00H	00H	03H	XXH	XXH

2. Read input register

Addr	Fun	DO addr hi	DO addr lo	Data #of regs hi	Data #of regs lo	CRC16 hi	CRC16 lo
01H	04H	00H	08H	00H	01H	XXH	XXH

3. Write single register

Addr	Fun	Data start Reg hi	Data start Reg lo	Value hi	Value lo	CRC hi	CRC lo
01H	06H	00H	40H	0AH	9DH	XXH	XXH

- Read Input Register (0×04) command 01 04 0038 0022 F1DEto read all input register
- Write single Register (0×06) command 01 06 0004 07E8 CA75 to set the Modbus holding register address to 0×06 (set device data 2024 year)
- Read holding Register (0×03) command 01 03 0002 0007 A5C8 to read all holding register.

Input Register Address

Address < Hex >	Content	R/W Property	Comment	Data Format on Modbus Poll	Value length
0×01	AQI	R	AQI US	Signed	U16
0×02	CO_2	R	ppm	Signed	U16
0×03	Temperature	R	°C	Signed	Tx100
0×04	Temperature	R	F	Signed	Tx100
0×05	Humidity	R	%	Signed	U16
0×06	Noise	R	dBm	Signed	U16
0×07	Light	R	Lux	Signed	U16
0×08	Air pressure	R	hPa	Signed	U16
0×09	TVOC	R	Index	Signed	U16
0×0A	PM2.5	R	$\mu g/m^3$	Signed	U16
0×0B	PM10	R	$\mu g/m^3$	Signed	U16
0×0C	PC0.3	R	Particle Count	Signed	U16
0×0D	PC2.5	R	Particle Count	Signed	U16
0×0E	PC10	R	Index	Signed	U16
0×0F	NO_X	R	Index	Signed	U16
0×10	Ozone	R	ppb	Signed	U16
0×11	NO_2	R	ppb	Signed	U16
0×12	CO	R	ppm	Signed	U16
0×13	HCHO	R	ppb	Signed	U16
0×14	H_2	R	%Vol	Signed	U16
0×15	SO_2	R	ppb	Signed	U16
0×16	NH_3	R	ppb	Signed	U16
0×17	H_2S	R	ppb	Signed	U16
0×18	SMELL	R	ppb	Signed	U16
0×19	C_2H_4O	R	ppb	Signed	U16

Note: *When the value is 65535, it indicates that the value is invalid*

Example:
Read Temperature:

Temperature is: 22.94 °C

Send:
01 04 00 03 00 02 34 0B

Receive:
01 04 04 41 B7 85 1F 7C C6

Holding Register Address

Address < Hex >	Content	R/W Property	Value	Data Format on Modbus Poll	Value length
0×01	Date (UTC)	R/W	07E8 09 04H 07E8H → 2024 year 09H → September 04H → 4th day	Signed	U32
0×03	Time (UTC)	R/W	000C 0A 01H 000CH → 12 hour 0AH → 10 minute 01H → 1 second	Signed	U32