AirQuality Unit – Modbus Address Map

Document revision

- Oct 3. 2025 - added RS485 settings
- Aug 30. 2025 - initial release

Brief information

This document describes the Modbus register and coil mapping implemented in the AirQuality Unit firmware.

Note: Register/coil addresses start from **0** (directly corresponding to the array index in the C source code).

📖 Input Registers (`input_registers[x]`)

Firmware & System Info

Address	Name / Function	Description
0	`fw_version[0]`	Firmware version – major
1	`fw_version[1]`	Firmware version – minor
2	`fw_version[2]`	Firmware version – patch
3	Reserved	Always 0
4	`uptime_hours`	Device uptime (hours)

Address	Name / Function	Description
5	`uptime_minutes`	Device uptime (minutes, 0–59)
6	`uptime_seconds`	Device uptime (seconds, 0–59)

Environmental & Meteorological Data (Floats)

Each value is stored as a **32-bit float = 2 registers** (`low word + high word`).
Base offset = `50` .

Address Range	Name / Function	Description	Unit
50–51	`pm1`	Particulate Matter PM1.0	µg/m³
52–53	`pm2_5`	Particulate Matter PM2.5	µg/m³
54–55	`pm4`	Particulate Matter PM4.0	µg/m³
56–57	`pm10`	Particulate Matter PM10	µg/m³
58–59	`voc`	Volatile Organic Compounds	index/ppb
60–61	`nox`	Nitrogen Oxides	index/ppb
62–63	`temperature`	Ambient temperature	°C
64–65	`humidity`	Relative humidity	%
66–67	`co2`	CO_2 concentration	ppm
68–69	`als`	Ambient light sensor	lux

📖 Holding Registers (`holding_registers[x]`)

Network Configuration

Address	Name / Function	Description	Example
0	`ip0`	IP address, byte 0	192
1	`ip1`	IP address, byte 1	168
2	`ip2`	IP address, byte 2	1
3	`ip3`	IP address, byte 3	50
4	`smask0`	Subnet mask, byte 0	255
5	`smask1`	Subnet mask, byte 1	255
6	`smask2`	Subnet mask, byte 2	255
7	`smask3`	Subnet mask, byte 3	0
8	`gw0`	Gateway address, byte 0	192
9	`gw1`	Gateway address, byte 1	168
10	`gw2`	Gateway address, byte 2	1
11	`gw3`	Gateway address, byte 3	1
12	`tcp_ports[0]`	TCP port 0	e.g., 502
13	`mac0`	MAC address, byte 0	00
14	`mac1`	MAC address, byte 1	11
15	`mac2`	MAC address, byte 2	22
16	`mac3`	MAC address, byte 3	33

Address	Name / Function	Description	Example
17	`mac4`	MAC address, byte 4	44
18	`mac5`	MAC address, byte 5	55
19	`tcp_ports[1]`	TCP port 1	e.g., 8080
20	`rtuadr`	Modbus RTU address (if used)	default 1
21	`rtubaud`	Modbus RTU baud rate index	0=9600, 1=19200, 2=38400, 3=57600, 4=115200, default 1
22	`rtupar`	Modbus RTU parity index	0=None, 1=Even, 2=Odd, default 1

General Configuration (Floats)

Stored at offset **50+** in Holding Registers:

Address Range	Name / Function	Description
50–51	`t_offset`	Temperature offset (float, 2 registers)
52–53	`als_gain`	ALS gain (float, 2 registers)

📖 Coils (`coils[x]`)

Address	Function	Description
0	`reset`	If set = 1 → System reset
1	`bootloader`	If set = 1 → Enter bootloader, then reset

Address	Function	Description
2	`save_network`	Save LAN and RS485 configuration from holding registers → EEPROM, then reset
3	`save_t_offset`	Save temperature offset (`holding[50..51]`) → EEPROM
4	`save_als_gain`	Save ALS gain (`holding[52..53]`) → EEPROM

📌 Notes

- **Address = C array index** (e.g., `holding_registers[0]` → Modbus address 0).
- Multi-byte values (floats) are stored in **two consecutive registers** (low word + high word).
- Environmental sensor values are mapped starting at **Input Register 50**.
- Coils used for saving configurations automatically reset to `0` after execution.
- After saving LAN configuration (coil 2), the device performs a reset.
