

AEROPULSE | PRODUCT SPECIFICATION

# A300 Wall-Mounted CO<sub>2</sub> Transmitter

High-accuracy room CO<sub>2</sub> transmitter with Senseair S12 true NDIR sensing

## Full CO<sub>2</sub> performance in a compact building-control transmitter

The A300 combines the ultra-compact Senseair S12 true NDIR CO<sub>2</sub> sensor with 24 VAC/DC power, configurable analog outputs and Modbus RTU connectivity. It is designed for demand-controlled ventilation, building management systems and indoor-air-quality applications where reliable long-term CO<sub>2</sub> data is required.

## Product overview

| Parameter                         | A300 specification                                       |
|-----------------------------------|----------------------------------------------------------|
| Integrated CO <sub>2</sub> sensor | Senseair S12, article 012-0-0001                         |
| Measurement range                 | 0-10,000 ppm published range; designed for 400-5,000 ppm |
| A300 supply                       | 24 VAC/DC, ±20%                                          |
| Outputs                           | OUT1: 0-10 V; OUT2: 2-10 V or 4-20 mA                    |
| Digital communication             | RS-485, Modbus RTU                                       |
| Mounting / enclosure              | Wall-mounted; 110 × 85 × 20 mm; IP30                     |

## Key benefits

- True NDIR CO<sub>2</sub> measurement using a solid-state optical design and LED light source.
- High accuracy, 1 ppm resolution and configurable measurement interval.
- Configurable 0-2,000 or 0-5,000 ppm analog scaling for building controls.
- Automatic Baseline Correction (ABC), enabled by default at sensor level and configurable by the host.
- Sensor life expectancy of more than 15 years.
- Maintenance-free operation when ABC is enabled and the application periodically reaches a suitable background concentration.

## Applications

Building management systems • Demand-controlled ventilation • Commercial and residential IAQ • Hotels, cinemas and museums • Underground parking and other CO<sub>2</sub> control applications

# 1. Sensor performance

The values in this section apply to the integrated Senseair S12 CO<sub>2</sub> sensor. They do not describe the total current consumption, supply voltage or enclosure limits of the assembled A300 transmitter.

## 1.1 Sensing performance

| Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Conditions / value                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Target gas                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Carbon dioxide (CO <sub>2</sub> )                                                                                          |
| Operating principle                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Non-dispersive infrared (NDIR); diffusion sampling                                                                         |
| Designed measurement range                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 400–5,000 ppm; extended range up to 10,000 ppm                                                                             |
| Published output range                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0–5,000 ppm standard; 5,001–10,000 ppm extended                                                                            |
| Accuracy — ANSI/ASHRAE environments                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ±(30 ppm + 3% of reading)                                                                                                  |
| Accuracy — 0–5,000 ppm                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ±(50 ppm + 3% of reading)                                                                                                  |
| Accuracy — 5,001–10,000 ppm                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Greater of ±(70 ppm + 3% of reading) or ±10% of reading                                                                    |
| Resolution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1 ppm                                                                                                                      |
| Measurement interval                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2 s default; configurable from 2 s                                                                                         |
| Sampling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 59 samples default; configurable                                                                                           |
| Response time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | T <sub>63</sub> <30 s                                                                                                      |
| Temperature compensation                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Automatic, using onboard sensor element                                                                                    |
| Pressure compensation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Host-supplied pressure value; without compensation, approximately 1.6% of reading per 1 kPa deviation from normal pressure |
| <b>Accuracy conditions</b> Accuracy is defined at 25 °C, 1013 mbar and 50% RH in continuous mode using filtered concentration readings. The specification is referenced to calibration-gas mixtures with an uncertainty of ±1%. Shipping, assembly and rough handling may temporarily affect accuracy; it can be restored by forced recalibration or after a maximum of three ABC periods after mounting. ANSI/ASHRAE accuracy applies at 600, 1,000 and 2,500 ppm, measured at sea level and 25 °C. |                                                                                                                            |
| <b>Below 400 ppm</b> Senseair states that exposure below 400 ppm may affect performance. For measurements below 400 ppm, ABC shall be turned off.                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                            |

## 1.2 General sensor performance

| Parameter                   | Senseair S12 value                                                                                    |
|-----------------------------|-------------------------------------------------------------------------------------------------------|
| S12 supply voltage          | 3.05–5.5 V                                                                                            |
| S12 peak current            | <20 mA                                                                                                |
| S12 average current         | <34 µA at default settings                                                                            |
| Sensor operating conditions | Standard calibrated range: 15–35 °C; extended operating range: –10 to 60 °C; 0–95% RH, non-condensing |
| Sensor storage temperature  | –40 to 85 °C                                                                                          |

| Parameter                  | Senseair S12 value                      |
|----------------------------|-----------------------------------------|
| Sensor dimensions / weight | 18 × 15 × 6 mm; <3 g                    |
| Sensor interfaces          | UART / I <sup>2</sup> C; digital output |
| Life expectancy            | >15 years                               |
| Maintenance                | Maintenance-free when ABC is enabled    |

## 2. A300 transmitter performance

**System boundary** The S12 operates internally at 3.05-5.5 V. The assembled A300 transmitter accepts 24 VAC/DC and provides conditioned analog and RS-485 outputs. Do not apply 24 V directly to the S12 sensor pins.

### 2.1 Electrical and analog outputs

| Parameter                       | A300 value                                                          |
|---------------------------------|---------------------------------------------------------------------|
| Power supply                    | 24 VAC/DC, ±20%                                                     |
| OUT1                            | 0-10 V; 0-2,000 or 0-5,000 ppm selectable                           |
| OUT2                            | 2-10 V or 4-20 mA selectable; 0-2,000 or 0-5,000 ppm selectable     |
| Output resolution               | Voltage: <10 mV; current: <0.02 mA                                  |
| Conversion accuracy             | Voltage: ±(20 mV + 2% of output); current: ±(0.3 mA + 2% of output) |
| Analog load                     | Voltage output: >5 kΩ; current output: <500 Ω                       |
| Permissible DC cable resistance | 100 Ω maximum                                                       |

### 2.2 Environmental and mechanical

| Parameter                     | A300 value                   |
|-------------------------------|------------------------------|
| Operating temperature         | -10 to 60 °C                 |
| Operating humidity            | 0-95% RH, non-condensing     |
| Assembled transmitter storage | -40 to 70 °C                 |
| Enclosure dimensions          | 110 × 85 × 20 mm (L × W × H) |
| Protection rating / mounting  | IP30; wall-mounted           |

## 2.3 Field terminals (J1)

| Pin | Signal | Description                                          |
|-----|--------|------------------------------------------------------|
| 1   | G+     | 24 VAC/DC input; DC positive or either AC conductor  |
| 2   | G0     | Supply return; DC negative or the other AC conductor |
| 3   | OUT1   | Buffered 0–10 V output                               |
| 4   | OUT2   | Buffered 2–10 V or 4–20 mA output                    |

## 2.4 RS-485 / Modbus RTU (J3)

| Pin | Signal | Description                      |
|-----|--------|----------------------------------|
| 4   | RS485+ | Modbus RTU differential positive |
| 5   | RS485– | Modbus RTU differential negative |
| 6   | GND    | Reference ground                 |

Default A300 settings: 9,600 baud, 8 data bits, no parity, 1 stop bit (8-N-1); slave address 0x01; function code 0x04; CO<sub>2</sub> input register 0x0000.

# 3. Configuration, calibration and installation

## 3.1 Output configuration

| Function       | Selection          | Result      |
|----------------|--------------------|-------------|
| OUT2 mode      | J4 voltage channel | 2–10 V      |
| OUT2 mode      | J4 current channel | 4–20 mA     |
| Analog scaling | J5/J7 High (H)     | 0–5,000 ppm |
| Analog scaling | J5/J7 Low (L)      | 0–2,000 ppm |

**Commissioning** Set configuration jumpers with power disconnected. Verify PCB markings, output mode and control-system scaling before commissioning.

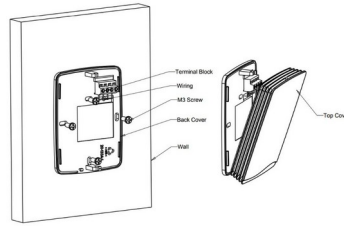
## 3.2 ABC and forced ABC calibration

The S12 incorporates a self-correcting Automatic Baseline Correction (ABC) algorithm. ABC is enabled by default, and both the ABC period and calibration target can be configured by the host system. Senseair does not state a fixed default ABC interval in PSP15871 Rev 4. For continuously occupied environments where CO<sub>2</sub> does not regularly return to a suitable background level, consult Senseair regarding the calibration strategy or consider the S12 Dual Technology version.

A300 SW1 triggers the Senseair S12 Forced ABC Calibration command (0x7C03), which is sent to the sensor via I<sup>2</sup>C. This command initiates an ABC calibration using valid ABC data and the currently configured ABC parameters. The factory-configured ABC Target is 400 ppm. The command is effective only when ABC is enabled and valid ABC data is available.

After receipt, calibration uses the first measurement taken immediately afterward. In single-measurement mode, the host system shall trigger that measurement.

### 3.3 Wall installation



- Remove the top cover and route field wiring through the rear cable opening.
- Fasten the back cover securely to the wall using the indicated mounting points.
- Terminate power and output wiring, verify polarity and configuration, then refit the top cover.
- Install where representative room air can reach the enclosure; avoid direct supply-air jets and localized heat sources.

### 3.4 Standards and source basis

Senseair S12 sensor compliance: ANSI/ASHRAE Standard 62.1-2025, RESET Grade B, WELL Building Standard® (WELL v2™), and Title 24 California Energy Code. Sensor data is aligned to Senseair S12 CO<sub>2</sub> Product Specification PSP15871 Rev 4 (July 2026). A300 supply, I/O, enclosure and configuration data is based on the latest A300 engineering specification.

This Aeropulse product specification describes the A300 transmitter integrating a Senseair S12 sensor. Senseair is a third-party sensor manufacturer, and this is not an official Senseair-issued document. Specifications are subject to change without notice.