S-C02/T MODBUS SENSOR

CE

HUB 8 SE - ACCESSORIES & THIRD PARTY MODBUS SYSTEM

1. INTRODUCTION

This document presents the installation and maintenance schemes for C02 sensor with Hub 8 SE: exhaust compensation valve and third-party Modbus systems. First, we will focus on the S-C02/T connections with Hub 8 SE and secondly with third party Modbus systems.

1.1. WARNINGS

PLEASE READ THE FOLLOWING INSTRUCTIONS BEFORE THE INSTALLATION:

In case of non-compliance with advice and warnings contained in this manual, the manufacturer can not be considered responsible for damages to persons or property.

The manual describes how to install, use and maintain correctly the appliance. The only way to ensure the efficiency and longevity of the product is to comply with these requirements.

Do not use this appliance for any applications for which it is not intended.

The system must be installed by experienced contractors, trained in the specificities of the process and having the necessary skills in aeraulics and electricity.

The use of gloves to carry on the installation is recommended.

After unpacking the appliance, make sure it is not damaged. Any functional default must be reported to your reseller.

The use of an electrical appliance implies the following fundamental rules:

- Do not touch the appliance with a wet or damp body (hands, feet, etc.).
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. To avoid any risk, do not allow them to play with the appliance.
- The electrical installation and electrical connections must be carried out by a qualified technician according to the manufacturer's instructions and in compliance with the characteristics listed on the nameplate of the unit.
- Before carrying out any operation on the appliance, unplug or disconnect it from the power supply, and ensure it can not be accidentally restored.
- Power cable modification or replacement must only be carried out by qualified personnel or by After-sales Service in order to avoid any accident.
- Children being supervised not to play with appliance.

2. DESCRIPTION

2.1. GENERAL INFORMATION

The S-C02/T Modbus sensor is compatible with HUB 8 SE and with third party Modbus systems for the management of airflow supply.

We recommend to use one sensor per main room (living room and bedroom).

- The S-C02/T can be mixed with other sensors such as Occupancy for the HUB 8 SE.
- A maximum of 8 sensors can be connected to the system.
- The connection to the system is made through RJ45 wires.

The S-C02/T sensor measures the concentration of CO_2 in a place. The principle of analysis consists of an absorption measurement of infrared rays to determine a concentration in the local. This method allows a very high fidelity of response and is independent of any other pollution (such as moisture, dust, etc.).

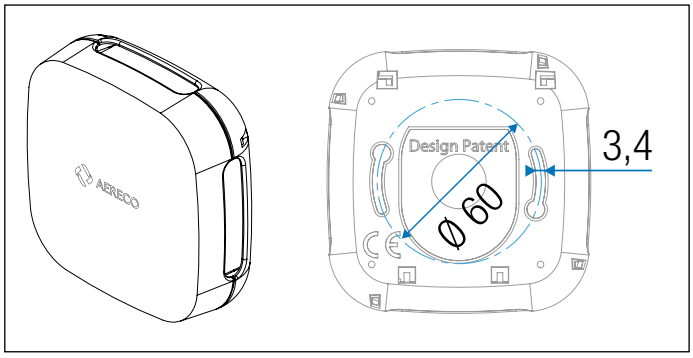
Protocol: Modbus RTU / through RS485
Baud rate: 9600 bit/s
Modbus implementation class: basic
Connectors type: RJ45 with shielded CAT5E cable or better

3. INSTALLATION

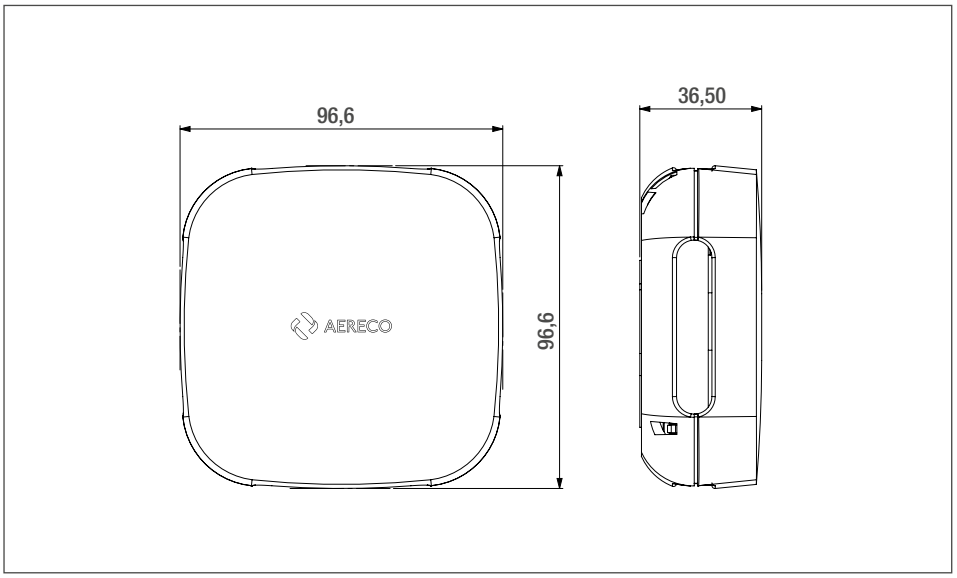
The S-C02/T sensor can be installed both on the wall (at least 1.5 meter from the floor) or at the ceiling.

- keep the sensor away from any direct solar radiation,
- keep the sensor away from draughts (door, window, supply, etc.),
- Avoid placing the sensor in dead zones (behind curtains, furniture, etc.),
- keep the sensor away from heat sources, if the sensor is located at the ceiling,
- keep it away from any supply unit to prevent any unwanted and harmful magnetic interaction.

The sensors should be fixed with two screws.

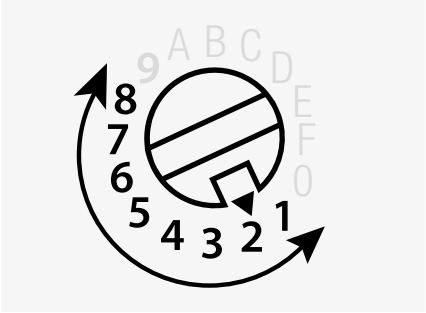


4. DIMENSIONS



5. THE S-C02/T MODBUS SENSOR'S CONNECTIONS WITH HUB 8 SE

5.1. SETTING OF THE S-C02/T SENSORS FOR HUB 8 SE



Modbus address rotary switch for selecting sensors (on the sensor's PCB)

8 indexation positions are allowed for every sensor (CO_2 or Occupancy): position 1 to position 8 included.

Important: Before to start the heat recovery unit, every sensor must have a specific identification number (1 to 8) so that the system can identify them. This index number has to be different from a sensor to another one. The index numbers must be incremented to each other so that there is no digit jump.

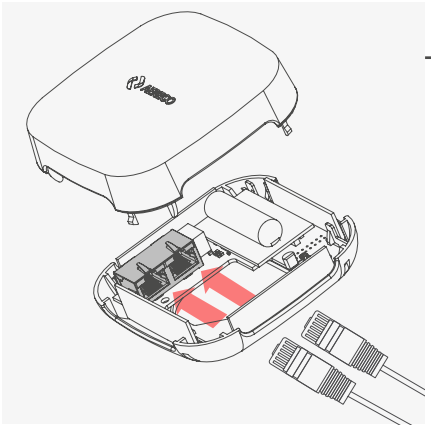
Example:

· CO_2 sensor in living room = 4 / because Hub SE outlet n°4 is connected to living room.
· Occupancy sensor bedroom A = 1 / because Hub SE outlet n°1 is connected to bedroom A.
· Occupancy sensor bedroom B = 2 / because Hub SE outlet n°2 is connected to bedroom B.
· Occupancy sensor bedroom C = 3 / because Hub SE outlet n°3 is connected to bedroom C.

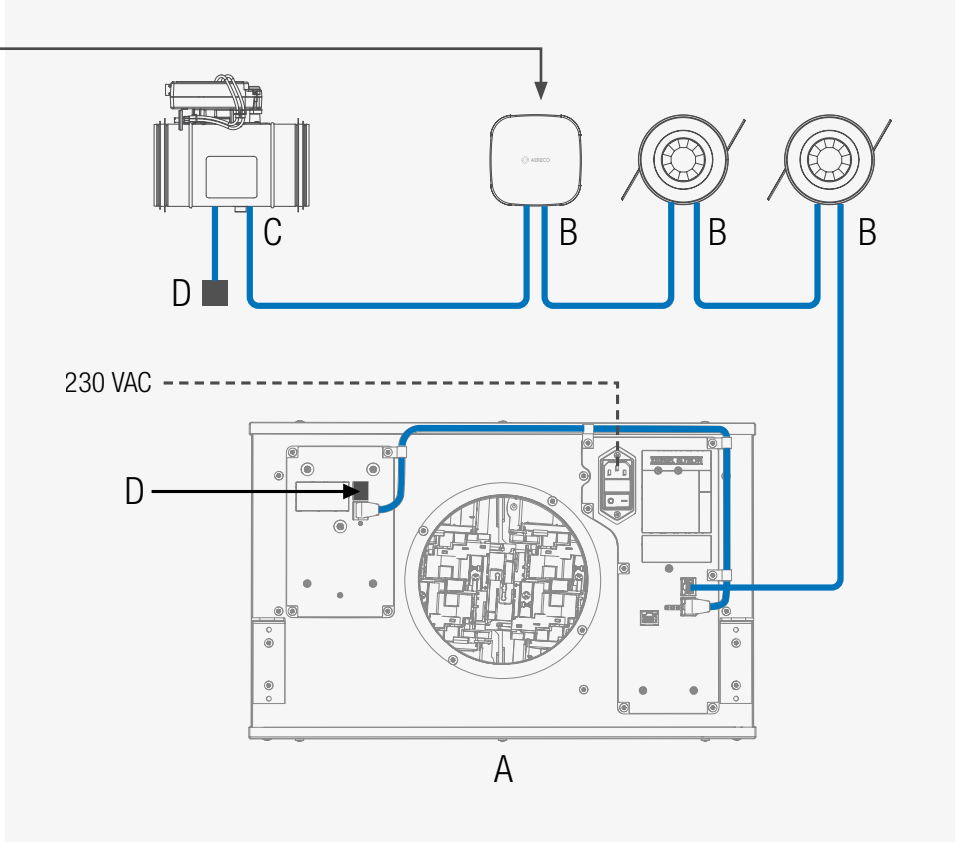
Note: the sensors are delivered in position 0. They must be manipulated with extreme care.

5.2. THE S-C02/T ELECTRICAL CONNECTIONS WITH HUB 8 SE

Disconnect the electrical power supply before any operations and ensure that the Hub SE cannot be started accidentally. The Hub SE communicates to the other components through Modbus connection. All the components are linked other via a daisy-chain. At the beginning and at the end of the daisy-chain, a termination is needed.

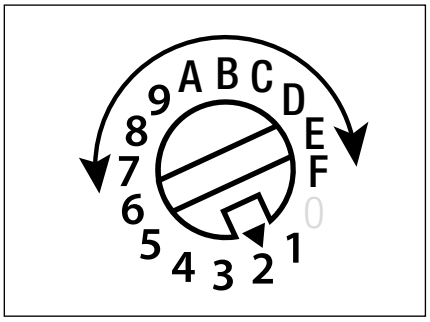


ModBus connection to the CO_2 sensor



A	Hub SE
B	Sensors
C	Compensation valve at exhaust
D	ModBus Termination

———	RJ 45
- - -	Supply (230 V): 1.5 mm².



Modbus address rotary switch for selecting sensors (on the sensor's PCB)

6. THE S-C02/T CONNECTIONS WITH THIRD PARTY MODBUS SYSTEMS

6.1. SETTING OF THE S-C02/T SENSORS FOR THIRD PARTY MODBUS SYSTEMS

15 indexation positions are allowed for Modbus addressing: position 1 to position F included. Address 0 is not available.

Important: Up to 15 sensors can be connected to the Modbus and each sensor must have a different address from others in diasy chain.

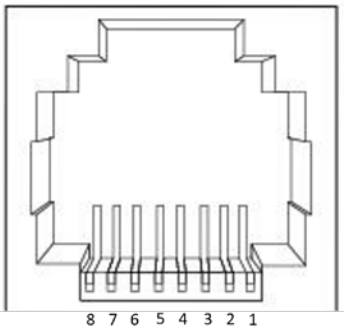
Note: the sensors are delivered in position 0. They must be manipulated with extreme care.

6.2. THE S-C02/T ELECTRICAL CONNECTIONS WITH THIRD PARTY MODBUS SYSTEMS

Disconnect the electrical power supply before any operations. The S-C02/T Modbus sensor communicates with other components through Modbus connection which is made by a RS485 interface connected through a double RJ45 connector for daisy chain linking.

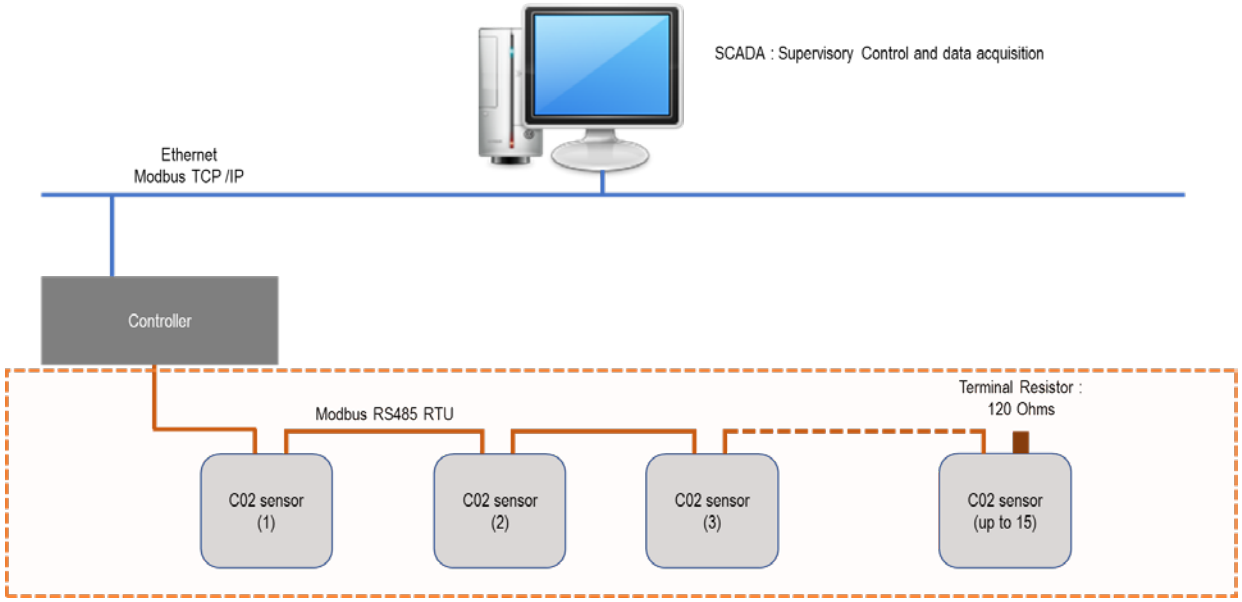
All the components are linked to each other via a daisy-chain whose length should not exceed 200 m with shielded CAT5E cable or better. At the beginning and at the end of the daisy-chain, a termination is needed. An electrical control board that contains a converter USB -> RS485 and a BUS polarization is necessary for the Modbus connection schemes. Aereco offers an optimal solution of electrical control board (ref: ADX1785EX) that is adapted to its S-C02/T Modbus sensors.

Pin	Label
1	+12 VDC
2	Not connected
3	+12 VDC
4	Data +
5	Data -
6	Not connected
7	0 V
8	0 V



2W-Modbus on RJ45 socket pin-out

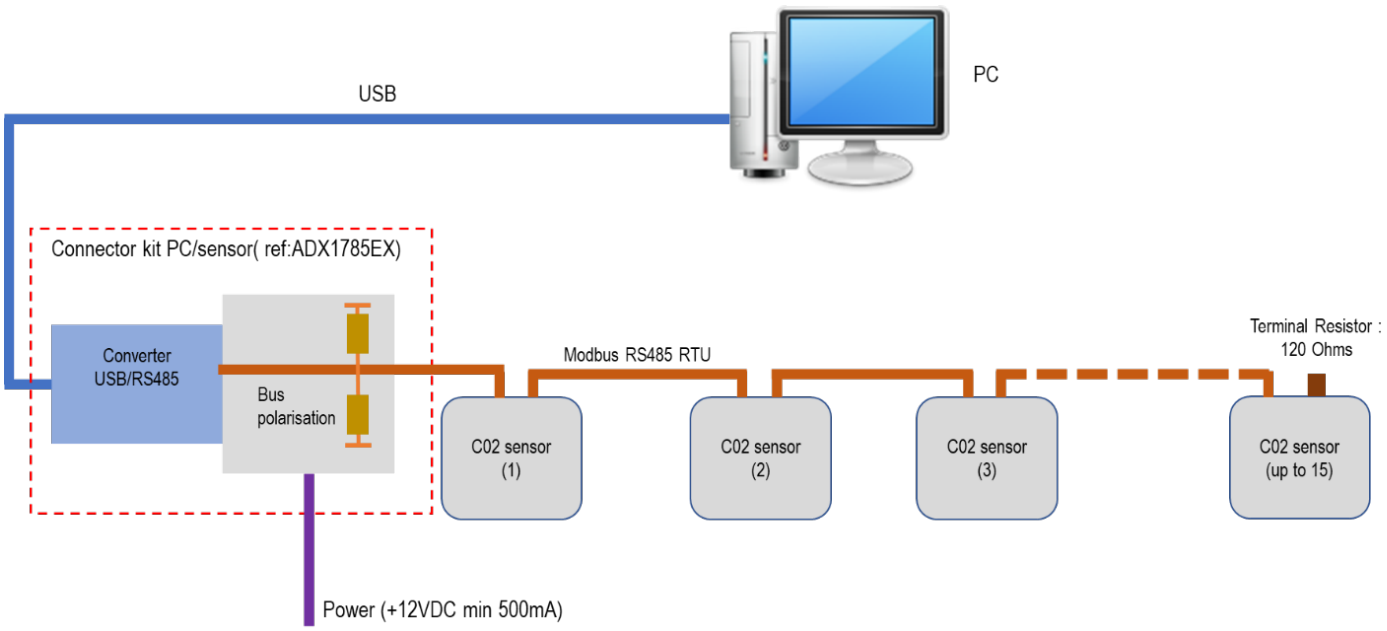
6.3. EXAMPLE OF MODBUS MASTER/SLAVE ARCHITECTURE FOR THIRD PARTY MODBUS SYSTEMS:



Note: There are different solutions for the connexion of RJ45 cable between the controller and the sensor:

- Cut and free the wires coming from the RJ45 connector and connect directly to the terminal block of the controller
- Second possibility is to use an adaptor RJ45 (RJ45 to terminal block)

6.4. APPLICATION DEVELOPMENT FOR MODBUS SENSOR:



Note: Aereco developed a customised kit for connecting PC and sensors. you can easily order with the reference code below (ref: ADX1785EX)

7. TECHNICAL DATA

	S-C02/T Modbus sensor
Standard code	**CAP1668**
Data points	**CO_2 and temperature**
CO_2 specifications	
Measurement principle	NDIR (non-dispersive infrared technology)
Sensor Type	Dual wavelength
Working range	0…2000 ppm CO_2
Accuracy at 25 °C and 1013 mbar	< ± (50 ppm +2 % of measuring value)
Response Time	105s with measured data averaging 60s without measured data averaging
Temperature dependency	typ. 2ppm CO2/°C (0...50°C / 32...122°F)
Measuring time interval	1h (default), use Synch operation (Modbus register table) for immediate measurement
Calibration interval	>5 years
Built-in temperature sensor	
Temperature working range	2°C to 50°C
Accuracy	0.5°C ensured at 25°C
Conversion Gain	10mV/°C
Electrical specifications	
Power supply	12 VDC
Power consumption (standby mode)	10mA
Power consumption (measuring mode)	135mA Max
Connection type	2xRJ45 shielded
Communication	
Protocol type	**Modbus RTU, RS485 physical layer**
Baud rate	9600bps
Data length	16bits
Housing	
Material	ABS
Color	white
Protection	IP 20
Weight	80.5g
Installation type	Ceiling and Wall-mounted,indoor

8. WARRANTY

This guarantee is valid for two years from the original date of purchase of your appliance, for faults of the appliance, which have been caused by faulty construction. On these conditions, Aereco guarantee the replacement or the supply of the equipment found to be defective after inspection by its after sales service. In any case, the warranty may not cover additional costs, of labour, transport or compensation of any kind. The warranty does not cover damage due to improper installation in this manual, improper use or attempted repair by unauthorized personnel. In case of problems, please contact your installer or your reseller.

CE

9. CONFORMITY AND STANDARD

The S-C02/T sensor is CE certified.

The S-C02/T sensor complies with the following regulatory references:

Directives	Standards
EMC	EN 61000-6-3 : 2007 / A1 : 2011
	EN 61000-6-1 : 2007

AERECO

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