ROTEM®
Control & Management

CO2 Sensor

User and Installation Guide

P/N: 110227

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Take Control©

WARRANTY & LIMITATION OF LIABILITY

1. ROTEM warrants that the product shall be free of defects in materials or workmanship and will conform to the technical specification for a period of 1 (one) year from the date of initial installation on site (the "warranty period").

2. Load cells are not covered by ROTEM's warranty.

3. ROTEM warrants that during said warranty period, any item/items or part/parts of equipment found defective with respect to materials or workmanship or which do not conform to the technical specification shall be repaired or replaced (at ROTEM's sole discretion), free of charge.

4. During the warranty period, in the event of an alleged defect, authorized resellers in relevant regions should be notified as soon as possible from the date of noticing the said defect, but no longer than thirty (30) days from such a discovery. The report shall include (1) a short description of the defects noticed (2) type of card / component and its matching serial number.

5. ROTEM's sole liability under this warranty is the repair or replacement of the defective item of product.

Conditions and Limitations

1. ROTEM will not be responsible for any labor costs or expenses associated with replacement of defective items or other parts of the product or repair.

2. This warranty shall not cover: (i) product or part therein which has been modified (without prior written approval of ROTEM), or (ii) product or part therein which has not handled or installed by an authorized reseller of ROTEM or (iii) product or part therein which has either handled or installed not in strict accordance with ROTEM's instructions, (iv) products which were used for function other than agriculture industry.

3. This warranty will not apply in the following cases: (i) if all components of the product are not originally supplied by ROTEM (ii) the defect is the result of an act of nature, lighting strikes, electrical power surge or interruption of electricity (iii) the defect is the result of accident, misuse, abuse, alteration, neglect, improper or unauthorized maintenance or repair.

ROTEM warns and alerts all users that the Product is inherently complex and may not be completely free of errors. ROTEM's products are designed and manufactured to provide reliable operation. Strict tests and quality control procedures are applied to every product. However, the possibility that something may fail beyond our control exists. Since these products are designed to operate climate control and other systems in confined livestock environments, where failure may cause severe damage, the user should provide adequate backup and alarm systems. These are to operate critical systems even in case of a ROTEM system failure. Neglecting to provide such a backup will be regarded as the user's willingness to accept the risk of loss, injury and financial damage.

In no event will ROTEM be liable to a user or any third party for any direct, indirect, special, consequential or incidental damages, including but not limited to any damage or injury to business earnings, lost profits or goodwill, personal injury, costs of delay, any failure of delivery, costs of lost or damaged data or documentation, lost or damaged products or goods, lost sales, lost orders, lost income.

Except for the above express warranty, ROTEM makes no other warranties, express or implied, relating to the products. ROTEM disclaims and excludes the implied warranties of merchantability and fitness for a particular purpose. No person is authorized to make any other warranty or representation concerning the performance of the products other than as provided by ROTEM.

Software Version: **1.0**

Document Version: **1.5**

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1 INTRODUCTION

The CO2 Sensor measures CO_2 levels in an agricultural environment. Working in conjunction with a controller, the CO2 Sensor sends a signal when the measured CO_2 levels fall outside the user-defined specifications. This signal activates the controller's ventilation. Refer to Figure 1.

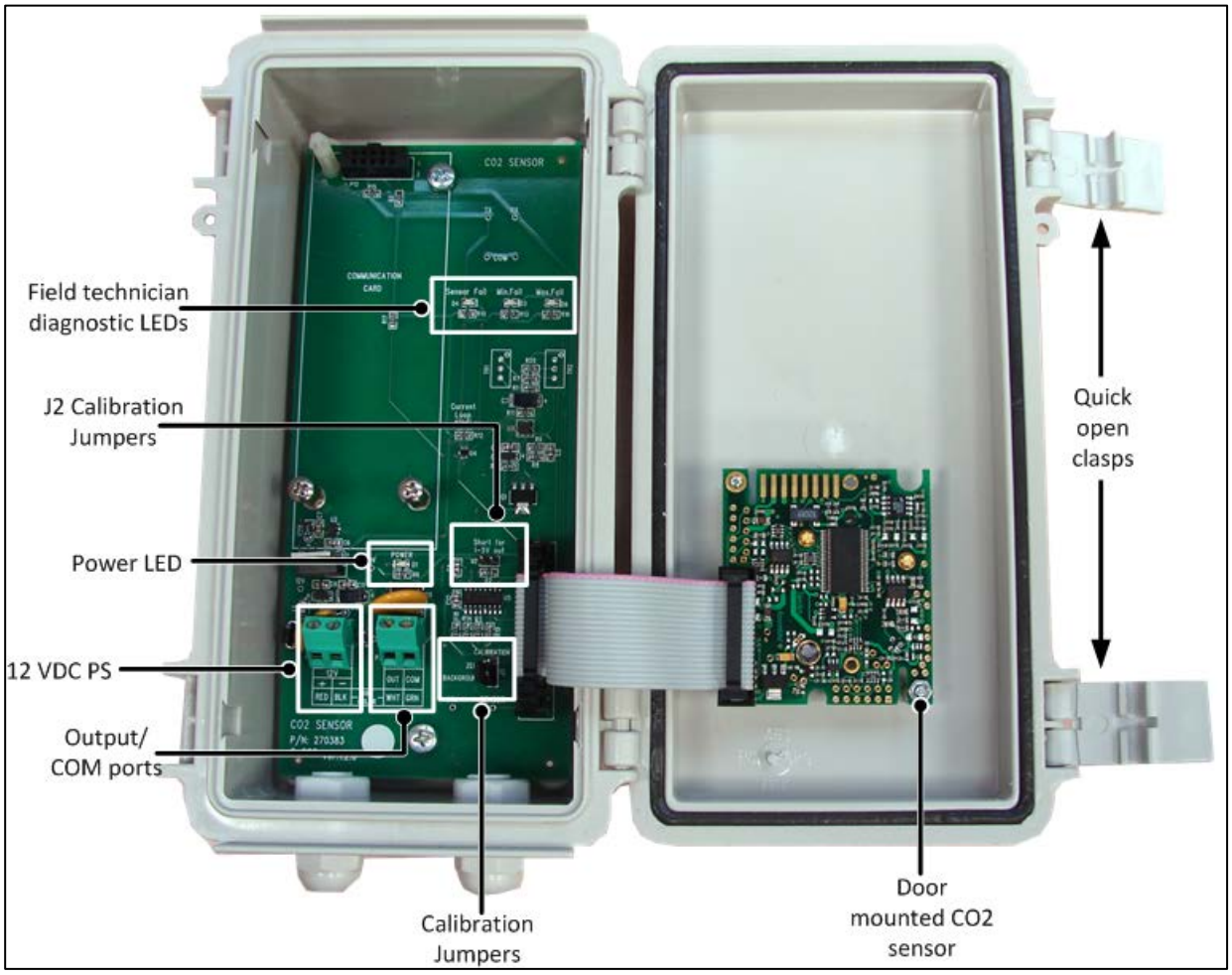

Figure 1: CO2 Sensor

NOTE: The unit comes supplied with a 12 VDC supply.

1.1 Features

- Self-contained environment and impact-resistant sealed box
- Quick open clasps
- Easy installation
- Simple to connect and configure
- Continuous uninterrupted CO2 sensing
- Diagnostic LEDs
- Door-mounted sensor

1.2 Operating Mode

The CO2 Sensor operates in a Current Loop mode (4 - 20 milliamps). In this mode, the CO_2 Sensor provides a signal proportional to CO_2 levels.

NOTE: Verify that J2 is not shorted (refer to Figure 2).

Figure 2: J2 Jumper

2 INSTALLATION

This section details:

- Installing the Sensor
- Calibrating the Device

2.1 Installing the Sensor

The CO2 Sensor comes with an extension cable that is used to:

- Connect the sensor to a power source
- Connect the sensor to the Platinum Controller (Figure 10, page 9)
- Detach the unit from the house during cleaning and maintenance procedures (Disconnecting the Sensor, page 11)

Figure 3: CO2 Sensor Attached to Connector

To install the unit:

1. Mount the sensor in place.
2. On the female plug, remove the retaining screw from the protective cover (Figure 4).

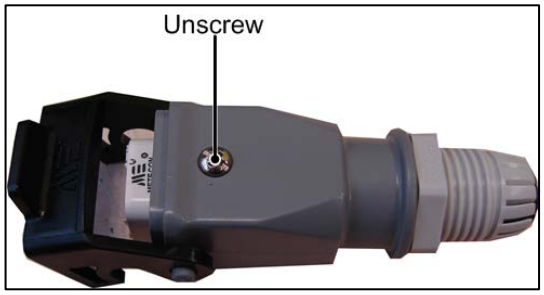

Figure 4: Protective Cover

3. Pull out the connector from the protective cover (Figure 5).

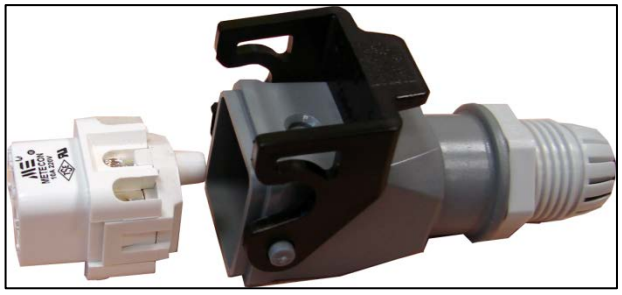

Figure 5: Remove the Connector

4. Place the cable through the protective cover (Figure 6).

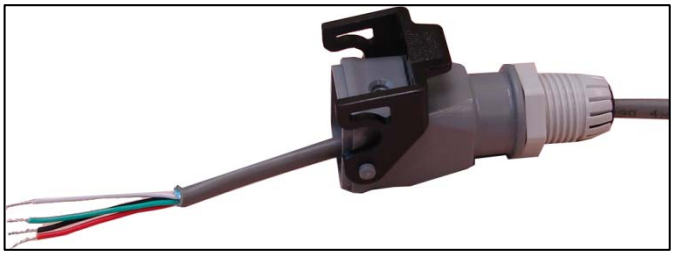

Figure 6: Threading the Cable

5. On the top of the connector are numbers (Figure 7. Each wire must be attached to the corresponding port (Table 2). Connect the four wires to the connector Figure 8.

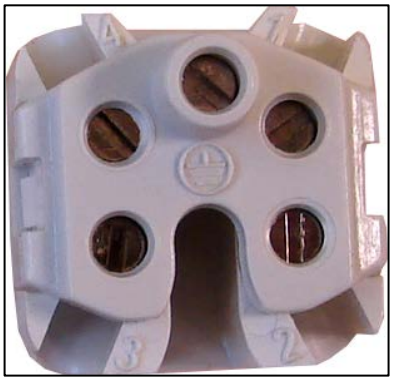

Figure 7: Connector Numbers

Table 1: Connecter Port Functions

Port Number	Function	Wire Color
1	+12 V	Red
2	12 V Com (-)	Black
3	SIG Out	White
4	SIG Com	Green

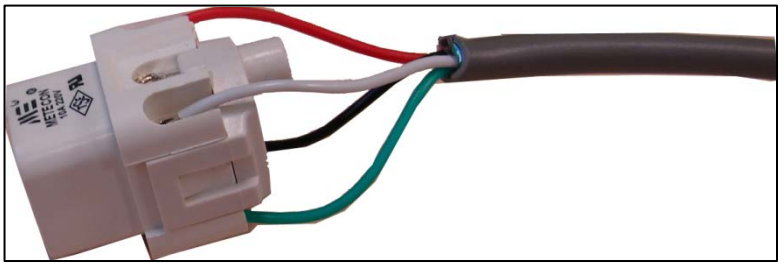

Figure 8: Wired Connector

6. Place the wired connector back into the protective cover and place the retaining screw in place (Figure 9).

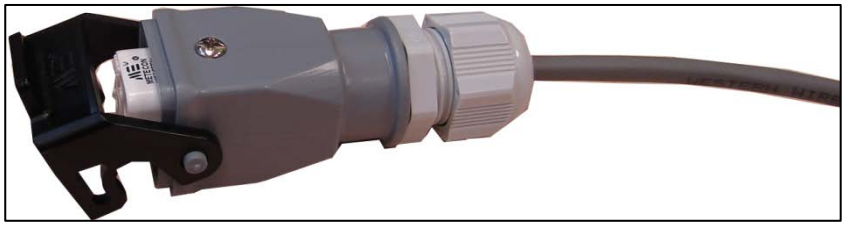

Figure 9: Wired Unit in Protective Cover

2.2 Controller Connection

1. Attach the other end of the cable to the power supply and Platinum Analog Input Card as indicated in Figure 10.

2. Connect:

- CO2 COM to COM
- CO2 output signal to the T5 or T6 terminal

3. **Place a jumper on the T5 or T6 pins (sets the 4 – 20 mA mode).**

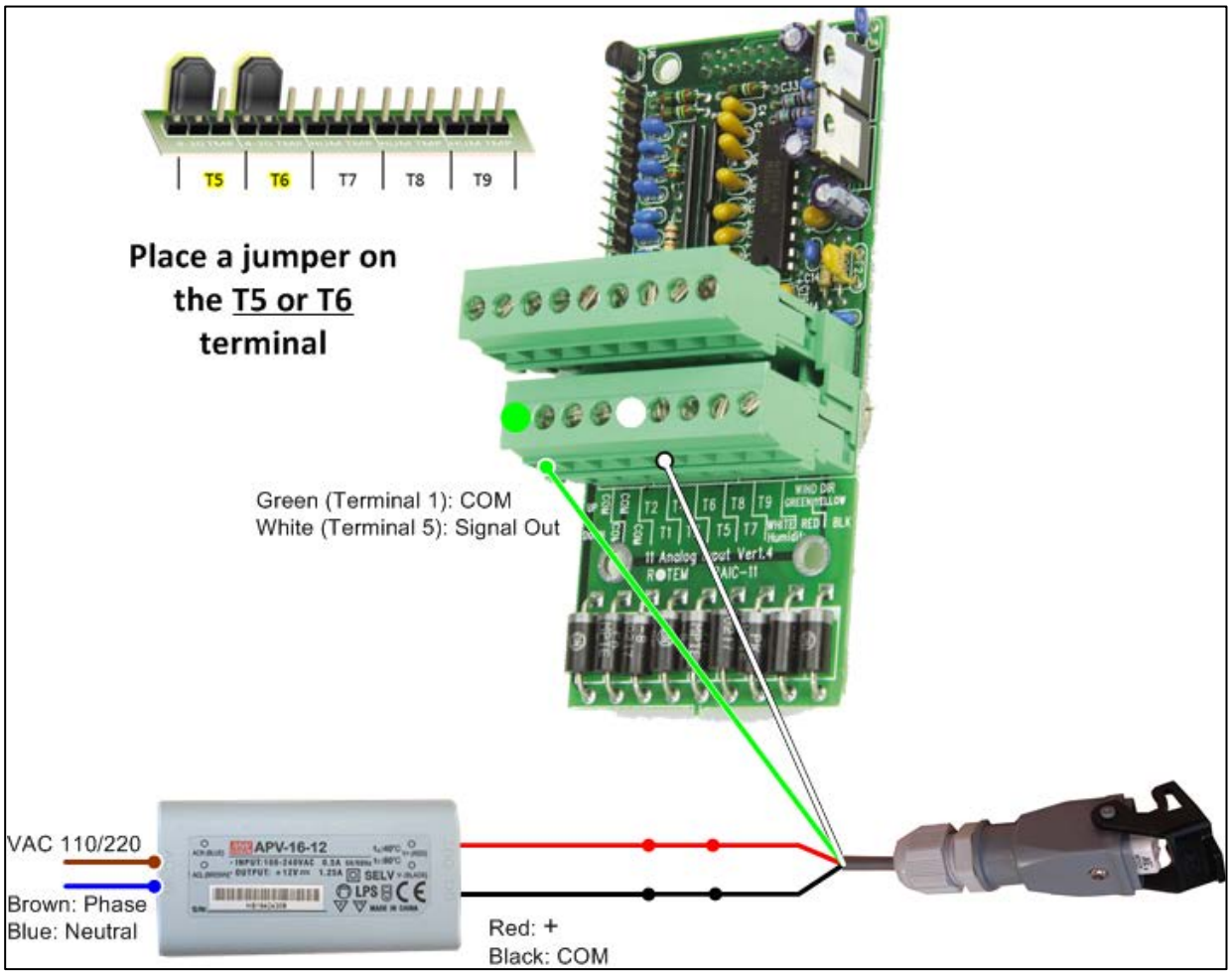

Figure 10: Power Supply Wiring

CAUTION	**Connect the shield to the safety ground.**

2.3 Calibrating the Device

Figure 11: Jumpers

The C02 sensor comes calibrated. In normal conditions fresh air should have approximately 350 - 450 ppm CO2. Calibrate the device if the following conditions are met:

- The CO2 sensor is exposed to fresh air or a room with open windows
- The sensor reading is above 550

To calibrate the sensor:

1. If connected, disconnect the device from the controller.
2. Place the sensor on a steady base (in an area with fresh air or in a room with open windows).
3. Apply 12V DC power.
4. Operate the CO2 sensor for five minutes to stabilize the device.
5. Using the supplied jumper, short the Background jumpers for 10 seconds as shown in Figure 12.

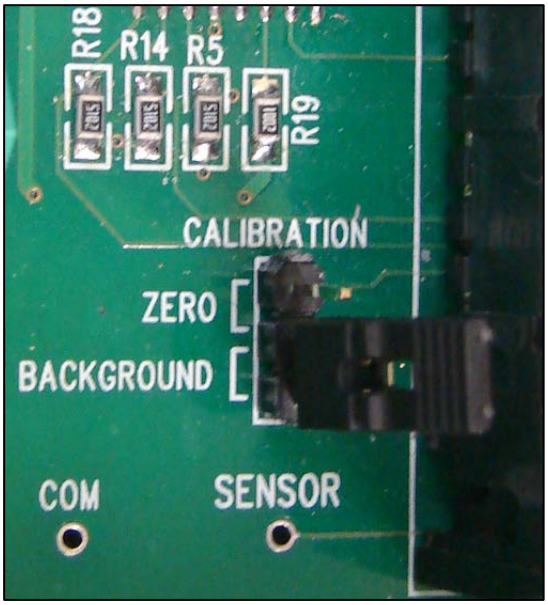

Figure 12: Shorting the Background Jumpers

6. Remove the jumper.
7. Disconnect the power and (re)connect the sensor to the controller.

CAUTION **Do not short the Zero jumpers; they are for factory-calibration only.**

NOTE: If the device reading is still above 550 when exposed to fresh air, repeat the process.

2.4 Disconnecting the Sensor

Before cleaning the poultry/animal house, disconnect the CO2 sensor.

To disconnect the sensor:

1. Dismount the sensor from the wall.
2. Separate the male and female plugs.

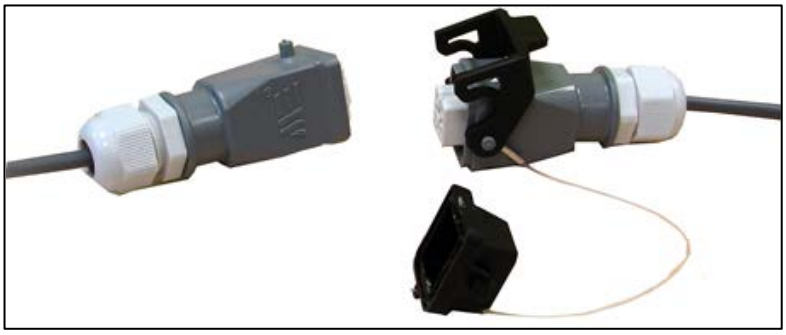

Figure 13: Plugs Separated

3. Place the plug cap on the female cap.

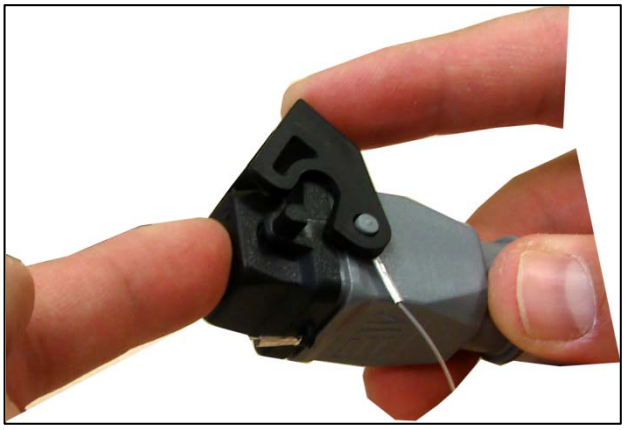

Figure 14: Cap in Place

4. Snap the cap into place.

Figure 15: Cap Snapped into Place

3 MAINTENANCE AND CARE

The CO2 Sensor requires little or no maintenance.

The following are general maintenance rules:

- Avoid damaging the CO2 Sensor box
- Avoid contact with water or other fluids (when you clean the poultry house, remove the box)
- Ensure sensor grill on front box panel is clean and clear of obstructions

NOTE: Water may damage the sensor; therefore minimize exposure while washing, or using water for any purpose.

4 SPECIFICATIONS

Input signal	12 VDC
Output signal	4 – 20 mAmp
Operating temperature	10 º - 70º C
CO2 range	0 – 5000 ppm
Accuracy	1%
Maximum cable length	300 meters
Minimum wire size	22 AWG
Power supply	12 VDC

5 TROUBLESHOOTING

The field technician diagnostic LEDs are visual diagnostic indicators for the field technician only. They are not end-user serviceable parts or indicators. Table 2 details possible system failure issues.

Table 2: CO2 Sensor System Failure Issues

Problem	Solution
The **Sensor Fail** LED is lit when CO2 sensing element fails.	Replace CO2 sensing element
The **Min.Fail** or **Max. Fail** LED is lit: The sensor is out of acceptable range.	Replace CO2 sensing element
If the diagnostic LEDs are lit (D2, R12), indicates that the circuit may be incomplete.	Check circuitry for breaks
Readings are off the scale, even when fresh air is present.	Verify that there is a jumper on the Platinum Analog card, placed on T5 or T6, set for 4 – 20 mA (refer to Figure 10).
Readings are lower than expected.	Remove jumper from J2 terminal (refer to Figure 2).
Power LED remains unlit	Check if power/COM wiring has been reversed (refer to Table 1).