

# Honeywell

# C7355A Room IAQ Monitor

## USER GUIDE



## INTRODUCTION

### About This Monitor

This air quality monitor is an advanced, configurable, connected device for commercial buildings' air quality monitoring. It monitors multiple air quality parameters including PM2.5, PM10, CO<sub>2</sub>, TVOC, temperature and humidity. This device communicates over RS-485, easily integrating with the intelligent building, air quality data collection system, green building evaluation system and ventilation system, etc.

The intelligent control algorithms built into the device helps to minimize the influence of ambient temperature and humidity on the measured values. The device is

packaged with numerous presets suitable for most commercial building requirements that enable quick and easy initial setup.

The sensor module in the monitor is specifically designed for detection stability to ensure reliability. The monitor has a three-color light ring to indicate different levels of indoor air quality. The simple structure and installation makes wall-mounting and ceiling mounting both easy and convenient.

### Intended audience and assumed knowledge

This document provides information about installing and commissioning the IAQ monitor.

It is assumed that the user is trained and familiar with HVAC concepts.

**IMPORTANT:** Always install equipment in accordance with the National Electric Code and in a manner acceptable to the local authority having jurisdiction (AHJ). No guidelines, instructions, installation practices, or other information presented in this guide may be interpreted to supersede or modify the local codes and practices of the AHJ.

### Reference documents

- IAQ Monitor Specification Data 31-00435: Describes IAQ monitor and its features.
- IAQ Monitor Mounting Instructions 31-00436: Describes how to mount the IAQ monitor.
- IAQ Monitor Quick Start Guide 31-00437: Contains only necessary procedures to enable the users to quickly use the device.



31-00434-01

## Dimensions

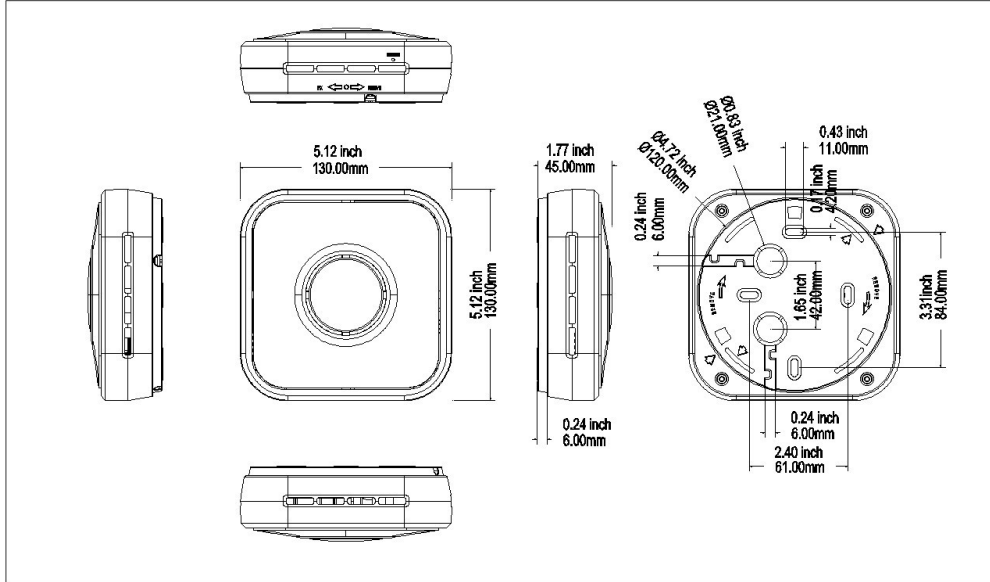


Fig. 1. Dimensions.

## SPECIFICATIONS

**Part Number:** C7355A1050

**Detection Parameters:** PM2.5/PM10, CO<sub>2</sub>,TVOC, Temperature & RH

**Operating Environment Temperature:** 32–122 °F (0–50 °C)

**Humidity:** 0–90% RH (non-condensing)

**Storage Conditions:** 14–122 °F (-10–50 °C); 0–90% RH (non-condensing)

**Overall Dimensions:** 5.12 in. × 5.12 in. × 1.77 in.  
130 mm × 130 mm × 45 mm

**Net weight:** 0.66 lb (300 g)

**Certification Standard:** CE/FCC

## IAQ MONITOR AT A GLANCE

### Light Ring Indicator Overview

The image below illustrates the typical face shell of this IAQ monitor. There is a circle light ring indicator in the center of the housing. This light is used to show the measured air quality.

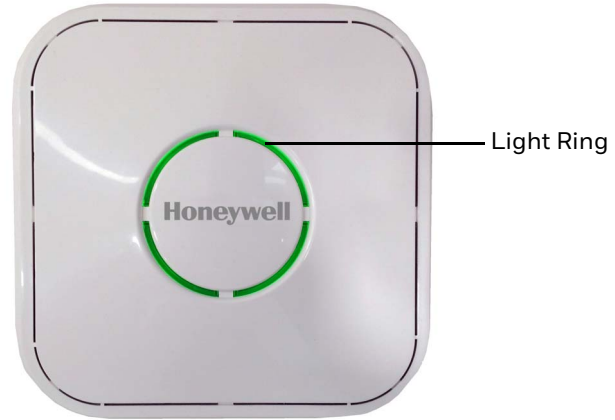


Fig. 2. Monitor light ring location.

Refer to “Managing Indicator Lights” on page 8 for more information.

# INSTALLATION

## ⚠ WARNING

- To reduce the risk of electrical shock do not open the detector. There are no user serviceable parts inside. Refer service to a qualified service personnel only.
  - Cleaning — Use a dry cloth to clean the product. Do not use liquid cleaners or aerosol cleaners
  - Water and moisture — Do not use the product near water. Do not install the product in a place where water may splash onto it.
  - Do not operate the detector with a hard, sharp or pointed object such as a fingernail or pen.
1. To separate the backplane from the detector, rotate the backplane clockwise according to the direction of the arrow (See Fig. 3 and 4).

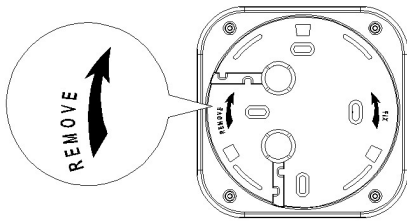


Fig. 3.

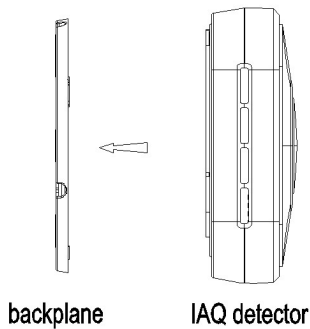


Fig. 4.

2. Use a screwdriver to punch out the appropriate opening. See Fig. 5.

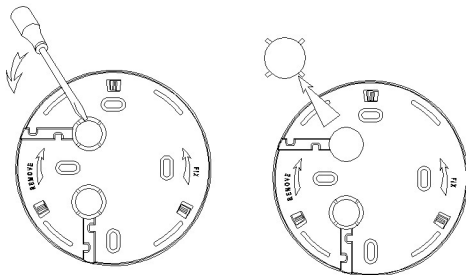


Fig. 5.

3. Pull wires through the opened hole. See Fig. 6 and 7.

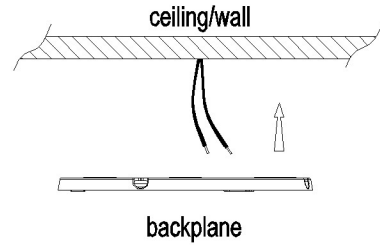


Fig. 6.

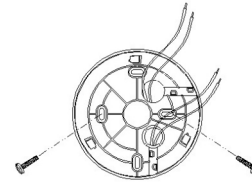


Fig. 7.

4. Unplug the terminal block from the contact pin. See Fig. 8.

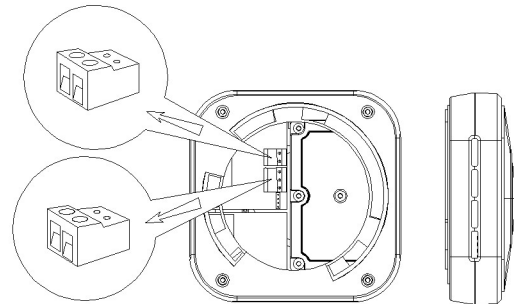


Fig. 8.

5. Connect the cable to the terminal block, then secure with the mounting screw. See Fig. 9, 10, and 11.

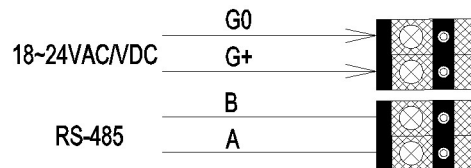


Fig. 9.

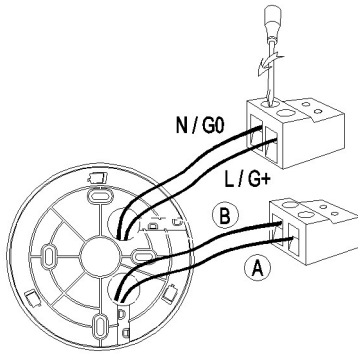


Fig. 10.

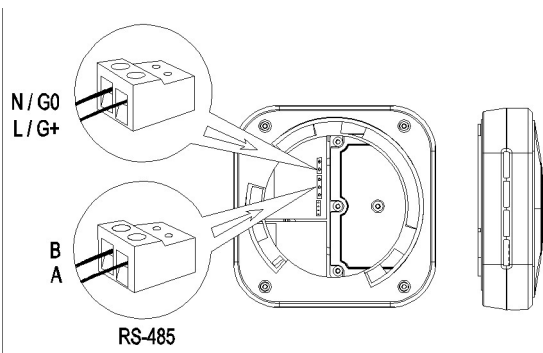


Fig. 11.

6. Plug the terminal blocks back onto the contact pins.
7. Aim the dot located in the middle of two arrows on the side of the detector with the vertical lines on the backboard. See Fig. 12. Then rotate detector following the "FIX" direction shown in Fig. 13. RS-485 wiring is completed.

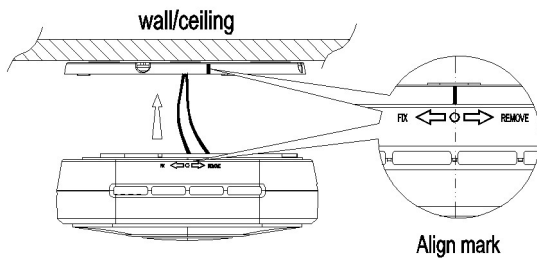


Fig. 12.

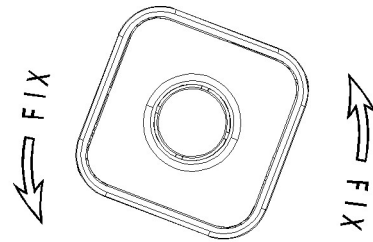


Fig. 13.

## RS-485 CONFIGURATION

### Prerequisites

Before going through RS-485 configuration, ensure the monitor is installed and wired up according to the Mounting Instructions.

After installing the monitor and powering it up for initial use or re-use, the device should be continuously powered for more than 48 hours to ensure stable output of all measured values. Complete these steps to configure the detector and connect it to the BMS.

### IMPORTANT

*Make sure the RS-485 wiring is done before powering up*

### Modbus Register Table

**Mode:** RTU (MSB First)

**Baud Rate:**

- 1-4800
- 2-9600
- 3-14400
- 4-19200
- 5-38400
- 6-56000
- 7-57600
- 8-115200
- default:** 2-9600bps

**Start Bits:** 1

**Data Bits:** 8

**Stop Bits:** 1 / 2  
**default:** 1

**Parity:** None / Odd / Even  
**default:** None

**Register Map**

**Support Function code:**

- 3 - Read Holding Registers
- 4 - Read Input Registers
- 6 - Write Single Register
- 16 - Write Multiple registers

Table 1. Modbus Register Table.

| Starting Register Decimal | Data Description   | Function | Read/Write | Quantity of Registers (2Bytes/16bit) | Format           | Decimals | Data Range, Data Description  | Default |
|---------------------------|--|----------|------------|--------------------------------------|------------------|----------|---|---------|
| 0/1050                    | PM2.5 hourly average measurement   | 4        | R          | 2                                    | Float-Big Endian | 1        | 0–1000.0 µg/m <sup>3</sup>  |         |
| 2/1052                    | PM10 hourly average measurement  | 4        | R          | 2                                    | Float-Big Endian | 1        | 0–1000.0 µg/m <sup>3</sup>  |         |
| 8/1058                    | CO <sub>2</sub> hourly average measurement   | 4        | R          | 2                                    | Float-Big Endian | 0        | 0–5,000 ppm   |         |
| 10/1060                   | TVOC hourly average measurement  | 4        | R          | 2                                    | Float-Big Endian | 3        | 0–4000 mg/m <sup>3</sup>  |         |
| 12/1000                   | PM2.5 one minute average measurement   | 4        | R          | 2                                    | Float-Big Endian | 1        | 0–1000.0 µg/m <sup>3</sup>  |         |
| 14/1002                   | PM10 one minute average measurement  | 4        | R          | 2                                    | Float-Big Endian | 1        | 0–1000.0 µg/m <sup>3</sup>  |         |
| 16/1004                   | Temperature real-time measurement  | 4        | R          | 2                                    | Float-Big Endian | 2        | -20.00 °C–60.00 °C  |         |
| 18/1006                   | Humidity real-time measurement   | 4        | R          | 2                                    | Float-Big Endian | 2        | 0–100.00% RH  |         |
| 20/1008                   | CO <sub>2</sub> real-time measurement  | 4        | R          | 2                                    | Float-Big Endian | 0        | 0–5,000 ppm   |         |
| 22/1010                   | TVOC real-time measurement   | 4        | R          | 2                                    | Float-Big Endian | 3        | 0–4000 mg/m <sup>3</sup>  |         |
| 24/1100                   | PM2.5 24-hour moving average measurement   | 4        | R          | 2                                    | Float-Big Endian | 1        | 0–1000.0 µg/m <sup>3</sup>  |         |
| 26/1102                   | PM10 24-hour moving average measurement  | 4        | R          | 2                                    | Float-Big Endian | 1        | 0–1000.0 µg/m <sup>3</sup>  |         |
| 32/1108                   | CO <sub>2</sub> 24-hour moving average measurement   | 4        | R          | 2                                    | Float-Big Endian | 0        | 0–5,000 ppm   |         |
| 34/1110                   | TVOC 8-hour moving average measurement   | 4        | R          | 2                                    | Float-Big Endian | 3        | 0–4000 mg/m <sup>3</sup>  |         |
| 1300                      | Primary pollutant 24-hour average measuring value (One of PM2.5/PM10/CO <sub>2</sub> /TVOC) (Calculated based on 24-hour or 1-hour moving average measurement) | 4        | R          | 2                                    | Float-Big Endian |          | 1300  |         |
| 1302                      | Primary pollutant type (One of PM2.5/PM10/CO <sub>2</sub> /TVOC) (Calculated based on 24-hour or 1-hour moving average measurement)                            | 4        | R          | 1                                    | INT16            |          | 1-PM25, 2-PM10, 3-CO <sub>2</sub> ; 4-TVOC  |         |
| 1303                      | Index level of the primary pollutant (One of PM2.5/PM10/CO <sub>2</sub> /TVOC) (Calculated based on 24-hour or 1-hour moving average measurement)              | 4        | R          | 1                                    | INT16            |          | Level 1-Excellent<br>Level 3-Light pollution<br>Level 4-Medium pollution<br>Level 5-Heavy pollution<br>Level 6-Severe pollution |         |

Table 1. Modbus Register Table.

| Starting Register Decimal | Data Description   | Function | Read/Write | Quantity of Registers (2Bytes/16bit) | Format | Decimals | Data Range, Data Description  | Default |
|---------------------------|--|----------|------------|--------------------------------------|--------|----------|---|---------|
| 1304                      | AQI value of the primary pollutant) (One of PM2.5/PM10/CO <sub>2</sub> /TVOC) (Calculated based on 24-hour or 1-hour moving average measurement) | 4        | R          | 1                                    | INT16  |          | 0-500   |         |
| 1320                      | PM2.5 AQI value (Calculated based on 24-hour moving average measurement)   | 4        | R          | 1                                    | INT16  |          | 0-500   |         |
| 1321                      | PM10 AQI value (Calculated based on 24-hour moving average measurement)  | 4        | R          | 1                                    | INT16  |          | 0-500   |         |
| 1322                      | CO <sub>2</sub> AQI value (Calculated based on 24-hour moving average measurement)   | 4        | R          | 1                                    | INT16  |          | 0-500   |         |
| 1323                      | TVOC AQI value (Calculated based on 24-hour moving average measurement)  | 4        | R          | 1                                    | INT16  |          | 0-500   |         |
| 1350                      | PM2.5 Pollution index level (Calculated based on 24-hour moving average measurement)   | 4        | R          | 1                                    | INT16  |          | 1-6   |         |
| 1351                      | PM10 Pollution index level (Calculated based on 24-hour moving average measurement)  | 4        | R          | 1                                    | INT16  |          | 1-6   |         |
| 1352                      | CO <sub>2</sub> Pollution index level (Calculated based on 24-hour moving average measurement)   | 4        | R          | 1                                    | INT16  |          | 1-6   |         |
| 1353                      | TVOC Pollution index level (Calculated based on 24-hour moving average measurement)  | 4        | R          | 1                                    | INT16  |          | 1-6   |         |
| 78                        | 3 color LED status   | 4        | R          | 1                                    | INT16  |          | 0-OFF, 1-Green, 2-Yellow, 3-Red                                       |         |
| 0                         | Modbus Address   | 3/6      | R/W        | 1                                    | UINT16 |          | 1-247   | 1       |
| 1                         | Modbus rate (bps)  | 3/6      | R/W        | 1                                    | UINT16 |          | 1-4800, 2-9600, 3-14400, 4-19200, 5-38400, 6-56000, 7-57600, 8-115200 | 2       |

Table 1. Modbus Register Table.

| Starting Register Decimal | Data Description                   | Function | Read/Write | Quantity of Registers (2Bytes/16bit) | Format           | Decimals | Data Range, Data Description  | Default |
|---------------------------|------------------------------------|----------|------------|--------------------------------------|------------------|----------|---|---------|
| 2                         | Modbus Parity check bit            | 3/6      | R/W        | 1                                    | UINT16           |          | 1-NONE, 1STOP_BIT, 2-NONE, 2STOP_BIT, 3-Odd, 1STOP_BIT, 4-Even, 1STOP_BIT | 1       |
| 4                         | Temperature correction value       | 3/16     | R/W        | 2                                    | Float-Big Endian | 2        | -3.0-3.0 °C/<br>-6.0-6.0 °F   | -2.0    |
| 6                         | Humidity correction value          | 3/16     | R/W        | 2                                    | Float-Big Endian | 2        | -5.0-5.0%RH   | 0       |
| 14                        | CO <sub>2</sub> compensation value | 3/16     | R/W        | 2                                    | Float-Big Endian | 0        | -300.0-300.0 ppm  | 0       |

In order to reserve the decimal part, the measuring value with decimal will be magnified 10/100/1000 times, marked as x10/x100/x1000.

| Starting Register Decimal | Data Description                              | Function | Read/Write | Quantity of Registers (2Bytes/16bit) | Format | Decimals | Data Range, Data Description                        | Default |
|---------------------------|---|----------|------------|--------------------------------------|--------|----------|---|---------|
| 50/1175                   | PM2.5 hourly average measurement x10          | 4        | R          | 1                                    | UINT16 | 1        | 0-10000 corresponding to 0-1000.0 µg/m <sup>3</sup> |         |
| 51/1176                   | PM10 hourly average measurement x10           | 4        | R          | 1                                    | UINT16 | 1        | 0-10000 corresponding to 0-1000.0 µg/m <sup>3</sup> |         |
| 54/1179                   | CO <sub>2</sub> hourly average measurement x1 | 4        | R          | 1                                    | UINT16 | 0        | 0-5000 corresponding to 0-5,000 ppm                 |         |
| 55/1180                   | TVOC hourly average measurement x1000         | 4        | R          | 1                                    | UINT16 | 3        | 0-3575 corresponding to -4.000 mg/m <sup>3</sup>    |         |
| 56/1150                   | PM2.5 one minute average measurement x10      | 4        | R          | 1                                    | UINT16 | 1        | 0-10000 corresponding to 0-1000.0 µg/m <sup>3</sup> |         |
| 57/1151                   | PM10 one minute average measurement x10       | 4        | R          | 1                                    | UINT16 | 1        | 0-10000 corresponding to 0-1000.0 µg/m <sup>3</sup> |         |
| 58/1152                   | Temperature real-time measurement x100        | 4        | R          | 1                                    | INT16  | 2        | -2000-6000 corresponding to -20.00 °C-60.00 °C      |         |
| 59/1153                   | Humidity real-time measurement x100           | 4        | R          | 1                                    | UINT16 | 2        | 0-10000 corresponding to 0-100.00% RH               |         |
| 60/1154                   | CO <sub>2</sub> real-time measurement x1      | 4        | R          | 1                                    | UINT16 | 0        | 0-5000 corresponding to 0-5,000 ppm                 |         |
| 61/1155                   | TVOC real-time measurement x1000              | 4        | R          | 1                                    | UINT16 | 3        | 0-3575 corresponding to -4.000 mg/m <sup>3</sup>    |         |

| Starting Register Decimal | Data Description                                      | Function | Read/Write | Quantity of Registers (2Bytes/16bit) | Format | Decimals | Data Range, Data Description                               | Default |
|---------------------------|---|----------|------------|--------------------------------------|--------|----------|--|---------|
| 62/1200                   | PM2.5 24-hour moving average measurement x10          | 4        | R          | 1                                    | UINT16 | 1        | 0-10000 corresponding to 0-1000.0 $\mu\text{g}/\text{m}^3$ |         |
| 63/1201                   | PM10 24-hour moving average measurement x10           | 4        | R          | 1                                    | UINT16 | 1        | 0-10000 corresponding to 0-1000.0 $\mu\text{g}/\text{m}^3$ |         |
| 66/1204                   | CO <sub>2</sub> 24-hour moving average measurement x1 | 4        | R          | 1                                    | UINT16 | 0        | 0-5000 corresponding to 0-5,000 ppm                        |         |
| 67/1205                   | TVOC 24-hour moving average measurement x1000         | 4        | R          | 1                                    | UINT16 | 3        | 0-3575 corresponding to 0-4.000 $\text{mg}/\text{m}^3$     |         |

## MANAGING INDICATOR LIGHTS

### About Indicator Lights

Indicator lights are configured for data points to indicate the conditions that may require control. C7355A helps to view and manage the data points alarm. It also groups the indicators into High, Medium and Low categories. You can view the indicators on the C7355A detector light ring.




### Indicator Lights Notification Signs

The indicator light notification has different color codes to indicate the severity of the concentration. The following table describes the available signs with color codes of the indicator lights pages.

The indicator lights are controlled by one minute average value of PM2.5, and change the color depending on the concentration. See Table 3 for concentration level.

DIP switches control the Indicator Lights OFF, Three-color Indicator Lights, and Green Indicator Lights ON. Please see Fig. 14 and Table 3.

Table 2. Indicator Lights For One Parameter.

| Alarm light  | Description   |
|--|---|
|   | High<br>PM2.5 >75 $\mu\text{g}/\text{m}^3$                    |
|  | Medium<br>PM2.5 is between 35 and 75 $\mu\text{g}/\text{m}^3$ |
|  | Low<br>PM2.5 <35 $\mu\text{g}/\text{m}^3$                     |



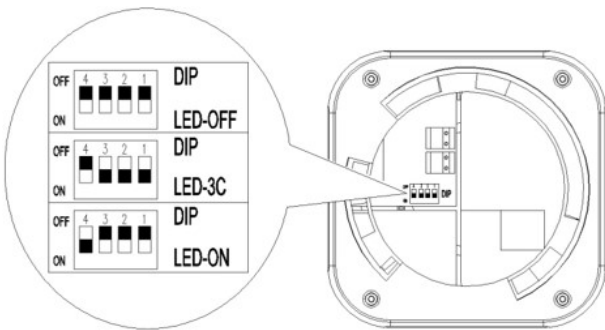


Fig. 14.

Table 3. DIP Switch Settings

| Indicator Lights                   | DIP4 | DIP3 | DIP2 | DIP1 |         |
|------------------------------------|------|------|------|------|---------|
| Indicator Lights OFF               | OFF  | OFF  | OFF  | OFF  |         |
| Three-color Indicator Lights       | OFF  | ON   | ON   | ON   | Default |
| Green Indicator Lights Normally ON | ON   | OFF  | OFF  | OFF  |         |

## CORRECTION AND CALIBRATION

### Regular Correction

In order to ensure the accuracy of the measured value, the C7355A should be corrected every year. The correction should be carried out when a large deviation in the measured value occurs even if it has been used for less than one year.

This chapter describes the correction environment and requirement needed on user's site, the correction can be carried out by the user via RS-485.

If the following environment conditions are required for field correction.

#### CORRECTION ENVIRONMENT:

Temperature: 68 °F ~ 77 °F (20 ~ 25 °C)

Humidity: 40% ~ 50% RH

The C7355A needs to be placed in the indoor natural environment within the above temperature and humidity range.

There should be windows and no human interference with good air circulation.

The room area for correction should not be less than 325 ft<sup>2</sup> (30 m<sup>2</sup>).

### CALIBRATION STANDARDS NEEDED FOR ON-SITE CORRECTION.

#### PM2.5/PM10

PM2.5/PM10 calibration standard: TSI 8533 as a standard machine, or a new C7355A device.

After the new C7355A and the old C7355A that needs to be corrected are powered on continuously and synchronously for more than 10 minutes, record the PM2.5 value for 30 minutes, and synchronous average value over 30 minutes can be applied for correction.

#### Temperature and humidity

Temperature and humidity calibration standard: commercial or industrial temperature and humidity calibration standard.

After the temperature and humidity calibration standard and C7355A that needs to be corrected are powered on continuously and synchronously for more than 60 minutes, start to record the value of temperature and humidity for 10 minutes, use the synchronous average value within 10 minutes over correction.

#### CO<sub>2</sub>

CO<sub>2</sub> calibration standard: e.g. CO<sub>2</sub> transmitter. Outdoor CO<sub>2</sub> reference value is about 380 ppm-420 ppm.

After the CO<sub>2</sub> calibration standard and C7355A that needs to be corrected are powered on continuously and synchronously for more than 48 hours, the CO<sub>2</sub> value shall be continuously recorded for 30 minutes, use the synchronous average value over 30 minutes for correction.

#### TVOC

TVOC calibration standard: Because each TVOC uses different sensors and sensitive substances, it is recommended to use the new C7355A machine as the TVOC calibration standard.

After the TVOC and C7355A that needs to be corrected are powered on continuously and synchronously for more than 48 hours, record the TVOC value continuously for 30 minutes and use the synchronous average value over 30 minutes for correction TVOC value will be stable only after correction and at least 24 hours power-on.

**Measurements Adjustment via MODBUS:**

1. Temperature
2. Humidity
3. CO<sub>2</sub>
4. TVOC coefficient
5. Particle coefficient

Use MODBUS PC software to operate according to the following table:

**Table 4. Measurement Adjustment via MODBUS.**

|                         | <b>Temperature value adjustment</b>                        | <b>RH value adjustment</b>                              | <b>CO<sub>2</sub> value adjustment</b>                         | <b>TVOC coefficient adjustment</b>         | <b>Particle total environmental coefficient adjustment</b>   |
|-------------------------|--|---|--|--|--|
| Function code           | 3(Read)/16(Write)  | 3(Read)/16(Write)                                       | 3(Read)/16(Write)  | 3(Read)/16(Write)                          | 3(Read)/16(Write)  |
| Starting point (Base 0) | 4  | 6   | 14   | 12   | 1224   |
| Data length             | 2  | 2   | 1  | 2  | 2  |
| Data type               | 32 Bit Float<br>Big-endian                                 | 32 Bit Float<br>Big-endian                              | INT16  | 32 Bit Float<br>Big-endian                 | 32 Bit Float<br>Big-endian                                   |
| Setting value           | Standard reading - C7355A local temperature measured value | Standard reading - C7355A local humidity measured value | Standard reading - C7355A local CO <sub>2</sub> measured value | Standard reading/TVOC local measured value | Standard reading X C7355A local PM2.5 average measured value |
| Setting range           | -9.00~+9.00 °F(--5.00~+5.00 °C)                            | -10.00~+10.00%RH  | -300~+300 ppm  | 0.001~65.000 times                         | 0.001~10.000 times   |

# MAINTENANCE & FAULT CHECK

## Maintenance

To ensure accurate C7355A data, regular maintenance is required in normal use environments. Depending on the environment in which it is used, maintenance is usually required once every 3 to 6 months. Public places with high concentration of dust, dry seasons, pollen seasons, and poor environmental cleanliness can shorten the maintenance period.

General maintenance includes: cleaning the filter using a vacuum cleaner to remove dust inside the filter.

## Fault Check

If a fault occurs in a normal use environment, see Table 5 to troubleshoot. If the fault cannot be eliminated, contact the dealer or the manufacturer.

**Table 5. Fault Check-out.**

| Fault condition  | Troubleshooting  |
|--|--|
| PM2.5 data abnormal, deviation is too large, the value is too high or too low          | Check whether there is debris or a lot of dust in the C7355A housing or on the air inlet and air outlet.   |
| The CO <sub>2</sub> data is abnormal, the value is too high or too low                 | The CO <sub>2</sub> sensor has a self-calibration function inside. Usually the self-calibration will return CO <sub>2</sub> values to normal. Self-calibration conditions: The CO <sub>2</sub> concentration is around 400 ppm for at least 4 hours in every 24 periods. The self-calibration environment should last for one week.  |
| TVOC's deviation is too large (high or low)  | TVOC in the environment needs to be stabilized for at least 48 hours after the sensor is powered on. TVOC data deviation may be a little large within a short time after power is on. TVOC base line deviation may result in large data deviation. The equipment can be placed outside the window or outdoors for at least 24 hours when the outdoor air is good and clear, allowing TVOC to retrace its baseline. |
| Temperature and humidity deviation is too large, the value is too high or low          | Check whether the environmental factors surrounding the C7355A have any influence, such as direct sunlight, close to the heating or air conditioning air outlets, etc.   |
| Temperature and humidity deviation is too large; value does not change for a long time | Sensor can be powered off and back on to see if the reading returns to normal. If value cannot be recovered, contact the dealer or manufacturer.   |
| Communication interruption RS-485 (Modbus RTU)   | Check if the power supply is normal and if the RS-485 terminal is loose. Check whether the RS-485 communication line is accidentally cut. Check for an inductive load with electromagnetic interference near the equipment or RS-485 communication line, such as a water pump.   |

## Waste Electrical and Electronic Equipment (WEEE)



- At the end of the product life, dispose of the packaging and product in an appropriate recycling center.
- Do not dispose of the device with the usual domestic refuse.
- Do not burn the device.

## FCC Part 15 compliant

This device complies with part 15 of the F C C Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

**Honeywell Building Technologies**

In the U.S.:

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