

TOSHIBA

TOSHIBA MCA1V-E
Multi Function
Sensor



TOSHIBA MCA1V-E Multi Function Sensor User Manual

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TOSHIBA MCA1V-E Multi Function Sensor



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TOSHIBA TCB-SFMCA1V-E Multi Function Sensor User Manual

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Thank you for purchasing the “Multi-function sensor” for TOSHIBA Air Conditioner.
Before starting the installation work, please read this manual carefully and install the product properly.

Model name: TCB-SFMCA1V-E

This product is used in combination with a heat recovery ventilation unit. Do not use the multi-function sensor on its own or in combination with other companies' products.

Product Information

Thank you for purchasing the Multi-function sensor for TOSHIBA Air Conditioner. This product is used in combination with a heat recovery ventilation unit. Please note that it should not be used on its own or in combination with other companies' products.

Specifications

- Model Name: TCB-SFMCA1V-E
- Product Type: Multi-function sensor (CO2 / PM)

CO2 / PM2.5 Sensor DN Code Setting List

Refer to the table below for the DN code settings and their descriptions:

DN Code	Description	SET DATA and Description
560	CO2 concentration control	0000: Uncontrolled 0001: Controlled
561	CO2 concentration remote controller display	0000: Hide 0001: Display
562	CO2 concentration remote controller display correction	0000: No correction -0010 – 0010: Remote controller display value (no correction) 0000: No correction (altitude 0 m)
563	CO2 sensor altitude correction	
564	CO2 sensor calibration function	0000: Autocalibration enabled, Force calibration disabled 0001: Autocalibration disabled, Force calibration disabled 0002: Autocalibration disabled, Force calibration enabled
565	CO2 sensor force calibration	
566	PM2.5 concentration control	
567	PM2.5 Concentration remote controller display	
568	PM2.5 Concentration remote controller display correction	
790	CO2 target concentration	0000: Uncontrolled 0001: Controlled
793	PM2.5 target concentration	
796	Ventilation fan speed [AUTO] fixed operation	
79A	Fixed ventilation fan speed setting	
79B	Concentration-controlled minimum ventilation fan speed	

Product Usage Instructions

How to Set Each Setting

To configure the settings, follow these steps:

1. Stop the heat recovery ventilation unit.
2. Refer to the installation manual of the heat recovery ventilation unit (7 Installation method for each system configuration) or the installation manual of the remote controller (9. DN setting in the 7 Field setting menu) for details on how to set the DN code.

Sensor Connection Settings

To perform automatic fan speed control using the CO2 / PM2.5 sensor, change the following setting:

DN Code	SET DATA
Multi-function sensor (CO2 / PM)	0001: With connection

FAQ

- **Q: Can I use the multi function sensor on its own?**

A: No, this product is designed to be used in combination with a heat recovery ventilation unit. Using it on its own may result in improper functionality.

- **Q: Can I use the multi function sensor with other companies' products?**

A: No, this product should only be used with TOSHIBA Air Conditioner and its specified heat recovery ventilation unit.

- **Q: How do I calibrate the CO2 sensor?**

A: Refer to the DN code settings for CO2 sensor calibration. The manual provides options for autocalibration and force calibration.

CO2 / PM2.5 sensor DN code setting list

Refer to How to set each setting for the details of each item. Refer to the installation manual of the heat recovery ventilation unit for other DN codes.

DN code	Description	SET DATA and description	Factory default
560	CO2 concentration control	0000: Uncontrolled 0001: Controlled	0001: Controlled
561	CO2 concentration remote controller display	0000: Hide 0001: Display	0001: Display
562	CO2 concentration remote controller display correction	0000: No correction -0010 – 0010: Remote controller display value (no correction) + setting data × 50 ppm	0000: No correction
563	CO2 sensor altitude correction	0000: No correction (altitude 0 m) 0000 – 0040: Setting data × 100 m altitude correction	0000: No correction (altitude 0 m)
564	CO2 sensor calibration function	0000: Autocalibration enabled, Force calibration disabled 0001: Autocalibration disabled, Force calibration disabled 0002: Autocalibration disabled, Force calibration enabled	0000: Autocalibration enabled, Force calibration disabled

565	CO2 sensor force calibration	0000: No calibrate 0001 – 0100: Calibrate with setting data × 20 ppm concentration	0000: No calibrate
566	PM2.5 concentration control	0000: Uncontrolled 0001: Controlled	0001: Controlled
567	PM2.5 concentration remote controller display	0000: Hide 0001: Display	0001: Display
568	PM2.5 concentration remote controller display correction	0000: No correction -0020 – 0020: Remote controller display value (no correction) + setting data × 10 µg/m ³	0000: No correction
5F6	Multi-function sensor (CO ₂ / PM) connection	0000: Without connection 0001: With connection	0000: Without connection
790	CO ₂ target concentration	0000: 1000 ppm 0001: 1400 ppm 0002: 800 ppm	0000: 1000 ppm
793	PM2.5 target concentration	0000: 70 µg/m ³ 0001: 100 µg/m ³ 0002: 40 µg/m ³	0000: 70 µg/m ³
796	Ventilation fan speed [AUTO] fixed operation	0000: Invalid (according to fan speed in remote controller settings) 0001: Valid (fixed at Fan speed [AUTO])	0000: Invalid (according to fan speed in remote controller settings)
79A	Fixed ventilation fan speed setting	0000: High 0001: Medium 0002: Low	0000: High
79B	Concentration-controlled minimum ventilation fan speed	0000: Low 0001: Medium	0000: Low

How to set each setting

Configure the settings when the heat recovery ventilation unit is stopped (Be sure to stop the heat recovery ventilation unit). Refer to the installation manual of the heat recovery ventilation unit (“7 Installation method for each system configuration”) or the installation manual of the remote controller (“9. DN setting” in the “7 Field setting menu”) for details on how to set the DN code.

Sensor connection settings (be sure to implement)

To perform automatic fan speed control using the CO₂ / PM_{2.5} sensor, change the following setting (0001: With connection).

DN code	SET DATA	0000	0001
5F6	Multi function sensor (CO ₂ / PM) connection	Without connection (factory default)	With connection

CO₂ / PM_{2.5} target concentration setting

Target concentration is the concentration at which the fan speed is the highest. The fan speed is changed automatically in 7 stages according to the CO₂ concentration and PM_{2.5} concentration. The CO₂ target concentration and PM_{2.5} target concentration can be changed in the settings below.

DN code	SET DATA	0000	0001	0002
790	CO ₂ target concentration	1000 ppm (factory default)	1400 ppm	800 ppm
793	PM _{2.5} target concentration	70 µg/m ³ (factory default)	100 µg/m ³	40 µg/m ³

- Although the fan speed is switched automatically using the set CO₂ concentration or PM_{2.5} concentration as a target, the detection concentration differs depending on the operating environment and product installation conditions etc., so the concentration may go above the target concentration depending on the operating environment.
- As a general guideline, the CO₂ concentration should be 1000 ppm or less. (REHVA (Federation of European Heating Ventilation and Air Conditioning Associations))
- As a general guideline, the PM_{2.5} concentration (daily average) should be 70 µg/m³ or less. (Ministry of Environment of China)
- The concentration at which the fan speed is the lowest will not change even if the settings above are configured, with the CO₂ concentration being 400 ppm, and the PM_{2.5} concentration being 5 µg/m³.

Remote controller display settings

The display of the CO₂ concentration and PM_{2.5} concentration on the remote controller can be hidden with the following settings.

DN code	SET DATA	0000	0001
561	CO ₂ concentration remote controller display	Hide	Display (factory default)
567	PM _{2.5} concentration remote controller display	Hide	Display (factory default)

- Even if the concentration is hidden in the remote controller display, when DN code “560” and “566” control is enabled, automatic fan speed control is performed. Refer to section 5 for DN code “560” and “566”.
- If the concentration is hidden, in the event of a sensor failure, the CO₂ concentration “- – ppm”, PM_{2.5} concentration “- – µg/m³” will also not be displayed.

- The display range of the concentration is as follows: CO2: 300 – 5000 ppm, PM2.5: 0 – 999 µg/m3.
- Refer to section 6 for details on the remote controller display in a group connection system.

Remote controller concentration display correction

Detection of the CO2 concentration and PM2.5 concentration is performed at the RA air path of the heat recovery ventilation unit main body. As unevenness will also occur in the indoor concentration, a difference between the concentration displayed in the remote controller and the environmental measurement etc. may result. In such a situation, the concentration value displayed by the remote controller can be corrected.

DN code	SET DATA	-0010 – 0010
562	CO2 concentration remote controller display correction	Remote controller display value (no correction) + setting data × 50 ppm (factory default: 0000 (no correction))

DN code	SET DATA	-0020 – 0020
568	PM2.5 concentration remote controller display correction	Remote controller display value (no correction) + setting data × 10 µg/m3 (factory default: 0000 (no correction))

- The CO2 concentration will appear as “- – ppm” if the corrected value is too low.
- If the corrected PM2.5 concentration is negative, it will appear as “0 µg/m3”.
- Correct only the concentration display value displayed by the remote controller.
- Refer to section 6 for details on the remote controller display in a group connection system.

Concentration control setting

Automatic fan speed control according to the CO2 concentration or PM2.5 concentration can be selected individually. When both controls are enabled, the unit will run at a fan speed close to the target concentration (higher of the concentrations).

DN code	SET DATA	0000	0001
560	CO2 concentration control	Uncontrolled	Controlled (factory default)
566	PM2.5 concentration control	Uncontrolled	Controlled (factory default)

- Both CO2 concentration control and PM2.5 concentration control are enabled in the factory default settings, so be extra careful when either control is disabled as the following faults may occur.
 1. If CO2 concentration control is disabled and the PM2.5 concentration is maintained at a low level, the fan speed will drop, so the indoor CO2 concentration may rise.
 2. If PM2.5 concentration control is disabled and the CO2 concentration is maintained at a low level, the fan speed will drop, so the indoor PM2.5 concentration may rise.
- Refer to section 6 for details on the concentration control in a group connection system.

Remote controller display and concentration control according to system configuration

- **Heat recovery ventilation unit only system**

(when multiple heat recovery ventilation units are connected in a group) The CO₂ / PM_{2.5} concentration displayed on the remote controller (RBC-A*SU5*) is the concentration detected by the sensor connected to the header unit. Automatic fan speed control by sensor is only applicable to heat recovery ventilation units connected to a sensor. Heat recovery ventilation units not connected to sensors will run at a fixed ventilation fan speed setting when Fan speed [AUTO] is selected. (Refer to section 8)

- **When system is linked with air conditioners**

The CO₂ / PM_{2.5} concentration displayed on the remote controller (RBC-A*SU5*) is the concentration detected by the sensor connected to the heat recovery ventilation unit with the smallest indoor address. Automatic fan speed control by sensor is only applicable to heat recovery ventilation units connected to a sensor. Heat recovery ventilation units not connected to sensors will run at a fixed ventilation fan speed setting when Fan speed [AUTO] is selected. (Refer to section 8)

Minimum ventilation fan speed setting

When running under automatic fan speed control, the minimum ventilation fan speed is set as [Low] but this can be changed to [Medium]. (In this case, the fan speed is controlled at 5 levels)

DN code	SET DATA	0000	0001
79B	Concentration-controlled minimum ventilation fan speed	Low (factory default)	Medium

Fixed fan speed setting with no sensor equipped when there is a sensor failure

In the system configuration in section 6 above, heat recovery ventilation units with no sensor equipped will run at a fixed ventilation fan speed setting when Fan speed [AUTO] is selected with the remote controller. In addition, for heat recovery ventilation units equipped with a sensor, the unit will also run at a fixed ventilation fan speed setting when the sensor performing concentration control fails (*1). This fixed ventilation fan speed setting can be set.

DN code	SET DATA	0000	0001	0002
79A	Fixed ventilation fan speed setting	High (factory default)	Medium	Low

When this DN code is set to [High], the unit will run in the [High] mode even if the DN code “5D” is set to [Extra High]. If the fan speed needs to be set to [Extra High], see the installation manual of the heat recovery ventilation unit (5. Power setting for applied control) and set the DN code “750” and “754” to 100%.

- 1 If both CO₂ and PM_{2.5} concentration control are enabled and either sensor fails, the unit will run at automatic fan speed control with the functioning sensor.

CO₂ sensor calibration function settings

The CO₂ sensor uses the lowest CO₂ concentration in the past 1 week as a reference value (equivalent to the general atmospheric CO₂ concentration) to perform automatic calibration. When the unit is used in a location where the atmospheric CO₂ concentration is always higher than the general reference value (along main roads etc.), or in an environment where the indoor CO₂ concentration is always higher, the detected concentration may deviate greatly from the actual concentration due to the autocalibration effect, so either disable the automatic calibration function, or perform force calibration where necessary.

DN code	SET DATA	0000	0001	0002
564	CO2 sensor automatic calibration function	Autocalibration enabled Force calibration disabled (factory default)	Autocalibration disabled Force calibration disabled	Autocalibration disabled Force calibration enabled

DN code	SET DATA	0000	0001 – 0100
565	CO2 sensor force calibration	No calibrate (factory default)	Calibrate with setting data × 20 ppm concentration

For force calibration, after setting the DN code “564” to 0002, set DN code “565” to a numeric value. To perform force calibration, a measuring instrument that can measure the CO2 concentration is required separately. Run the heat recovery ventilation unit at a time period during which the CO2 concentration is stable, and quickly set the CO2 concentration value measured at the air inlet (RA) with the remote controller using the prescribed method. Force calibration is performed once only after configuration ends. Not implemented periodically.

CO2 sensor altitude correction

Correction of the CO2 concentration will be performed according to the altitude at which the heat recovery ventilation unit is installed.

DN code	SET DATA	0000	0000 – 0040
563	CO2 sensor altitude correction	No correction (altitude 0m) (factory default)	Setting data × 100 altitude correction

Ventilation fan speed [AUTO] fixed operation setting

For a system that is connected to an air conditioner, Fan speed [AUTO] cannot be selected from the remote controller. By changing the DN code “796” setting, it is possible to run the heat recovery ventilation unit at Fan speed [AUTO] regardless of the fan speed set by the remote controller. In this case, take note that the fan speed will be fixed as [AUTO].

DN code	SET DATA	0000	0001
796	Ventilation fan speed [AUTO] fixed operation	Invalid (according to fan speed in remote controller settings) (factory default)	Valid (fixed at Fan speed [AUTO])

List of check codes for CO2 PM2.5 sensor

Refer to the installation manual of the heat recovery ventilation unit for other check codes.

References

- [User Manual](#)

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