TES0902

NDIR CO2 GAS SENSOR (Dual-channel detector)

- Standard : 400 to 5,000ppm
- Optional : 0 to 5,000ppm
- TES0902-M10 : 400 to 10,000ppm

KEY POINTS

- Ultra small size, Easy integration, Quick response time, High accuracy
- Sensor suitable for long-term testing with excellent stability and accuracy
- Pre-calibrated and ready-to-use
- Applicable to user's various applications and devices
- Suitable for HVAC systems, indoor air quality systems, smart farms, etc.

About Tempus Inc.

IR Multiband Spectral Sensor Company
We design and operate our own production, calibration, and test equipment after long trial and error for mass production of infrared sensor devices and modules.

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IAQ(Indoor Air Quality)

MODERN PEOPLE STAYING INDOORS FOR A CONSIDERABLE AMOUNT OF TIME PER DAY

CO2 is the standard indoor ventilation gas specified by the International Energy Agency (IEA). If the concentration is high, it is harmful to health.

Should be <1,000ppm	CO2 concentration(Indoor air quality) of multi-us facilities including schools and medical institutions
400ppm	Normal concentration of CO2 in outside air
>1,000ppm	Decreased concentration, productivity, and learning ability
>2,000ppm	Drowsiness appears
>5,000ppm	Feel lack of Oxygen

RECOMMENDATION

TES0902 (Standard) : 400 to 5,000ppm
TES0902 –M10 : 400 to 10,000ppm

- *HVAC system*
- *Ventilation*
- *CO2 transmitter*
- *Air purifiers*
- *Air conditioners*
- *Kitchen hood*
- *IoT devices*
- *Smart home*
- *IAQ control*

Even users who are not familiar with the severity of CO2 gas can check when ventilation is necessary through the color displayed on the ventilation system screen or the alarm sound.

Ventilation is possible whenever a high CO2 concentration is measured through an HVAC system with built-in CO2 sensor.

Ventilation is very important. If there is ventilation system that can measure CO2, it automatically ventilates according to the CO2 concentration.

- ✓ Fresh and clean air enters the room and polluted air is discharged outside
- ✓ Reduce heating costs
- ✓ Increase student performance and attendance Improve respiratory health

* Note: The application examples provided in this flyer are for reference only. In practical application, please contact Tempus before using the product.

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SMART FARM : Fresher !

TES0902, AN NDIR CO2 GAS SENSOR THAT HELPS IMPROVE PLANT GROWTH

CO2 is very important for plant growth. We can check the CO2 level through our dual channel NDIR CO2 sensor TES0902 for optimal yield.

CO2 gas is also a feedstock for photosynthesis. Increasing CO2 gas not only accelerates plant growth, but also potentially increases agricultural productivity.

Experiments conducted in greenhouse and growth chamber conditions have shown that doubling the Co2 concentration increases crop yields by over 30% on average.

RECOMMENDATION

TES0902 (Standard) : 400 to 5,000ppm
TES0902 (Optional) : 0 to 5,000ppm

- *Manual calibration function*
- *Dual channel CO2 detector*

- ➢ *Smart farm*
- ➢ *Greenhouse*
- ➢ *Mushroom, Strawberry, Lettuce, etc.*

- ✓ If plants receive too much CO2, they will slow or stop photosynthesis.
- ✓ Users can check the required CO2 concentration level and provide appropriate CO2 gas for plant growth. This accelerates plant photosynthesis, which increases plant growth and yield.

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AUTOMOTIVE : Be Safe !

REAL TIME MONITORING CO2 CONCENTRATION INSIDE A CAR

CO2 concentration is recommended to be less than 1000ppm. Inhaling 2000ppm or more CO2 for a long-time will affect the human body.

Driving without opening the window for a long time can cause drowsiness and increase breathing and pulse.

Children and older people are at grater risk of suffocation when turning on the heater and air conditioner.

That is why it is important to monitor the CO2 concentration in small spaces.

RECOMMENDATION

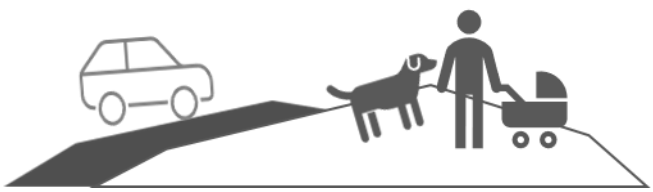
TES0902 (Standard) : 400 to 5,000ppm
TES0902 –M10 : 400 to 10,000ppm

- *Manual calibration function*
- *Dual channel CO2 detector*

➢ *Prevention of drowsiness driving, and car accident caused by increase of carbon dioxide.*
➢ *Ventilation notification function*

✓ By connecting a TES0902 sensor to an in-car accessory such as a black box, you can make it show the CO2 concentration changes on the screen and guide the room ventilation periodically/repeatedly if necessary.

✓ It prevents driver's drowsiness factors in advance, reduces risk of accidents and helps to drive safely.



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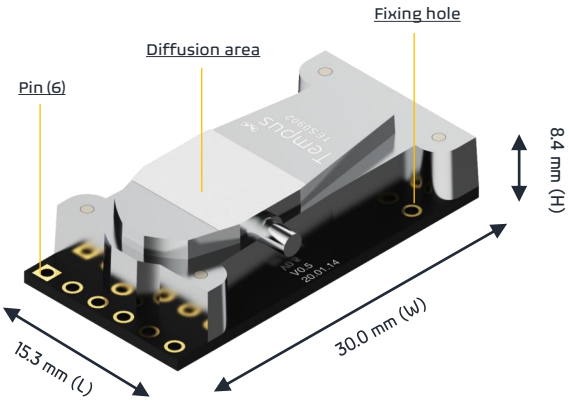
TES0902 VIEWED FROM VARIOUS ANGLES



Top

Front

BENEFITS and PIN CONFIGURATION of TES0902

Various of measurement range
- 400 to 5,000ppm (option: 0 to 5,000ppm)
- **TES0902-M10 : 400 to 10,000ppm*

Smaller than other NDIR products
(30.0mm (W) x 15.3mm (L) x 8.4 mm (H))

Cost effective. Best performance to price ratio

Inhouse digital dual-channel detector based on TEMPUS's micro-thermopile technology

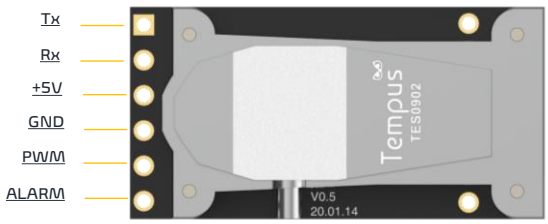
Best temperature stability

Very long-term stability

Fully calibrated

Digital interface using RS232 and PWM

Short lead time



Pin	Description
TX	TX: 3.3V(Typ.) CMOS Level Signal
RX	RX: 3.3V(Typ.) CMOS Level Signal
+5V	+5V Input
GND	Ground
PWM	PWM Output: 3.3V(Typ.) CMOS Level Signal
ALARM	ALARM Signal

* Note: Specification and pin configuration are subject to change without notice.

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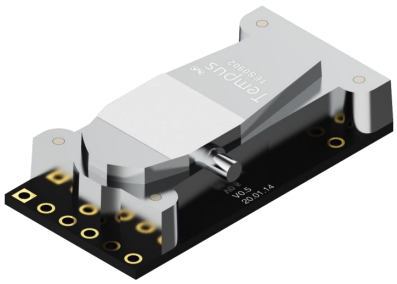
SPECIFICATIONS

	TES0902	TES0902-M10
Measurement Range	***(Standard)*** 400 to 5,000 ppm ***(Optional)*** 0 to 5,000 ppm*(1)	400 to 10,000 ppm
Accuracy	***(Standard)*** ±(50ppm + 3 % of measured value) ***(Optional)*** ±(50ppm + 3 % of measured value) *(2)	400 to 5,000 ppm : ±(50ppm + 3 % of measured value) * 5,000 to 10,000 ppm : ±(50ppm +5% of measured value)
Size , Weight	*30.0mm (W) x 15.3mm (L) x 8.4mm (H)* *3.4g*	
Operating temperature	-10℃ ~ 50℃ (Non-condensing)	
Operating humidity	0 ~ 95% RH (Non-condensing)	
Operating environment	Residential, Commercial spaces	
Storage temperature	-20℃ ~ 80 ℃ (Non-condensing)	
Power Input	5 VDC @5% (4 .75Vdc ~ 5.25vdc) Average current 25 .0 mA@5V IR Lamp On 120 mA@5V IR Lamp Off 10 mA@5V	
Output connector	6 pins (Terminals not mounted)	
Digital output	RS232(UART), PWM, Alarm CMOS level output	
Calibration	ABC on by default	
Manual Calibration support	Yes (@400ppm, 25℃)	



*(1) Optional spec. Standard measurement range is from 400ppm to 5,000ppm
*(2) The stated accuracy is for 400~5000ppm. When Auto Background Calibration is in operation, exposure to an artificial low concentration environment (ex. below 400ppm) may affect the sensor accuracy.
In this case, it is recommended that the customer turn off the ABC automatic calibration function before using it.

* Note: Specification and pin configuration are subject to change without notice.

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