

Tinytag CO₂ Logger

TGE-0010 0 to 2,000ppm

TGE-0011 0 to 5,000ppm

Warnings

- If this equipment is installed or used in a manner not specified by the manufacturer then the protection provided by the equipment may be impaired.
- This equipment contains a lithium battery. Danger of explosion if the battery is incorrectly fitted. Do not cut open, incinerate, recharge or expose to temperatures in excess of 100°C (212°F).
- The battery should only be replaced with the battery type specified in this document, observing the correct polarity.
- This equipment should only be interfaced to a UL or CSA listed computer with RS232 levels of not more than $\pm 12V$.
- This equipment should only be interfaced to equipment which is powered by a Safety Extra Low Voltage Supply. The maximum voltage levels are to be 30V rms, 42V peak or 60Vdc and separated from hazardous voltages by double or reinforced insulation. For the United States consider a Safety Extra Low Voltage Supply to be a Class 2 source as defined in the National Electrical Code. If the unit is connected to a computer outdoors the computer must also comply.
- This equipment should be used within the temperature range and other environmental conditions specified in this manual.
- The mains adaptor supplied is for indoor use only. Do not allow to become wet.
- Do not use the mains adaptor or cable if damaged.
- Never un-plug the adaptor by pulling on its cable.
- Do not attempt to open the mains adaptor.

Getting Started

To use a Tinytag CO₂ data logger you will require the following items:

- The supplied mains power adaptor
- A copy of the Tinytag Explorer software
- A USB download cable

Install Tinytag Explorer and the USB download cable, as described in the software's quick start guide.

Plug the mains adaptor into the larger of the two sockets on the side of the unit.

Plug the USB download cable into the smaller of the two sockets on the side of the unit.

Once started, using Tinytag Explorer, the data logger can be unplugged from the mains adaptor to be moved to where you want it to record (this may result in a period of zero value readings whilst the unit is being moved, so you may wish to consider setting the unit for a delay start so that logging starts after the unit is in place). Once in place, the logger should be plugged back into the mains.

The logger must be plugged into the mains for it to read correctly when logging.

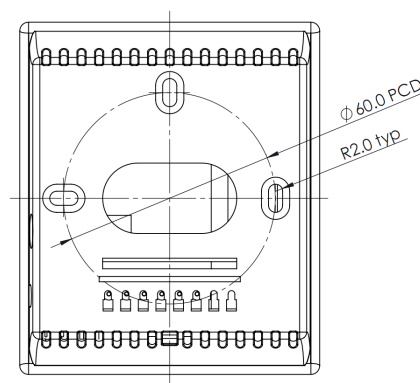
For further information on how to start the data logger recording, and how to view the results from the unit, please see the Tinytag Explorer quick start guide.

Positioning Information

The logger should be positioned in a location that will give a good representation of conditions in the application. If the logger is positioned near an open door or window, it may give lower readings than it will when positioned well away from any ventilation.

The logger is designed to be wall mounted, but can work equally well if placed flat on its back on a desk or a shelf, provided there is a good air flow through it.

The mounting points for the logger are as shown below:



LED Flash Patterns

When logging, a status LED on the front of the unit will flash as follows:

Flash Pattern	Indication
A green flash every 4 seconds	Logging
A green flash every 8 seconds	Waiting to log (set for a delay start)
A red flash every 4 seconds	Alarm limit breached

As supplied, the data logger has been preconfigured to give a red flash every four seconds when there is no mains supply powering the units sensor. When a mains supply is present the units LED will flash green. This uses one of the data loggers two user programmable alarms to do this, and changing the value of the preset alarm will effect how this indication works.

For more information on the alarms and how they work, please see the Tinytag Explorer quick start guide and help file.

Reading Specification

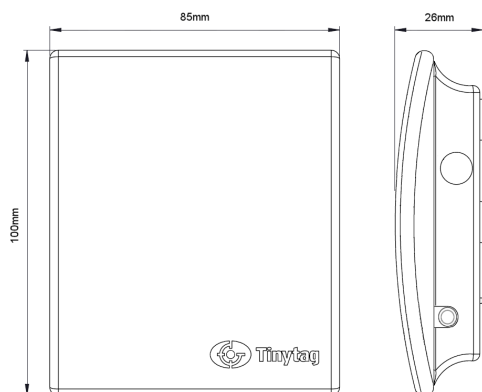
Sensor Type	NDIR Infra-red CO ₂ sensor
Response Time t_{63}	< 195s
Temperature Dependence	2ppm CO ₂ /°C
Long Term Stability	20ppm / year (typical)
Reading Resolution	0.1 ppm
TGE-0010 Accuracy	$\pm (50\text{ppm} + 2\% \text{ of measuring value})$
TGE-0011 Accuracy	$\pm (50\text{ppm} + 3\% \text{ of measuring value})$

The accuracy figures quoted above are at 25°C (77°F) and 1013mbar (see over for details on how to calculate the CO₂ levels at other pressures).

A warm-up time of 5 minutes is required to achieve values specified above.

Physical Specification

Working Temperature Range	-20°C to +60°C (-4°F to +140°F)
Case Dimensions	
Width	85mm / 3.35"
Height	100mm / 3.94"
Depth	26mm / 1.03"
Weight	100g / 3.53oz



Power Supply Information

The data logger is supplied with a mains power adaptor to power its CO₂ sensor.

When plugged into the mains the data logging part of the unit will also be powered from the mains supply.

If the mains is disconnected a back-up battery will ensure the data logger keeps recording, but because there is no power supply to the sensor it will record a zero value until the mains supply is restored.

The data logger can be disconnected from the mains when being started and for downloading.

When not in use the data logger should be stopped to avoid running the back-up battery flat.

Mains power	100-240V AC, 50-60Hz (0.3A) to 18V DC external power adapter (supplied).
Logger current consumption	10mA typ, 0.5A max for 0.3S
Back-up Battery Type	CR2325

The power adaptor is supplied with UK, EU and US connections.

The unit also has a +15V DC screw terminal connection on its circuit board that can be used to power the unit from a separate supply if required.

How Does the Tinytag CO₂ Data Logger Measure CO₂ Levels?

Tinytag CO₂ data loggers use a self calibrating Non-Dispersive Infrared (NDIR) sensor to measure CO₂ concentrations in an application.

Over time, the properties of the infrared source used to do this will change, so the sensor uses a second infrared source, that is only powered up occasionally, to calibrate the first.

This patented measurement technique allows for excellent long-term accuracy and stability, giving a typical drift of just 20ppm a year.

CO₂Logger

What Levels of CO₂ Can I Expect To See?

Typically, the average concentration of CO₂ in the Earth's atmosphere is about 390 parts per million (or ppm).

The concentration of CO₂ in a workplace or school is typically 600 to 700ppm above this level, and 1,500ppm is often specified as a maximum comfortable level, although levels of up to 5,000ppm are allowed in some instances.

Atmospheric pressure has an effect on the CO₂ levels recorded by the logger.

The accuracy figures quoted in the specification section for the logger are at 1013mBar. If the pressure is different to this the actual CO₂ level can be calculated using the following equation:

$$CO_2Real = CO_2Measured \times (1 + \Delta pmbar \times 0.14\%)$$

Where:

CO₂Measured is the value recorded by the data logger and
Δpmbar is the difference in pressure from 1013mBar

Approvals

Gemini Data Loggers (UK) Ltd. operates a Business Management System which conforms to ISO 9001 and ISO 14001.



Warranty

This product carries a manufacturing defects warranty of 12 months from the date of purchase. Units returned under warranty will be repaired or replaced at the manufacturer's discretion. This warranty does not cover mishandling, modification or battery replacement and is subject to the standard Terms and Conditions of Sale, a copy of which is available on request.

The equipment/goods are sold "as is" and with "all faults" (applies in USA). Claims under warranty should be referred to the point of sale.

Disposal

Data loggers, accessories and batteries should be disposed of at organised facilities, where available, in line with local regulations.

In accordance with the WEEE directive Gemini Data Loggers (UK) Ltd. will take back and dispose of any equipment purchased directly. Equipment not purchased directly should be returned to the point of sale for disposal.



Further Information

Further information on Tinytag data loggers, software and accessories can be found on our web site at:

www.tinytag.info

If you should have any further questions, please contact your distributor or:

Gemini Technical Support

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