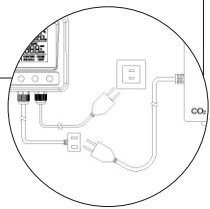
OPERATION MANUAL

CO_2 CONTROLLER WITH EXTERNAL SENSOR





APL ASIA CO., LTD. Authorized Distributor
Address: 11/129-132 Moo.5 Lamlukka Rd.,
T.Kookot, A.Lamlukka, Pathumthani 12130 Thailand.
TEL: 0-2996-4461-6
Website: www.apl-asia.com
EMAIL: sales@apl-asia.com
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Model:

- 7530-US
- 7530-EU
- 7530-UK
- 7530-FR
- 7530-AU

CE

INTRODUCTION

Thank you for purchasing this wall mount CO_2 controller. An external CO_2 sensing probe is included to help you measure CO_2 level in a closed space. This CO_2 controller has a USA type piggyback plug to get AC power from wall power socket and also provide controlling function to other connected devices, such as CO_2 generator and ventilation fan.

To ensure safety, please read this manual carefully before installation and follow up the instructions. Store this manual in a secure place for future reference.

Features:

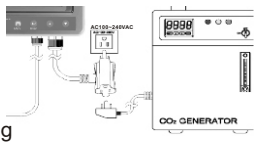
- Accurate & low drift NDIR CO_2 measuring
- External CO_2 sensor to be used in a closed space
- Display real time CO_2 value
- Display CO_2 chart with adjustable time scale (week/day/hour/min/auto)
- Auto Max. /Min. Recall on CO_2 chart
- Programmable CO_2 zone value & CO_2 center value to control output power on/off
- Audible alarm warns CO_2 concentration
- Target zone indicator on CO_2 chart
- Built-in Day/Night auto detection on CO_2 probe to override CO_2 control
- Backlight to assist operation in dark place
- Monitoring& Controlling CO_2 value in Green house, residential and commercial building

MATERIAL SUPPLIED

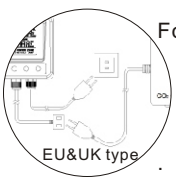
This package contains:

- ✓ Meter (controller+sensing)
- ✓ Operation manual
- ✓ Paper box
- ✓ Screws and tape

POWER SUPPLY



The meter is powered by AC100~240 VAC directly. The power plug is a USA piggyback plug type so you can plug in the device you want to control.



For customers who must use EU or UK or FR or AU type plug, the power coil & output coil are separated.

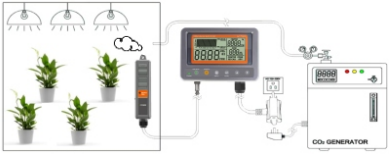
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PLACEMENT

An external CO_2 sensing probe is included to help you measure CO_2 level in a closed space, the cable is 4.5 meter long to extend your measure spot 4.5 meter away from display. Please make probe and meter **away from water spray** to extend the life time.

Screws are provided in package. First using the provided wall sticker to locate the spot where you want to hang the sensing probe and controlling meter on , drill to fix screw and hang devices.





SAFETY FUSE

The meter is powered by AC100~240 VAC directly and provide power through piggyback socket or EU/UK/FR/AU type socket to drive CO2 generator or ventilation. To avoid the damage by power overload, a 3kA@300VAC fuse is installed in meter. Contact distributor or shop to purchase new fuse while necessary. See appendix for detail.

KEYPAD& LED INDICATOR

MENU Enter setup mode.

ENTER Save and finish settings.

▲ Select mode or increase value in calibration and setup.

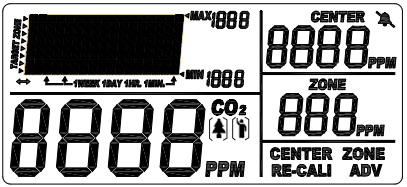
▼ Change time scale. Select mode or decrease value in calibration and setup.

Power : Green on while powered

Day time: Green on while detected light is >60 lux for 10 sec.

Output: Green on while relay is ON

LCD DISPLY



CO_2 Chart	CO_2 trend in graphic
Max	Max of displayed chart
MIN	Min of displayed chart
Buzzer	Beeper alarm on/off indicator
Zone	Zone value for relay control
Center	Center value for relay control
CO_2 PPM	Current CO_2 value
Time scale	Chart time scale. Includes week, day, hour, min, auto
Target Zone	Controlling zone indicator
ADV	Advanced setting to customize your CO_2 controller
RE-CALI	Operate to do CO_2 calibration
	Plant mode or Human mode

OPERATION

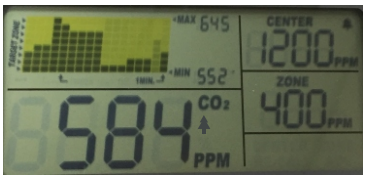
POWER ON

Plug the power plug into the wall socket to turn the controller on. While connect is successful, the device will show full display with a short beep and then performs 10 sec. countdown to warm up and also displays firmware information and “Warm Up” in chart display section.

Unplug the power plug to turn off the meter. While power on the meter again, the meter will retain the same setting from last operation, except the chart time will stay as 1 day while re-powered.

TAKING MEASUREMENT

The meter starts taking measurement after power on and updates readings every 5 seconds. If your application is for green house CO2 control, no initial setup is needed. In the condition of operating environment change (ex. from high to low temp.), it takes 30 sec to respond for CO_2 change. Do not hold the sensing probe close to face in case that exhalation affects CO2



The device constantly displays current ambient CO2, set center value and set zone value.

Trend Chart Zone

Below is a table that shows the available time scale and the duration of each division for corresponding scale:

Time Span	Time per division
1min	5sec/div
1hour	5 min/div
1day	2 hour/div
1week	0.5 day/div
Auto cycle	Cycle above

Using ▼ to toggle the available time scale. When you choose auto cycle, you will see " ◀▶ " on LCD and time scale exchange every 20 sec.

MAX/MIN of displayed chart

At the right side of the displayed chart, there are two numerical indicators: Max and Min. They are the maximum

and minimum values on the displayed chart. While you press down key to change the chart time scale, these value update as well.

Display Backlight

By pressing any key can activate the backlight for 30 seconds to help you operate in dark environment.

Auto Detect Day/Night

In greenhouse application, CO2 control is not necessary while light is weak. The built-in Photo-Cell sensor in CO2 sensing probe can automatically detect whether it is Day (above 60 Lux) or Night(less than 20Lux). It can override the CO2 control and shut off the CO2 generator by turning off the output power during the night. Conversely, if the Photo-Cell detects light (>60Lux) and the CO2 level is consistently low for 30 seconds, the device will start the CO2 generator by turning on output power.

Above auto detect Day/Night function is ignored while users pick up " Human" mode in advanced setting. With auto detection is ignored, the relay output control is only decided by CO2 value, only. Day or Night has no influence on it

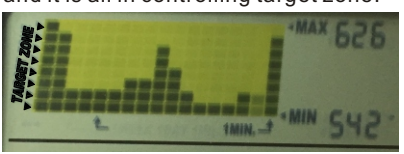
Output Control

Output power is on when CO2 value is lower Set Center-(1/2) Set zone, and off when CO2 concentration is above Set Center+(½) Set zone. For example, if the Set Center is 1200ppm, and the Set zone is 400ppm, the output power will shut off when CO2 over 1200+(1/2)*(400)=1400ppm, and power on when CO2 below 1200-(½)*(400)=1000ppm.

Above output control pattern is opposite

while users pick up " Human" mode in advanced setting. You can check from display to know the existing setting is Human or Plant .
In Human mode, if the Set Center is 1200ppm, and the Set zone is 400ppm, the output power will turn on when CO2 over 1200+(1/2)*(400)=1400ppm, and shut off when CO2 is below 1200-(½)*(400)=1000ppm.

Target Zone indicator
From displayed chart, users can easily know whether the current CO2 reading is the controlling target zone or not by checking the chart. Target zone is indicated by triangle icons.
For example, below picture shows the max. & min value of this time scale in last 85 seconds is 626ppm and 542ppm and it is all in controlling target zone.



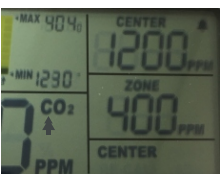
Buzzer Alarm
Buzzer alarm default as OFF (icon) . You may go for setup mode to turn the buzzer alarm function on (icon). While the buzzer is on, it beeps when CO2 value is over Set Center+Set zone, and off when CO2 concentration is below Set Center+Set zone. For example, if the Set Center is 1200ppm, and the Set zone is 400ppm, the beep will start when CO2 is over 1200+400=1600ppm, and buzzer off when CO2 is below 1600ppm.
Above high alarm buzzer working pattern is applied to both Plant & Human mode.

SETUP

Hold MENU key under normal mode to enter setup mode.
Press MENU key to choose the necessary setup function and then press ENTER to enter.
To exit setup, press MENU key four times till it returns to normal mode. “Center”, “Zone”, “Re-CALI”, “ADV” and then return to normal display is a complete cycle of setup function.
In setup mode, if none of the keys are pressed within 1 min, the device will automatically return to normal status.

CENTER

When entering setup mode, press ENTER to enter “Center” value setup. The default value is 1200ppm for general plant. Press ▲ or ▼ to change the value and it is 50ppm/step. Then, press ENTER again to confirm it.



ZONE

When entering setup mode, press ENTER to enter “Zone” value setup. The default value is 400ppm for general purpose. Press ▲ or ▼ to change the value and it is 10ppm/step. Then, press ENTER again to confirm it.

Note: One short cut for users to revert the Center and Zone to 1200& 400ppm : In normal mode, press ENTER for 3 secs till an audible beep and LCD should show " Back Home Done" .

RE-CALI

While the accuracy of this device is a concern, you may use this function to calibrate this device with outdoor fresh atmospheric air in ~400ppm condition. It is suggested to do calibration in sunny day to ensure the fresh air is closed to 400ppm.
Leave the sensor in outdoor fresh air for 20 mins before you want to start the calibration. When entering setup mode, press keys to select "Re-CALI", then hold ENTER for 3 seconds until a beep and the chart will read "Calibration". Leave the sensor in outdoor fresh air for 20 mins to complete the calibration.

To escape, press MENU to terminate without saving.

Make sure the device is far away from CO2 source, not in direct sunlight, and not exposed to water.

Note:
The meter is calibrated at standard 400ppm CO_2 concentration in factory.

Note:
Do not calibrate the meter in the air with unknown CO_2 level. Otherwise, it will be taken as 400ppm and leads to inaccurate measurements.

ADV(advance)

The last function in setup mode is called advance setting which allows you to customize your controller with more flexibility, includes: 1. buzzer alarm on/off, 2. CO2 altitude (pressure) compensation,3. choose relay output to Human or 4. Plant mode, 5.restore to factory default status.

Press keys to select “ADV”, then press ENTER to enter. In ADV, press ▲ or ▼ to select Buzzer, Altitude, Restore or Human/Plant.

To enter Buzzer, press ENTER and then use ▲ or ▼ to turn on/off buzzer alarm. The default is off.

To enter Altitude, press ENTER and then use ▲ or ▼ to adjust. The range is 50M to to 5000Meter. 50M/step.

To select Plant, you will see plant icon is flashing, press ENTER to confirm. Now, your relay output will be activated while Co2 value is lower than threshold.

To select Human, you will see human icon is flashing, press ENTER to confirm. Now, your relay output will be activated while CO2 value is too high.

To restore to factory default, press and hold ENTER for 3 seconds till an audible beep. Now, all Center/Zone/Chart time/ Calibrate/Altitude will all restore to 1200 ppm/400ppm/1Day and 0M.

TROUBLE SHOOTING

? Can't power on

Check whether the power is well plugged.
Check whether the fuse is damaged

? Slow response

Check whether the air flow channels on the sensing probe is blocked.

? CO2 reading is "Hi"

Means the measured value is higher than 5000ppm. Remove the sensor to fresh air to revert it to normal display.

? Error messages

Err4, means IR lamp error
Please reconnect power adapter
Err5, means Internal parameter error
Please reconnect power adapter
Err6, means Communication error
Please reconnect sensor unit

If above methods to release Err4 ~ 6 are not working, please contact the shop where you purchased device from for service.

SPECIFICATION

Model	7530
Measuring range CO2	0~5000 ppm
Resolution	1ppm (0-1000); 5ppm (1000-2000); 10ppm (>2000)
Accuracy CO2 below 3000ppm Co2 above 3000ppm	±50ppm or ±5% of reading, whichever is greater ±7% of reading
Warm-up time	30 seconds
Response time CO2	<2min for 63% of step change or <4.6min for 90% step change
LCD size	47 x 104 mm
Meter size	158 x 106 x 50 mm
Sensor size	124 x 33 x 26 mm
Operating condition	0~50°C, 5~95% RH (avoid condensation)
Storage condition	-20~ 60°C,5~95%RH(avoid condensation)
Power supply	AC100~240VAC
Piggyback socket load	5A@250VAC; 10A@120VAC
Weight	700g
Standard package	Sensor, controller, manual, screws

WARRANTY

The meter is warranted to be free from defects in material and workmanship for a period of one year from the date of purchase. This warranty covers normal operation and does not cover misuse, abuse, alteration, neglect, improper maintenance, or damage resulting from leaking batteries. Proof of purchase is required for warranty repairs. Warranty is void if the meter has been opened.

RETURN AUTHORIZATION

Authorization must be obtained from the supplier before returning items for any reason. When requiring a RA (Return Authorization), please include data regarding the defective reason, the meters are to be returned along with good packing to prevent any damage in delivery and insured against possible damage or loss.

OTHER RELATED PRODUCTS

Other related CO_2 products:

a. Model 7752 portable Temp./CO_2 meter, general purpose.
b. Model 77532 portable Temp./CO_2 meter, high performance.
c. Model 7755 portable Temp./RH/CO_2 meter, general purpose.
d. Model 77535 portable Temp./RH/CO_2 meter, high performance.

Appendix

FUSE SPECIFICATION

Dimension:
Dia.5 x 20(L) mm



-Amp code:1600
-Rated Current: 6.00A
-Max. Voltage:300 VAC
300 VDC
-Max. Voltage Drop: 150 mV
-Breaking Capacity: 3kA@300V AC
3kA@300V DC
-Typical Pre-arcing I2t (A^2Sec):30

Location:
The fuse is on the PCB. Please unscrew 7 screws on the back side of meter then you can find the fuse as shown.



CO_2 LEVELS AND GUIDELINES

Plant

This CO2 is default as 1200ppm for Target Zone (center) value and 1200ppm is suitable for most application. However, you still can adjust center and zone value to customize a best controlling output for your plant!

Plant Name	Target Zone/PPM
bean	600-900
chillies	800-1000
cucumber	1000-1500
grape	800-1400
orchid	800-1400
potato	1200-1800
strawberry	800-1200
tomato	800-1200

Appendix

CO_2 LEVELS AND GUIDELINES

Non-Enforced Reference levels

NIOSH recommendations

250-350ppm: normal outdoor ambient concentrations

600ppm: minimal air quality complaints

600-1000ppm: less clearly interpreted

1000ppm: indicates inadequate ventilation; complaints such as headaches, fatigue and eye/throat irritation will be more widespread. 1000ppm should be used as an upper limit for indoor levels.

EPA Taiwan: 600ppm and 1000ppm

Type 1 indoor areas such as department stores, theaters, restaurants, libraries, the acceptable CO_2 concentration of 8 hours avarge is 1000ppm.

Type 2 indoor areas with special requirements of good air quality such as schools, hospitals, day care centers, the suggested CO_2 level is 600ppm.

Regulatory exposure limit

ASHRAE Standard 62-1989: 1000ppm

CO_2 concentration in occupied building should not exceed 1000ppm.

Building bulletin 101 (BB101): 1500ppm

UK standards for schools say that CO_2 at averaged over the whole day(i.e. 9am to 3.30 pm) should not exceed 1500ppm.

OSHA: 5000ppm

Time weighted average over five 8-hour work days should not exceed 5000ppm.

Germany, Japan, Australia, UK...: 5000ppm

8 hours weighted average in occupational exposure limit is 5000ppm.

Accuracy, the Zenith of
Measuring / Testing Instruments !

Hygrometer/Psychrometer
Thermometer
Anemometer
Sound Level Meter
Air Flow meter
Infrared Thermometer
K type Thermometer
K.J.T. type Thermometer
K.J.T.R.S.E. type Thermometer
pH Meter
Conductivity Meter
T.D.S. Meter
D.O. Meter
Saccharimeter
Manometer
Tacho Meter
Lux / Light Meter
Moisture Meter
Data logger
Temp./RH transmitter
Wireless Transmitter .....

More products available !

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