Particle Counter
User Manual

Please read this manual before switching the unit on.
Important safety information inside.

www.cem-instruments.com
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1. Introduction
Thank you for purchasing this 4 in 1 Particle Counter instrument. This instrument is a Particle Counter with a 2.8” color TFT LCD display & a MicroSD memory card for capturing images (JPEG) or video (3GP) for viewing on your PC. Proving fast, easy, and accurate readings for particle counter, GAS (HCHO, CO) detectors, air temperature & relative humidity, most surface temperature measurements. It is the first combination of these measurements in global. Would be the best instrument for environment protection and energy save. The dewpoint temperature measurement will be very visible for wet and dry proof. It is a good hand industrial measurements and data analyzing, the real scene and time can be displayed on color TFT LCD. Any memory readings can be recorded in MicroSD card. The user can be back in office to analyze the measured air quality under the support of software.

2. Features
- 2.8” TFT Color LCD display
- 320*240 pixels
- Images (JPEG) & Video (3GP)
- MicroSD (max, use 8GB) memory card
- Air temperature and humidity
- Dewpoint & Wetbulb temperature
- Simultaneously measure and display 6 channel of particle sizes.
- HCHO detectors
- CO detectors
- MAX, MIN, DIF, AVG record, Date/time setup controls
- Auto Power Off

3. Specifications

<table>
<thead>
<tr>
<th>Particle Counter</th>
<th>Channels</th>
<th>0.3, 0.5, 1.0, 2.5, 5.0, 10um</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Rate</td>
<td>0.1ft³(2.83L/min)</td>
<td></td>
</tr>
<tr>
<td>Counting Efficiency</td>
<td>50% @ 0.3 μm; 100% for particles &gt; 0.45 μm</td>
<td></td>
</tr>
<tr>
<td>Coincidence Loss</td>
<td>5% at 2,000,000 particles per ft³</td>
<td></td>
</tr>
<tr>
<td>Data Storage</td>
<td>5000 sample records (MicroSD card)</td>
<td></td>
</tr>
<tr>
<td>Count Modes</td>
<td>Cumulative, Differential, Concentration,</td>
<td></td>
</tr>
</tbody>
</table>

**HCHO Measure**

<table>
<thead>
<tr>
<th>Range</th>
<th>0.01~5.00PPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Accuracy</td>
<td>±5%F.S</td>
</tr>
<tr>
<td>Display resolution</td>
<td>0.01ppm</td>
</tr>
</tbody>
</table>

**CO Measure**

<table>
<thead>
<tr>
<th>Range</th>
<th>10~1000PPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Accuracy</td>
<td>±5%F.S</td>
</tr>
<tr>
<td>Display resolution</td>
<td>1ppm</td>
</tr>
</tbody>
</table>
### Air Temperature and Relative humidity measurement

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range/Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Air Temperature Range</strong></td>
<td>0°C to 50°C(32°F to 122°F)</td>
</tr>
<tr>
<td><strong>Dewpoint Temperature Range</strong></td>
<td>0°C to 50°C(32°F to 122°F)</td>
</tr>
<tr>
<td><strong>Relative Humidity Range</strong></td>
<td>0 to 100%RH</td>
</tr>
<tr>
<td><strong>Air temperature Accuracy</strong></td>
<td>±0.5°C(0.9°F) 10°C to 40°C, ±1.0°C(1.8°F) others</td>
</tr>
<tr>
<td><strong>Dewpoint temp. Accuracy</strong></td>
<td>±0.5°C(0.9°F) 10°C to 40°C, ±1.0°C(1.8°F) others</td>
</tr>
<tr>
<td><strong>Relative Hum. Accuracy</strong></td>
<td>±3%RH 40% to 60%, ±3.5%RH 20% to 40% and 60% to 80%, ±5%RH 0% to 20% and 80% to 100%</td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>0°C to 50°C(32°F to 122°F)</td>
</tr>
<tr>
<td><strong>Storage Temperature</strong></td>
<td>-10°C to 60°C(14°F to 140°F)</td>
</tr>
<tr>
<td><strong>Relative Humidity</strong></td>
<td>10 to 90%RH non-condensing</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>2.8”320*240 Color LCD with backlight</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Battery</strong></td>
<td>Rechargeable battery</td>
</tr>
<tr>
<td><strong>Battery Life</strong></td>
<td>About 4 hours continuous use</td>
</tr>
<tr>
<td><strong>Battery Charge Time</strong></td>
<td>About 2 hours with AC adapter</td>
</tr>
</tbody>
</table>
4. Front Panel And Button Description

![Front Panel Diagram]

5. Power on or Power off

On the power off mode, press and hold \( \text{Power ON/OFF} \) button, until the LCD is on, then the unit will power on.

On the power on mode, press and hold \( \text{Power ON/OFF} \) button, until the LCD is off, then the unit will power off.

6. Measurement Mode

This instrument has three modes.

On the power on mode, the unit will display the three measure modes, and display three setup options. You can use \( \text{Measure} \) button to select any measure mode you need, and use function button F1, F2, F3 to enter the system interface.
### Items

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Particle Counter" /></td>
<td>Particle Counter measurement</td>
</tr>
<tr>
<td><img src="image" alt="HCHO Detector" /></td>
<td>HCHO Detector measurement</td>
</tr>
<tr>
<td><img src="image" alt="CO Detector" /></td>
<td>CO Detector measurement</td>
</tr>
<tr>
<td><img src="image" alt="Memory Set" /></td>
<td>Memory Set</td>
</tr>
<tr>
<td><img src="image" alt="System Set" /></td>
<td>System Set</td>
</tr>
<tr>
<td><img src="image" alt="Help file" /></td>
<td>Help file</td>
</tr>
</tbody>
</table>

### Symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Cumulative mode" /></td>
<td>Cumulative mode</td>
<td><img src="image" alt="Differential mode" /></td>
<td>Differential mode</td>
</tr>
<tr>
<td><img src="image" alt="Concentration mode" /></td>
<td>Concentration mode</td>
<td><img src="image" alt="Scan" /></td>
<td>Scan</td>
</tr>
<tr>
<td><img src="image" alt="HOLD" /></td>
<td>HOLD</td>
<td><img src="image" alt="Alarm working" /></td>
<td>Alarm working</td>
</tr>
<tr>
<td><img src="image" alt="CAM mode" /></td>
<td>CAM mode</td>
<td><img src="image" alt="CO detection mode" /></td>
<td>CO detection mode</td>
</tr>
<tr>
<td><img src="image" alt="Video mode" /></td>
<td>Video mode</td>
<td><img src="image" alt="HCHO detection mode" /></td>
<td>HCHO detection mode</td>
</tr>
</tbody>
</table>
7. ParticleCounter measurement mode
On the power on mode, you can use the ▲ or ▼ button to select, then press the ENTER button to enter the Particle Counter mode. Start to measure and display temperature and humidity.

Press RUN/STOP button to start detection of particles, when the sample time is up, the particle measurement will automatically stop, and the data will automatically save. You can also, press RUN/STOP button to stop the measurement when the sample time is not up. This mode can take picture and take video.

7.1 Take picture function
On the particle counter mode, you can see icon, and these icon corresponding to F1, F2, F3 button. Press F1 button can enter picture taking icon will appear, you can press F2 button to take picture. Press “ESC” button to exit this mode.

7.2 Take video function
On the particle counter mode, you can see icon, and these icon corresponding to F1, F2, F3 button. Press F2 button can enter video taking mode. Press the RUN/STOP button to start the particle measurement, the instrument start to measure the particle and take video. It can auto to save the file when the measure finished. Press ESC button to exit this mode.

7.3 Particle Setup mode
On the particle counter mode, you can see icon, and these icon corresponding to F1, F2, F3, press F3 can enter the setup mode, on this mode, you can setup any parameter you want. Use the ▲ or ▼ button to select any option you want to setup.

Then press ENTER button to confirm the parameter.
Sample time
You can adjust the sample time use the ▲ or ▼ button to control the volume of measured gas.

Start Delay
You can adjust the time use the ▲ or ▼ button to control start time.

Size & Alarm
This setting to select the channel is being displayed and the alarm set value channel. Use the ▲ or ▼ button to select channel and use ENTER button to confirm.
Environment Set
Choose this setting if the Air temperature and humidity are displayed.

Sample Cycle: This option is used to set the sampling period.

Sample Mode
This setting to set the display mode of particle counter. When You select the cumulative mode, the particle measure will display symbol. When you select the differential mode, the particle measure will display symbol. When you select the concentration mode, the particle measure will display symbol.

Interval
Set the time between samples for the sampling period is greater than one times.

8. HCHO Measurement mode (The DT-9881 has the unique function)
On the power on mode, you can use the ▲ or ▼ button to select, then press ENTER button to enter the HCHO measure mode. Start to measure HCHO, air temperature and humidity after clearing a few seconds. Press RUN/STOP button to stop or open the measurement. This mode can take picture and take video.
8.1 Take picture function
On the HCHO mode, you can see an icon, and these icon corresponding to F1, F2, F3 button, press F1 can enter picture taking mode. Icon will appear, you can press F2 button to take picture. Press ESC button to exit this mode.

8.2 Take video function
On the HCHO mode, you can see an icon, and these icon corresponding to F1, F2, F3 button, press F2 can enter video taking mode. Press the RUN/STOP button to start the HCHO measurement, the instrument start to measure the HCHO and take video. It can auto to save the file when press RUN/STOP button again. Press ESC button to exit this mode.

8.3 HCHO Setup mode
On the HCHO mode, you can see an icon, and these icon corresponding to F1, F2, F3 button, press F3 can enter the Setup mode, on this mode, you can setup any parameter you want. Use the ▲ or ▼ button to select any option you want to setup. Then press ENTER button to confirm the parameter.

Start Delay
Set the waiting time before the start of measurement. Press ENTER button to select the time and adjust the time with the ▲ or ▼ button.
HCHO Alarm
Set the alarm value of HCHO. Optional alarm off and turn the alarm function. You can set the size of the alarm parameters.

Max/Min
Set whether to display the measured maximum, minimum.

Average/Dif
Set whether to display the value of average or different.

Ambient Temp/%RH
Set whether to display the air temperature and relative humidity.

Dewpoint/Wetbulb
Set whether to display the dewpoint and wetbulb.
9.CO Measurement mode (The DT-9881 has the unique function)

On the power on mode, you can use the ▲ or ▼ button to select CO, then press ENTER button to enter the CO measure mode. Start to measure CO, air temperature and humidity after clearing a few seconds. Press RUN/STOP button to stop or open the measurement. This mode can take picture and take video.

On the CO mode, you can see icon, and these icon corresponding to F1, F2, F3 button, press F1 can enter picture taking mode. icon will appear, you can press F2 button to take picture. Press ESC button to exit this mode.

On the CO mode, you can see icon, and these icon corresponding to F1, F2, F3 button, press F2 can enter video taking mode. Press the RUN/STOP button to start the CO measurement, the instrument start to measure the CO and take video. It can auto to save the file when press RUN/STOP button again. Press ESC button to exit this mode.

On the CO mode, you can see icon, and these icon corresponding to F1, F2, F3 button, press F3 can enter the Setup mode. On this mode, you can setup any parameter you want. Use the ▲ or ▼ button to select any option you want to setup. Then press ENTER button to confirm the parameter.

9.1 Take picture function
On the CO mode, you can see icon, and these icon corresponding to F1, F2, F3 button, press F1 can enter picture taking mode. icon will appear, you can press F2 button to take picture. Press ESC button to exit this mode.

9.2 Take video function
On the CO mode, you can see icon, and these icon corresponding to F1, F2, F3 button, press F2 can enter video taking mode. Press the RUN/STOP button to start the CO measurement, the instrument start to measure the CO and take video. It can auto to save the file when press RUN/STOP button again. Press ESC button to exit this mode.

9.3 CO Setup mode
On the CO mode, you can see icon, and these icon corresponding to F1, F2, F3 button, press F3 can enter the Setup mode. On this mode, you can setup any parameter you want. Use the ▲ or ▼ button to select any option you want to setup. Then press ENTER button to confirm the parameter.
Start Delay
Set the waiting time before the start of measurement. Press ENTER button to select the time and adjust the time with the ▲ or ▼ button.

CO Alarm
Set the alarm value of CO. Optional alarm off and turn the alarm function. You can set the size of the alarm parameters.
Max/Min
Set whether to display the measured maximum, minimum.

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Max/Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>01-01-2010</td>
<td>01:22</td>
<td></td>
</tr>
</tbody>
</table>

- Enable
- Disable

Average/Dif
Set whether to display the value of average or different.

- Enable
- Disable

Ambient Temp/%RH
Set whether to display the air temperature and relative humidity.

- Enable
- Disable

Dewpoint/Wetbulb
Set whether to display the dewpoint and wetbulb.

- Enable
- Disable

10. Storage File Browser
Turn on the instrument, below the LCD has a bar icon. Click on the icon to enter the data memory via the F1 button. On the Memory set mode, there are three options, press ▲ or ▼ button to select one and press ENTER button to enter this option, and then you can view the recorded data, images, and video information. If you do not save the information, it shows no file.
11. System Settings

Turn the instrument on, below the LCD has a bar icon. Click on the icon to enter the System Set Mode via the F2 button.

<table>
<thead>
<tr>
<th>Items</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date/Time</td>
<td>Set date and time</td>
</tr>
<tr>
<td>Font Colour</td>
<td>Select the font colour</td>
</tr>
<tr>
<td>Brightness</td>
<td>Brightness adjustment</td>
</tr>
<tr>
<td>Auto Power Off</td>
<td>Select auto power off time</td>
</tr>
<tr>
<td>Display Timeout</td>
<td>Select display auto off time</td>
</tr>
<tr>
<td>Memory Status</td>
<td>Display the memory and MicroSD card capacity</td>
</tr>
<tr>
<td>Factory Setting</td>
<td>Restore factory settings</td>
</tr>
<tr>
<td>Units(°C/°F)</td>
<td>Select the temperature unit</td>
</tr>
</tbody>
</table>

Press the ▲ or ▼ button to select the items, then press the ENTER button to enter.

11.1 Date/Time

Press the ▲ or ▼ button to select the value, press ENTER button to set the next value, press ESC button to exit and save the date and time.

Date: 01-11-2009

Am/Pm: 06:02 Am
11.2 Font Colour
Press the ▲ and ▼ button to select the color, press the ESC button to esc and save.

- Orange
- Green
- Black
- Blue
- Gold
- Purple

11.3 Brightness
Press the ▲ and ▼ button to select the backlight brightness, press the ESC button to esc and save.

- 100%
- 90%
- 80%
- 70%
- 60%
- 50%
- 40%
- 30%

11.4 Auto Power off
Press the ▲ and ▼ button to select the auto power off time or never auto power off, press the ESC button to esc and save.

- Disabled
- 3 Min
- 15 Min
- 60 Min
11.5 Display Timeout
Press the ▲ and ▼ button to select the Display auto off time or never Display auto off, press the ESC button to esc and save.

- Disabled
- 30s
- 1 Min
- 2 Min

11.6 Memory Status
Press the ▲ and ▼ button to select the memory (flash or microSD). Press the ESC button to esc and save.

- Device Memory
- SD Card

<table>
<thead>
<tr>
<th>Total: [49] MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used: [0] MB</td>
</tr>
<tr>
<td>Free: [49] MB(100)%</td>
</tr>
</tbody>
</table>

NOTE: If MicroSD card inserted, MicroSD card will be selected by default. Press the ENTER button to format the flash or MicroSD card, press F3 button to cancel format, press F1 button to confirm format.

<table>
<thead>
<tr>
<th>Total: [49] MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used: [0] MB</td>
</tr>
<tr>
<td>Free: [49] MB(100)%</td>
</tr>
</tbody>
</table>

CONFIRM   NO
11.7 Factory Setting
Press the ▲ and ▼ button to select yes or no restore factory settings. Press the ESC button to esc and save.

- No
- Yes

11.8 Units(°C/°F)
Press the ▲ and ▼ button to select the unit, press the ESC button to esc and save.

- ° C
- ° F