GT-526
MANUAL

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GT-526 Manual

Technical Support

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NOTICE

CAUTION—Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

WARNING—This product, when properly installed and operated, is considered a Class I laser product. Class I products are not considered to be hazardous.

There are no user serviceable parts located inside the cover of this device.

Do not attempt to remove the cover of this product. Failure to comply with this instruction could cause accidental exposure to laser radiation.

Table of Contents

1.   Introduction

The GT-526 is a six channel handheld particle counter used to measure particle concentration in the air. An internal pump is used to draw air into the unit for sampling. The unit then utilizes scattered laser light to count individual particles as the air is drawn through the unit. Counted particles are converted into a concentration and displayed on the front LCD screen of the unit. Completed samples are stored for either viewing on the front LCD screen or retrieving serially.

2.   Setup

Setup for the GT-526 is very simple since the unit is a handheld device and most features are integrated into the unit. The following sections cover unpacking, layout and performing a test run to verify operation.

2.1.   Unpacking

When unpacking the GT-526 and accessories, inspect the carton for obvious damage. If the carton is damaged notify the carrier. Unpack everything and make a visual inspection of the GT-526 components. The GT-526 is shipped with the items shown on the following pages. The first page shows the standard equipment shipped with the GT-526 and the next page shows the optional equipment which can be purchased with the GT-526. If any of the equipment is missing, contact the supplier immediately.

GT-526 Standard Equipment

Custom Serial Cable

MOI P/N: 3228

GT-526

MOI P/N: GT-526

Miniature Screwdriver

MOI P/N: 993020

Iso-Kinetic Sample Probe

MOI P/N: G3110

AC To DC Converter

MOI P/N: 510640

Carrying Case

MOI P/N: 8517

Zero Particulate Filter

MOI P/N: G3111

IEC AC Power Cord

MOI P/N: 400100

GT-526 QuickStart Guide

MOI P/N: GT-526-9810

Calibration Certificate

MOI P/N: GT-526-9600

GT-526 CD

MOI P/N: 80256

GT-526 Optional Equipment

Printer

MOI P/N: G3115

Temperature & Humidity Probe

MOI P/N: G3120

Dwyer™ Ball Flow Meter

MOI P/N: 9801
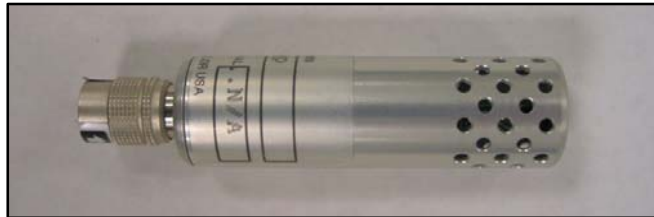
2.2. Layout

The following figure shows the layout of the GT-526 and provides a description of each of the components.

GT-526 Layout
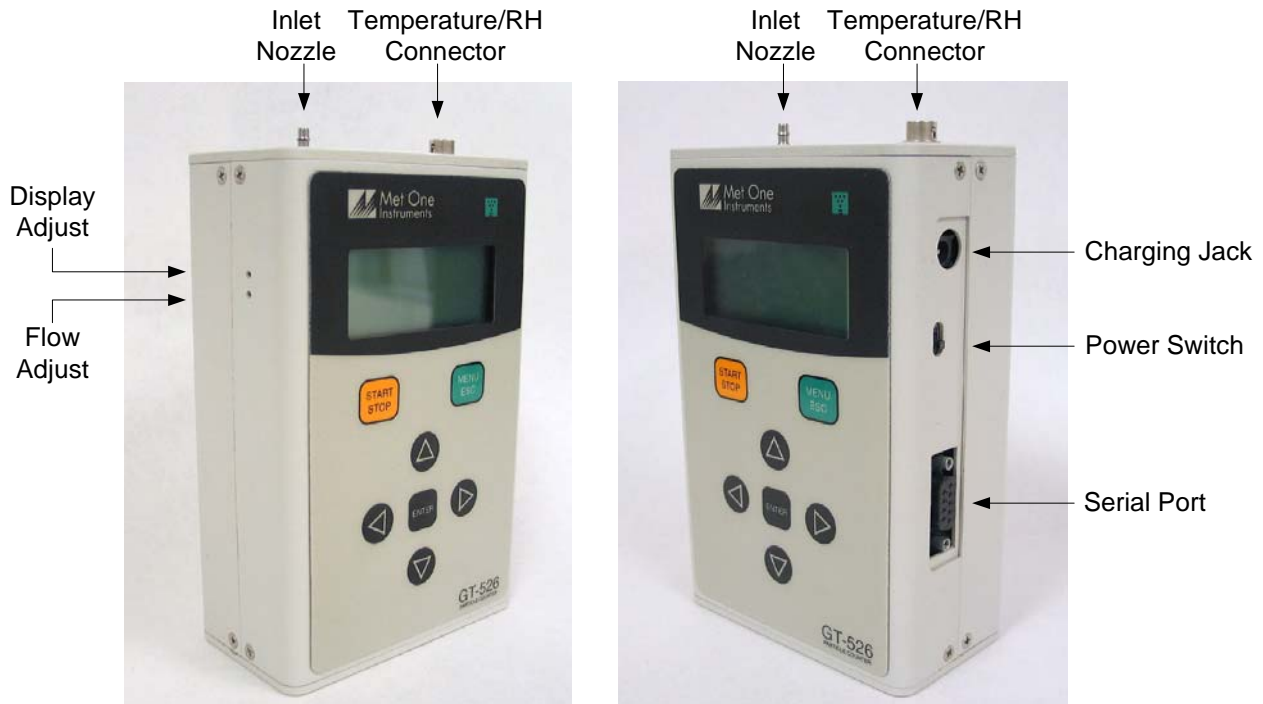
Figure 1 – GT-526 Layout

Component	Description
Power Switch	Switch that turns the GT-526 on or off. Slide up (towards inlet nozzle) to turn on and slide down to turn off.
Charging Jack	Input jack for AC to DC converter. Charges the internal batteries and provides continuous power for the unit.
Serial Port	Connection used for serial communication (either RS-232 or RS-485).
Temperature/RH Connector	Mating connector for the optional external Temperature/RH sensor.
Inlet Nozzle	Nozzle through which air sampling occurs. Under normal operation an iso-kinetic probe is connected to the nozzle to ensure even flow velocity. When performing a zero count a zero filter is connected.
Display Adjust	Used to adjust the LCD display contrast.
Flow Adjust	Used to adjust the sample flow rate of the GT-526.

2.3.　Default Settings

The GT-526 comes with the sample settings and unit settings set to the following default values.

Parameter	Value
Sample Location	1
Sample Mode	Manual
Sample Time	60 seconds
Sample Hold Time	0 seconds
Volume	FT3
Temperature Units	C
Baud Rate	9600
Printer Mode	RS-232

2.4.　Initial Operation

Before operating the GT-526 for the first time, it is recommended that the unit be fully charged. Information regarding charging the battery is found in section 4.11 of this manual.

3.　User Interface

The GT-526 user interface is composed of a 7 button keypad and a LCD display. The following sections provide an overview of the keypad and menu systems, which will be referenced throughout the document.

3.1. Keypad

The GT-526 keypad is composed of 7 buttons as shown in Figure 2.
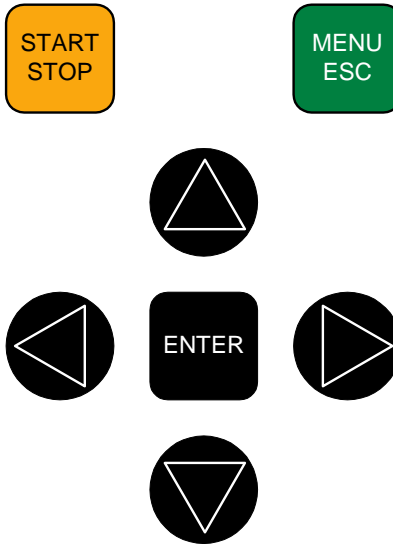
Figure 2 – GT-526 Keypad

The following table provides a description of how each button is used in the operation of the unit.

Key	Description
START STOP	• Starts or stops the unit sampling when either the Operate or Main Menu Screen is displayed. • Starts the unit printing when in the Print Data Screen. • Recalls the selected data when in the Recall Data Screen.
MENU ESC	• Loads the Main Menu Screen when not editing a field in a screen. • Loads the Operate Screen when in the Main Menu Screen. • Stops editing a field and returns the field to the original value before editing began.
ENTER	• Loads the screen associated with menu item. • Begins editing of the selected item in a screen when not already editing. • Stops editing a field and saves the changed value.
△	• Navigates up when not editing. • Modifies field when editing.

▽	• Navigates down when not editing. • Modifies field when editing.
▷	• Navigates right
◁	• Navigates left

3.2. Menu

The GT-526 main menu provides access to core functions of the GT-526 and is accessible by pressing the menu key on the Operate Screen. Figure 3 shows the whole GT-526 main menu (4 lines visible at a time on unit).

```
SAMPLE SETUP
RECALL DATA
PRINT DATA
MEMORY
SETTINGS
SET CLOCK
ABOUT
```
Figure 3 – GT-526 Main Menu

Menu Item	Description
SAMPLE SETUP	Loads the Sample Setup Screen where sample specific settings can be modified.
RECALL DATA	Loads the Recall Data Screen where a specific event can be recalled based on time.
PRINT DATA	Loads the Print Data Screen where stored data can be printed out based on a time range.
MEMORY	Loads the Memory Screen where memory usage can be viewed and memory cleared.
SETTINGS	Loads the Settings Screen where GT-526 settings can be modified.
CLOCK	Loads the Set Clock Screen where the date and time can be set.
ABOUT	Loads the About Screen where GT-526 version information can be viewed.

4.   Operation

The primary function of GT-526 is to take samples, store the data and retrieve the data. All other operations of the unit are derived from this basic purpose. The following sections cover the basic operation of GT-526.

4.1.   Power Up

The GT-526 power is controlled by a switch located on the upper right hand side of the unit. To power up the unit move the switch to the on position (towards the top of the case). The following sections describe the screen sequence on power up.

4.1.1. Startup Screen
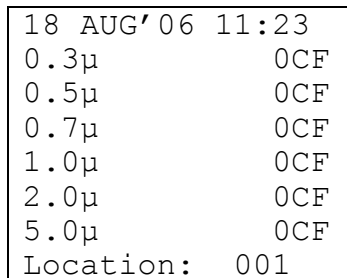
The first screen shown on power up is the Startup Screen.   The Startup Screen displays the product type and company website for 1 second before loading the Operate Screen. Figure 4 shows the Startup Screen.
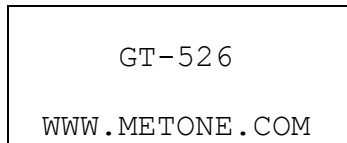
```
GT-526

WWW.METONE.COM
```
Figure 4 – Startup Screen

4.2.   Operate Screen

The Operate Screen is designed to provide user feedback on the sampling process. The Operate Screen displays the sample status, current event data and previous event data depending upon the GT-526 operation status and user selections. Figure 5 shows the Operate Screen when the unit is not running, no samples have been taken and the RH/Temp probe is not connected (the top line is always the same, the remaining lines scroll).

```
18 AUG'06 11:23
0.3µ            0CF
0.5µ            0CF
0.7µ            0CF
1.0µ            0CF
2.0µ            0CF
5.0µ            0CF
Location:   001
```
Figure 5 – Operate Screen w/o RH/Temp

The top line of the Operate Screen is reserved for the date/time, status or alarm depending upon the machine status. The top line always remains the same while the other 3 lines scroll to display the full list. The first 6 scrollable items are the count channels, which show either the current or previous count values. If the RH/Temp probe is connected to the unit, the next 2 items are the Temp and RH as shown in Figure 6. The last item is the location, which is a user settable sample setting and is discussed in section 4.4.

```
18 AUG'06 11:23
0.3µ            0CF
0.5µ            0CF
0.7µ            0CF
1.0µ            0CF
2.0µ            0CF
5.0µ            0CF
Temp          24 C
RH            40 %
Location:    001
```

Figure 6 – Operate Screen w/ RH/Temp

The units for the counts are determined by a user settable setting. The counts can be displayed in units of cubic feet (CF) or liters (/L). The units for the temperature are also determined by a user settable unit setting. The temperature can be displayed in units of Celsius (C) or Fahrenheit (F). Both unit settings are discussed in section 4.8.

4.2.1. Sampling

When the unit is sampling, the Operate Screen displays the current sample information. All of the scroll fields are as described in section 4.2 and they are real-time values as long as the unit is sampling. The count values are scaled while the unit is sampling as an approximation of the final count values. Figure 7 shows the Operate Screen while sampling with RH/Temp probe connected.

```
█               58
0.3µ    29,780CF
0.5µ     1,400CF
0.7µ       610CF
```

Figure 7 – Operate Screen Sampling

The top line of the Operate Screen displays the status of the GT-526 while the unit is sampling. The following table shows the various status messages and their meaning:

Status	Description
STARTING…	GT-526 is starting the sample and is waiting for the count system to initialize.
HOLDING…	GT-526 is in auto mode and is waiting for the hold time to finish.
STOPPING…	GT-526 is stopping the sample and is waiting for the count system to stop.
▉▉▉▉▉▉ 10	GT-526 is sampling. The progress bar moves from left to right as the sample is closer to finished. The time remaining is displayed to the far right.

4.2.2. Non-Sampling

When the unit is not sampling, the Operate Screen displays previous sample information or real time information. The Operate Screen defaults to showing real time information, which includes the current counts, temperature, rh and location. In the case of counts, since the unit is not counting, the displayed values will show the previous count or no counts if a sample has not been taken. Figure 8 shows the Operate Screen while not sampling and displaying real time information.

```
18 AUG'06 11:23
0.3µ            0CF
0.5µ            0CF
0.7µ            0CF
```

Figure 8 – Operate Screen Not Sampling

The top line of the Operate Screen displays the date and time associated with the data being displayed. When real time information is being displayed the top line shows the current date and time value.

To navigate and view previous data, the left and right arrow keys are used. Pressing the left arrow key shows older events while pressing the right arrow key shows newer events. Each press of an arrow key moves 1 record in the associated direction. When the oldest record has been reached, pressing the left arrow key will not change the current record being viewed. When the newest record has been reached, pressing the right arrow key will cause the Operate Screen to display real time information. Pressing the Enter key at any time causes the Operate Screen to display real time information.

4.2.3. Warnings

The low battery warning occurs when the battery voltage drops beneath 5.80 V and persists until the voltage rises above 5.90 V. When a low battery warning occurs, the Operate Screen displays the low battery warning on the top line of the Operate Screen. This warning alternates with the normal text displayed when no alarm is occurring. The low battery warning is displayed whether the unit is sampling or not sampling. Figure 9 shows the Operate Screen with the low battery error on the top line.

```
  Low Battery!
0.3µ          0CF
0.5µ          0CF
0.7µ          0CF
```

Figure 9 – Operate Screen Low Battery

4.3.   Sampling

The primary function of the GT-526 is to sample and the following sub-sections cover sample related functions.

4.3.1. Starting/Stopping

A sample can be manually started or stopped from either the Operate Screen or the menu. To start or stop a sample from either of these screens press the START/STOP key on the keypad. Starting or stopping a sample from the menu will load the Operate Screen.

Depending upon the current sample mode of the GT-526; the sample will either run a single sample or continually run samples. If the GT-526 is set to continually run samples, the unit will continue to sample until the internal memory is full or unit is stopped. GT-526 sample modes are discussed in section 4.4.

4.3.2. Sample Error

In the event that an error occurs during the unit sampling, the sample is stopped and the error is displayed.

4.3.3. Real-Time Output

GT-526 provides real-time output on the serial port at the end of each sample. The format of the output is controlled by the printer mode setting (section 4.8). Section 4.12.3 covers real-time output in greater depth.

4.3.4. Sample Length

The sample length determines the amount of time that counts are accumulated while the pump is running. The length of the sample is user settable from 1 – 999 seconds and is discussed in section 4.4.

4.3.5. Sample Hold Time

The sample hold time is used when the sample mode is set to auto (continuous sample). The sample hold time represents the time from the completion of the last sample to the start of the next sample. The hold time could also be considered the amount of time between samples when no sampling is occurring. The sample hold time is user settable from 0 – 999 seconds and is discussed in section 4.4.

4.3.6. Sample Timing

The following figures depict the sample timing sequence for both manual and auto sampling modes. Figure 10 shows the timing for manual sample mode.

Start
Time   Sample Time   Stop
                       Time

Figure 10 – Manual Mode Sample

Figure 11 shows the timing for auto sample mode.

Start
Time   Sample Time   Hold Time   Sample Time   Stop
                                                                 Time

Figure 11 – Auto Mode Sample

4.4.   Sample Setup

To access the sample settings select SAMPLE SETUP from the menu. Figure 12 shows the Sample Setup Screen.

```
LOCATION: 001
MODE:     MANUAL
SAMPLE:   001
HOLD:     000
```

Figure 12 – Sample Setup Screen

4.5. Recalling Sample Data
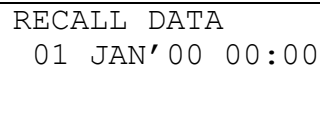
Stored sample events can be viewed from the Operate Screen (as described in section 4.2.2), but requires navigating one record at a time to reach a desired record. The Recall Data Screen provides a way to quickly navigate to a record based on time. The Recall Data Screen is accessed by selecting RECALL DATA from the main menu. If no sample events are available the screen shown in Figure 13 is displayed. To exit the No Samples Events Screen press the Start/Stop, ESC or Enter keys.

```
NO SAMPLE EVENTS
    AVAILABLE.


```

Figure 13 – Recall Data Screen (No Data)

Figure 14 shows the Recall Data Screen when there are sample events available.

```
RECALL DATA
 01 JAN'00 00:00


```

Figure 14 – Recall Data Screen

To recall data, enter the desired date/time string of the data to recall and select the START/STOP button. The unit will recall the data from the date/time entered (if an exact match is found) or the next most recent data available. The screen shown when the data is recalled is the Operate Screen. The screen reacts in exactly the same manner as described above and it now has the desired data shown.

4.6. Printing Sample Data

Stored sample events can be printed through the printer port within a user selected range. The following sections describe the process of printing sample data.

4.6.1. Selecting Data Range

To access the printing feature of the GT-526, select PRINT DATA from the menu. If no sample events are available the screen shown in Figure 15 is displayed. To exit the No Samples Events Screen press the Start/Stop, ESC or Enter keys.

```
NO SAMPLE EVENTS
    AVAILABLE.

```

Figure 15 – Print Data Screen (No Data)

Figure 16 shows the Print Data Screen when there are sample events available.

```
PRINT DATA
LOCATION: 000
 01 JAN'00 00:00
 18 AUG'06 13:23
```
Figure 16 – Print Data Screen

To select which sample events to print, the location and time range must be specified. The following table describes the printing selection settings.

Setting	Description
Location	The location ID of the sample events to print. Setting location to 000 prints all locations. Settable from 0 - 999
01 JAN'00	The date/time to begin printing sample events from.
18 AUG'06	The date/time to stop print samples at.

4.6.2. Printing

After the print settings have been selected, the Printing Status Screen is displayed. Figure 17 shows the Printing Status Screen as it would look when finished.

```
PRINTING STATUS
SCANNING...15
PRINTING...10
FINISHED!
```
Figure 17 – Printing Status Screen

The following table describes the status components of the Printing Status Screen.

Status	Description
Scanning…	Displays how many records have been checked to determine if they meet the print settings.
Printing	Displays how many records have been printed.
Finished!	Is shown when the printing has completed.

Pressing the ESC button cancels the data printing and loads the menu. The format of the print is dependent upon the port setting (Section 4.8).

4.7. Memory Management

The GT-526 memory is composed of a single file which contains the data from sample events. Every time a sample is completed, the GT-526 stores that data into the memory. The GT-526 memory is circular, meaning when the memory is full, the unit will start overwriting the oldest saved samples with new samples. GT-526 provides the user the ability to view the memory usage as well as clear the memory.

4.7.1. Viewing Usage

To view the amount of memory left in GT-526 for data storage or to clear the memory, the Memory Screen is used. The Memory Screen is accessed by selecting MEMORY from the menu. Figure 18 shows the Memory Screen.

```
FREE:      100%
SAMPLES: 8000
PRESS ENTER TO
   CLEAR MEMORY!
```
Figure 18 – Memory Screen

The following table lists the Memory Screen items and their description.

Item	Description
FREE	Shows the percentage of memory space which is available for data storage. When 0% is shown the memory is overwriting the oldest data with new data.
SAMPLES	Shows the number of samples which can be store in memory before the memory is full. When 0% is shown the memory is overwriting the oldest data with new data.

4.7.2. Clearing

Clearing the GT-526 memory removes all data from sampled events. To clear the GT-526 memory select the ENTER key while in the Memory Screen. The Memory Caution Screen, as shown in Figure 19, is shown to verify that the memory is to be cleared.

```
PRESS ENTER TO
   CLEAR MEMORY!

ESC TO CANCEL.
```

Figure 19 – Memory Caution Screen

If the ENTER key is pressed the memory clear is performed and Memory Clear Done Screen is shown, Figure 20.

```
           DONE!
```

Figure 20 – Memory Clear Done Screen

4.8. Unit Settings

To access the GT-526 settings select SETTINGS from the menu. Figure 21 shows the Settings Screen.

```
VOLUME:  CF
TEMP:    C
BAUD:    9600
PRINTER: PRINT
```

Figure 21 – Settings Screen

The following table lists the settings and describes their meanings.

Setting	Description
VOLUME	This is the volume used in displaying the concentration. GT-526 either displays concentration in cubic feet (CF) or liters (/L).
	Settable to either CF or /L.
TEMP	This details the units used to display temperature. GT-526 either displays temperature in Celsius (C) or Fahrenheit (F).
	Settable to either C or F.

BAUD	This is the baud rate used for serial communication. GT-526 communicates at baud rates from 300 – 38400.
	Settable to 300, 600, 1200, 2400, 4800, 9600, 19200 and 38400.
PRINTER	The printer is the mode which controls the behavior of the GT-526 serial output. The modes are RS232, RS485 or Printer.
	RS232 – RS-232 communication with CSV style output. RS485 – RS-485 communication with CSV style output. Printer – RS-232 communication with printer style output.
	Settable to RS232, RS485 or PRINT

4.9. Setting Date/Time

To set the date and time select SET CLOCK from the menu. Figure 22 shows the Set Clock Screen.

```
SET CLOCK
DATE: 18 AUG'06
TIME: 11:25:36
```

Figure 22 – Set Clock Screen

The following table lists the date and time settings and their meanings.

Setting	Description
DATE	The date in the following format: dd mmm'yy dd: Day mmm: Month yy: Year
TIME	The time in the following format: HH:MM:ss HH: Hours in 24 hour format MM: Minutes ss: Seconds

4.10. Viewing Version Information

To access the version information, select ABOUT from the menu. Figure 23 shows the About Screen with the master version.

```
    GT-526
  80203 R0.1.0


 www.metone.com
```
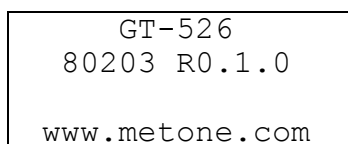
Figure 23 – About Screen Master Version

The GT-526 is composed of two components: the master, which controls the user interface, logging data and timing; and the counting circuitry which controls counting. Both components have firmware which is unique and therefore have their own version number. The About Screen shows the version of both pieces of firmware on the second line of the About Screen. The version is toggled by pressing either the up or down arrow key.

4.11. Charging The Battery

To charge the battery, connect the AC power cord from the AC to DC converter module to an AC power outlet. The module is universal and will work with power line voltages of 100 to 240 volts, at 60 Hz. The other plug coming from the converter module plugs into the charger input socket on the upper right side of the GT-526. A discharged battery pack may take up to 15 hours to fully charge.

When fully charged the battery inside the GT-521 will power the unit for about 11 hours of continuous sampling. Under normal operation, the battery will power the unit for about 17 hours.

- If used on a daily basis, connect the charger at the end of the day. The battery is not damaged by leaving the GT-526 connected to the charger for long periods.

- If used in an area where AC power is available, leave the charger connected to the GT-526.

- When storing the GT-526, charge the battery. Storing a discharged Ni-MH battery for any length of time will degrade its performance.

4.12. Communications

GT-526 provides serial communications via a DB9 connector located on the lower right hand side of the unit. The serial communication allows for flash upgrades (field upgrade) and the support of a serial command set. In addition, the serial communication provides real-time output of sample information. The following sections discuss the various serial communications available with GT-526.

4.12.1. Connection

The baud rate for GT-526 is settable from 300 – 38400 baud (section 4.8). The rest of the settings (parity and stop bits) are not. For communication to work properly with GT-526 the parity must be none and the stop bits 1. The baud rate must match on both GT-526 and the other unit attempting communication. The default baud rate for GT-526 is 9600 baud, but once changed the new rate will be the power up defualt.

GT-526 provides a physical connection in two different manners, RS-232 and RS-485. RS-232 is a two wire, full duplex, electrical connection which is the standard connection on a PC. RS-485 is a two wire, half duplex, differentiating electrical connection which is commonly used for local networks and multi-drop communication links. GT-526 is by default RS-232 and is only RS-485 when the printer mode is set to RS485 (section 4.8).

Warning – The cable supplied with the GT-526 is specially wired to function with the unit and the use of any other cable can cause damage. Only use the cable supplied with the GT-526 (MOI #3228)!

4.12.2. Commands

GT-526 provides a serial command set for remote accessing of stored data and settings. GT-526 is always ready for serial communication and provides a prompt ('>') whenever a carriage return is sent to it. All commands are terminated by a carriage return. Commands which need additional information prompt for the appropriate information. The following table lists the available commands and a description of the command.

Command	Description

?,H, h	Displays the following help menu to assist users.
	
	 ```----------------------------```
	```| GT-526 System Menu |```
	```----------------------------```
	```1 - Display Settings```
	```2 - Display All Data```
	```3 - Display New Data```
	```4 - Display Last Data```
	```D - Set Date```
	```T - Set Time```
	```C - Clear Data```
	```S - Start Sample```
	```E - End Sample```
	```ST - Set Sample Time```

1	Returns the units settings information
2	Returns all available records from the data file. If there is no data nothing will be returned.
3	Returns all records since last '2' or '3' command. All new data is displayed or if there is no new data nothing will be returned.
4	Returns the last record if just the '4' command is entered. If the command is '4' followed by a space and a number (x), the last x records are returned.
D, d	If just the command is entered, the current date setting and a prompt to change the date is shown. If the command is followed by a space and a valid date, the unit is set to that date. A valid date is formatted as mm/dd/YY.
T, t	If just the command is entered, the current time setting and a prompt to change the time is shown. If the command is followed by a space and a valid time, the unit is set to that time. A valid time is formatted as HH:MM.
C, c	Displays a prompt for clearing the stored unit data.
S, s	Starts a sample
E, e	Ends a sample
ST, st	If just the command is entered, the current sample time is displayed. If the command is followed by a space and a number, the sample time is set to that number of seconds.

4.12.3.Real Time Output

The real time output of GT-526 occurs when the unit finishes a sample. The output format is either a comma separated value (csv) or a printer style. The following sections show the two format styles.

4.12.4.Comma Separated Value (CSV)

The format for comma separated value is as follows:

1. Time
2. 0.3μ Channel – In units determined by unit settings.
3. 0.5μ Channel – In units determined by unit settings.
4. 0.7μ Channel– In units determined by unit settings.
5. 1.0μ Channel– In units determined by unit settings.
6. 2.0μ Channel– In units determined by unit settings.
7. 5.0μ Channel– In units determined by unit settings.
8. Temperature– In units determined by unit settings.
9. RH (%)
10. Location

4.12.5.Printer Style

The format for printer style without the RH/Temp probe connected:

```
18-AUG-2006  14:43:43
0.3    109,020
0.5        970
0.7        380
1.0        240
2.0        130
5.0         10
Location   001
```

The format for printer style with the RH/Temp probe connected:

```
18-AUG-2006  14:43:43
0.3    109,020
0.5        970
0.7        380
1.0        240
2.0        130
5.0         10
Temp        24 C
RH          41 %
Location   001
```

4.13. Flash Upgrade

GT-526 is firmware upgradeable via the serial connection using a Met One Instruments flash burn program. Using this program allows the GT-526 to have new firmware flashed into the unit in the field, without having to disassemble the unit. Binary files and the flash program must be provided by Met One Instruments.

5. Maintenance

Due to the nature of the instrument, there are no customer serviceable components in the GT-526. The case of the GT-526 should never be removed or opened for any reason. **Opening or removing the case of the GT-526 voids the warranty and may result in exposure to laser radiation, which can cause eye injury.**

5.1. Service Schedule

Although there are no customer serviceable components in the GT-526, there are service items which ensure the proper operation of the instrument. Table 1 shows the service schedule for the GT-526.

Time Period	Item	Manual Section
Weekly	Zero Count Test	5.2
Monthly	Flow Rate Test	5.3
Yearly	Annual Calibration	5.4

Table 1 Service Schedule

5.2. Zero Count Test

The zero count test determines whether the GT-526 is counting "false counts", which can be caused by air leaks or spurious noise. These "false counts" cause count measurement errors that become especially apparent when sampling relatively clean environments. It is Met One Instruments recommendation that a zero test be performed weekly to ensure optimal counting accuracy. The zero count test is as follows:

1. Attach a filter with a rating of $0.2\mu m$ or better to the GT-526 inlet nozzle. The filter must be large enough that it does not create a restriction and load down the small vacuum pump inside the GT-526. One zero particulate filter is supplied with the GT-526 (MOI #G3111).

2. Set the Sample – Op Mode to MANUAL and the Sample – Sample to 060. This ensures that the sample will be one minute long and only occur once.

3. Start and complete a sample.

4. The result of the one minute sample should be less than 1 on the 0.3μm channel.

5.3. Flow Rate Test

The flow rate test verifies that the flow rate is within tolerances for proper operation of the instrument. The GT-526 requires that the flow rate be set to 0.1 (cf) or 2.831 (L), which is the flow rate used for volume calculations within the instrument.

The flow rate test requires a flow meter that is ±3% accurate at 0.1 (cf) or 2.831 (L). The flow meter also needs to be of a type which is non-loading, because the vacuum pump inside the GT-526 can be easily loaded down by a small restriction. Met One Instruments sells a flow meter which can be used for the flow rate test (MOI #9801). The flow rate test is as follows:

1. To test the flow rate, connect a flow meter to the sample inlet nozzle of the GT-526 using a short piece of flexible 1/8" ID tubing (Tygon tubing is a good choice).

2. Start a sample on the GT-526 and while the unit is sampling, note the flow meter reading. The flow rate should be 0.1 (cf) or 2.831 (L) ±5%.

3. The flow rate can be adjusted by a trimpot located at the upper left side of unit. The trimpot is the lower access hole in the case and can be adjusted by the small screwdriver which came with the GT-526. Turn the adjustment pot clockwise to increase the flow and counter-clockwise to decrease the flow.

5.4. Annual Calibration

The GT-526 should be sent back to Met One Instruments yearly for calibration and inspection. Due to the nature of the instrument the sensor in the GT-526 needs annual calibration that cannot be performed by the customer. Calibrating particle sensors like the one in the GT-526 requires specialized equipment and a skilled technician. Met One Instruments maintains a calibration facility for calibrating particle counters according to industry accepted methods such as ASTM and JIS using NIST traceable standards.

In addition to calibration, the annual calibration allows a skilled technician to inspect the GT-526. This inspection ensures that any preventative maintenance is done before a failure occurs. The annual calibration and inspection process ensures that the GT-526 is operating and will continue to operate properly.

6.   Troubleshooting

The following section covers some common failure symptoms, causes and solutions. It is important to note that there are no customer serviceable components in the GT-526. The case of the GT-526 should never be removed or opened for any reason. **Opening or removing the case of the GT-526 voids the warranty and may result in exposure to laser radiation, which can cause eye injury.**

Symptom	Possible Cause	Solution
Display does not turn on	• Low Battery • Defective Battery	• Charge battery for at least 10 hours • Send to service center
Pump does not turn on when a sample is started	• Low Battery • Defective pump	• Charge battery for at least 10 hours • Send to service center
Keypad does not work	• Loose connector • Internal hardware failure	• Send to service center
Sample result is zero	• Zero filter is attached • Pump did not run • Internal hardware failure	• Remove zero filter • Send to service center
Sample result is lower than normal	• Flow rate is low • Debris may in unit • Optics may be contaminated	• Perform flow rate test • Send to service center
Sample result is higher than normal	• Air leak in unit • Internal hardware failure	• Send to service center
Battery does not hold a charge	• Defective or worn out battery • Defective power cords or connectors • Defective charger	• Send to service center

7.   Electrical & Safety Conformity

The manufacture certifies that this product operates in compliance with following standards and regulations:

- FDA / CDRH This product is tested and complies with 21 CFR, Subchapter J, of the health and Safety Act of 1968.
- European Community (CE) Directive 72/23/EEC
  EN 61010-1 (Safety)
- IEC 60825-1 Ed.1.1 (1998-01)
- EN 60825-1 W/A11 (1996)
- US 21 CFR 1040.10

8.   Warranty

Products manufactured by Met One Instruments, Inc. are warranted against defects in materials and workmanship for a period of (1) year from the date of shipment from the factory. Offered products not manufactured by Met One Instruments, Inc. will be warranted to the extent and in the manner warranted by the manufacturer of that product.

Any product found to be defective during the warranty period will, at the expense of Met One Instruments, Inc. be replaced or repaired and return freight prepaid. In no case shall the liability of Met One Instruments, Inc. exceed the purchase price of the product.

This warranty may not apply to products that have been subject to misuse, negligence, accident, acts of nature or that have been modified other than by Met One Instruments, Inc. Opening the particle counter, e.g. removing the cover, voids warranty!

Consumable items such as bearings are not covered under this warranty.

Other than the warranty set forth herein, there shall be no other warranties, whether expressed, implied or statutory, including warranties of fitness or merchantability.

9. Specifications

Measurement Method   Scattered laser light

Performance
Particle Size Range   6 channels – 0.3 µm, 0.5 µm, 0.7 µm, 1.0 µm, 2.0µm and 5.0 µm
Concentration Range   0 – 3,000,000 particles per cubic foot (105,900 particle/L)
Accuracy   ± 10% to calibration aerosol
Sensitivity   0.3 µm with 2 to 1 peak to valley (JIS), 2 to 1 S/N
Flow Rate   0.1 cfm (2.83 lplm)
Sample Time   Adjustable: 1 to 999 seconds
Hold Time   Adjustable: 0 to 999 seconds

Electrical
Light Source   Laser Diode, 35 mW, 780 nm
Power   6V Ni-MH Self-contained battery pack – Provides for 17 hours of typical intermittent operation, up to 11 hours continuous use.
Full recharge may take up to 15 hours.
AC Adapter/Charger   AC to DC module, 100 – 240 VAC to 9 VDC @ 350 mA typical
Communications   RS-232 or RS-485
Certifications   Meets or exceeds CE, ISO, ASTM and JIS international certifications.

Interface
Display   16 character x 4 line LCD
Keyboard   7 key membrane type

Physical
Size   Height =   6.25" (15.9 cm)
      Width =   4.00" (10.2 cm)
Thickness =   2.12" (5.4 cm)

Weight   2.00 lbs – 32 ounces – (0.91 kg)

Environmental
Operating Temperature   0º C to +50º C
Storage Temperature   -20º C to +60º C

Accessories
Supplied   Operation Manual
Serial Cable
Comet Software
AC to DC Converter Module with IEC AC Power Cord
Iso-kinetic Sample Probe
Screwdriver
Carrying Case
Zero Particulate Filter   (MOI #G3111)

Optional   RH & Temperature Probe   (MOI #G3120)
Flow Meter   (MOI #61082)
Portable Printer   (MOI #G3115)