ANALYT MESSTECHNIK



OPERATING MANUAL

SKC HAZ-DUST IV Particulate Monitor

Inlets for thoracic, respirable and inhalable dust, flow, zero and span checks, personal sampling and data download with the HAZ-DUST IV real-time personal dust monitor, model HD-1004, with the DustComm Pro software, maintenance and ordering information.

AMTC-MN-0027

Rev. 2 · October 2026

About this manual

The SKC HAZ-DUST IV is a real-time personal dust monitor, model HD-1004. The monitor is worn at the waist; its detached sensor head is clipped to the collar, in the worker's breathing zone. An internal pump draws air through an interchangeable inlet and the optical sensor, and the display shows the dust concentration in mg/m³ every second. A 37 mm filter cassette directly behind the sensor collects a concurrent sample for gravimetric or chemical analysis.

This manual takes you from unpacking to a downloaded data set: power, inlets, flow, zero and span checks, sampling, reading the results and transferring them to a PC with the DustComm Pro software. Later chapters cover cleaning the optics, technical data and order numbers.

Read Safety (p. 6) before you use the monitor for the first time. For a first measurement, follow Commissioning (p. 11), the preparation at the start of Operation (p. 12), Auto-zero (p. 16) and Sampling (p. 17) in that order.

The manual applies to the HAZ-DUST IV monitor, model HD-1004, supplied as the kit, order code 770-4004K. Analyt-MTC supplies, services and supports the monitor; for questions, calibration, repairs and spare parts see Service, warranty and contacts (p. 33).

Keep this manual for the lifetime of the product. The current revision is on the product page at analyt-mtc.com.

Conventions in this manual:

- Keys, buttons and menu entries are printed like this: **ENTER**, **Special Functions**.
- A menu path such as **Special Functions** › **System Options** › **Extended Options** means that you open each entry in turn.

Abbreviations

Abbreviation	Meaning
CIM	Chemical Information Manual of OSHA, cited as the reference method in Appendix B
IOM	Institute of Occupational Medicine; here the IOM inhalable sampler
IP-10	Inhalable particulate, an EPA designation of the fraction with a 10 µm cut point
mppcf	Million particles per cubic foot of air
PC	Personal computer
PM-10	Particulate matter, the EPA designation of the fraction with a 10 µm cut point
RAM	Random-access memory
RH	Relative humidity
SAE	Society of Automotive Engineers (SAE fine test dust)

How this manual marks information

⚠ WARNING

A hazardous situation which, if not avoided, could result in death or serious injury.

NOTICE

Practices not related to personal injury — damage to the product, the process or the sample.

Note
Information that helps understanding; never a hazard.

The four keys on the front panel are written **ON/OFF**, **ENTER**, **UP** and **DOWN**. In a menu path, move the selection arrow to each entry with **UP** or **DOWN** and confirm it with **ENTER**.

Document information

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Revision history

Rev.	Date	Change
2	October 2026	Quality programme: new document type, number and identity pages.
1	October 2026	First issue.

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CHAPTER 1

Safety

Read this chapter before you use the monitor for the first time. The HAZ-DUST IV is a battery-powered instrument for measuring dust in the breathing zone. The rules in this chapter protect the people working with it, the monitor itself and the quality of your data.

Intended use

Use the monitor only to measure airborne dust, as described in this manual, and only with the inlets and accessories listed in Ordering information (p. 32). The manufacturer cannot foresee every way the instrument might be used; the user is responsible for its use.

Service work

You may change the inlet, the filter and the battery, check and adjust the flow, run the zero and span checks and clean the sensor optics. Everything else inside the enclosure is service work for trained personnel; contact Analyt-MTC (see Service, warranty and contacts (p. 33)).

⚠ WARNING

High voltages may be present inside the instrument enclosure. Contact with them can cause an electric shock. Do not tamper with the hardware. Leave repairs to properly trained service personnel, following the manufacturer's service documentation. Apply the usual safety precautions when working on the instrument.

Battery and charging

The monitor runs on a rechargeable 6.0 V nickel-metal hydride (NiMH) battery pack. Charge it as described in Charging the battery (p. 11).

⚠ WARNING

Charging the battery in a hazardous environment can ignite an explosive atmosphere. An ignition can cause fire, explosion or injury. Never charge the battery in a hazardous environment. Use only the charger supplied with the monitor and designed for the HAZ-DUST IV.

Note

Switch the monitor off before you connect the charger. The battery must be charged with the monitor switched off.

Stored data

Two actions erase the whole data memory of the monitor: starting a run with the storage type **Overwrite**, and erasing the memory (p. 20). The flow check and the span check (see Checking the flow rate (p. 15) and Span check (p. 27)) start the pump with **Overwrite**, so they erase the memory too. The monitor asks you to confirm each one, but the data cannot be recovered afterwards.

NOTICE

An Overwrite run, a flow check and a span check erase the whole data memory. The data cannot be recovered afterwards. Download the stored data to a PC first (see Downloading data (p. 22)). Do this before an Overwrite run, a flow check or a span check.

CHAPTER 2

Product description

Real-time reading and filter sample in one

The HAZ-DUST IV combines the two usual ways of measuring dust exposure. The real-time method gives an immediate result: particles drawn into the sensor head are detected once every second, the concentration is calculated and displayed at once, and every data point is stored. The filter method gives the reference result: a pump draws air through a 25 mm or 37 mm membrane filter, and a laboratory weighs or counts what the filter has collected. It is the compliance reference method, it is specific and accurate, and the collected dust remains available for chemical analysis.

In the HAZ-DUST IV the air passes through the optical sensor and then through a 37 mm filter cassette mounted directly on the sensor head. One run therefore gives a concentration profile on site — useful for finding sources, warning the wearer with the audible alarm and cutting down the number of filter samples — and a filter for the laboratory.

The monitor is calibrated with Arizona Road Dust (ARD, SAE fine test dust) against NIOSH Method 0600 for respirable dust, with an accuracy of ±10 %. Dust that differs from the calibration dust in composition or size distribution reads differently; correct for it with a scale factor obtained from the filter sample (see Scale factor from a filter sample (p. 19)).

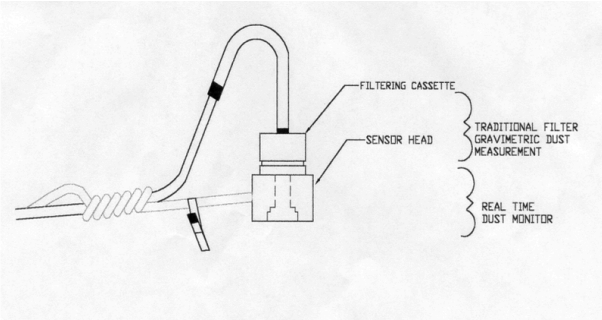


Figure 1. Traditional filter sampling and real-time measurement in one sampling train: the filter cassette sits on top of the sensor head, and the air intake tubing leads from the cassette to the monitor.

Particle fractions

The inlet on the sensor head decides which part of the airborne dust the monitor measures. Each fraction corresponds to how deep particles penetrate into the airways:

Fraction	Reaches	50 % cut point	Reference	Inlet
Inhalable	Nose and mouth	100 µm	NIOSH 0500	IOM sampling adapter
Thoracic	Beyond the larynx, into the airways of the lungs	10 µm	EPA PM-10, IP-10	Thoracic sampling inlet
Respirable	The gas-exchange region of the lungs	4 µm	NIOSH 0600	GS cyclone with adapter

Tell the monitor which fraction you sample; the display then shows it on the measuring screen. How to fit each inlet is described in Selecting the fraction and fitting the inlet (p. 12); the full penetration curves are in Particle size conventions (p. 35).

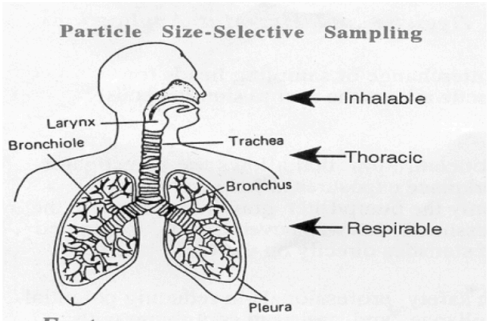


Figure 2. Where the size fractions are deposited: inhalable (nose, mouth and larynx), thoracic (trachea and bronchi), respirable (bronchioles and alveoli).

Checking the contents

The kit, order code 770-4004K, contains the parts below. If anything is missing, contact Analyt-MTC. The respirable and inhalable inlets, the calibration standard and a flowmeter are not included; order them separately (see Ordering information (p. 32)).

Qty	Part
1	HAZ-DUST IV monitor, model HD-1004, with detachable sensor head and rechargeable battery pack
1	Thoracic sampling inlet, detachable
1	Opaque 37 mm filter cassette holder
1	Zeroing filter
1	Battery charger
1	Trimming tool
1	RS-232 serial cable, 9-pin, female to male
1	Media with the DustComm Pro software and the manual (CD-ROM or USB flash drive)
1	Carrying case

Parts of the monitor

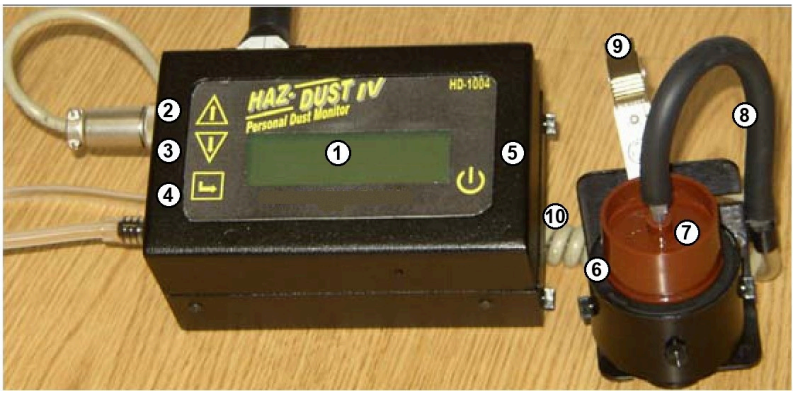


Figure 3. Monitor and sensor head.
1 Display, 4 lines of 20 characters · **2** `UP` · **3** `DOWN` · **4** `ENTER` · **5** `ON/OFF` · **6** Sensor head on its lapel bracket · **7** Filter cassette · **8** Air intake tubing to the internal pump · **9** Collar clip · **10** Sensor cable

A belt clip on the back of the case holds the monitor on the wearer's belt. The battery plate is held by two thumbscrews under the belt clip and carries the charging jack; the flow adjustment screw is on the bottom of the monitor, next to the charging jack.

Keys and menus

Key	What it does
ON/OFF	Switches the monitor on and off.
ENTER	Selects the menu entry marked by the selection arrow (▯). In a number field, moves to the next digit or field. Stops a running measurement.
UP	Moves the selection arrow up one line. In a number field, increases the selected digit. In the statistics, steps backwards.
DOWN	Moves the selection arrow down one line. In a number field, decreases the selected digit. In the statistics, steps forwards.

When you switch on, the title screen shows the instrument name and the firmware version. Press **ENTER** to reach the main menu. Every submenu ends with **Cancel**, which takes you back without changes; the complete structure is in Menu map (p. 34).

Entry	Leads to
Run	Starting a measurement: sample interval, storage type, security code, alarm (see Starting a measurement (p. 18)).
Review Data	Statistics on the display and download to a PC (see Reviewing stored data (p. 20)).
Special Functions	Date and time, alarm level, memory, particle fraction, scale factor, battery status.
Auto Zero	Setting the zero baseline (see Auto-zero (p. 16)).

CHAPTER 3

Commissioning

Switching on and off

The monitor runs on a rechargeable 6.0 V NiMH battery pack (up to 8 hours per charge). It can also be powered from an AC power source, but the battery must be fully charged before each use in either case.

Step	Action
1	Press **ON/OFF**. The title screen appears. To switch off, press **ON/OFF** again.
2	Wait at least 2 minutes before you measure, so that the monitor can stabilise.

Checking the battery

Step	Action
1	Select **Special Functions** › **System Options** › **Extended Options** › **Battery Status**. The Battery Level screen shows the battery voltage.
2	At 6.2 V or more the battery is charged. Below 6.2 V, recharge it.

Note
When the battery runs low during a measurement, the monitor ends the measurement and shows the low-battery screen.

Charging the battery

WARNING

Charging in a hazardous environment can ignite an explosive atmosphere. An ignition can cause fire, explosion or injury. Never charge in a hazardous environment. Use only the charger supplied with the monitor.

Step	Action
1	Switch the monitor off and plug the charger into a mains socket.
2	Plug the charger cable into the charging jack on the back of the battery plate. Charging starts; with the monitor switched off there is no indication that it is charging.
3	Leave the battery on charge for about 16 hours for a full charge. The battery can be charged in the monitor or on its own, removed from the monitor.

Note
If a charged battery no longer lasts 8 hours, extend the charging time to 24 hours. A battery pack typically lasts 18 to 24 months; then replace it.

CHAPTER 4

Operation

Operation runs from preparing a measurement to the downloaded data: set the date, time and alarm and fit the inlet; check the flow rate and run the auto-zero; take the measurement; review the stored data on the monitor; then transfer it to a PC with DustComm Pro.

Before the first measurement of a series, check the date and time, set the alarm if you want one, and select the particle fraction with its inlet. Then zero the monitor (see Auto-zero (p. 16)).

Date and time

Every stored reading carries the date and time of the internal clock, so set them correctly for reliable records. The clock is set at the factory to US Eastern time; change it to your time zone, and again when daylight saving time begins or ends. Times use the 24-hour clock; dates are shown day-month-year, for example MON 17-DEC-04.

To	Do this
To view	Select **Special Functions › Date/Time › View Date/Time**. Press **ENTER** to return.
To set	Select **Special Functions › Date/Time › Set Date/Time**. Change the selected digit with **UP** and **DOWN** and move to the next digit or field with **ENTER**. When everything is correct, press **ENTER** and select **Set Date/Time** to save, or **Cancel** to leave without saving.

Alarm level

The audible alarm warns the wearer when the concentration approaches a limit. Set the alarm level to the occupational exposure limit that applies to the dust you sample. The alarm sounds only if you start the measurement with the alarm (see Starting a measurement (p. 18)).

Step	Action
1	Select **Special Functions › Set Alarm**.
2	Enter the concentration digit by digit: **UP** and **DOWN** change the selected digit, **ENTER** moves to the next one.
3	Press **ENTER** after the last digit. The alarm level is saved and the main menu appears.

Selecting the fraction and fitting the inlet

Select the fraction in the menu first, then fit the matching inlet. The selection marks the fraction on the measuring screen.

Step	Action
1	Select **Special Functions › System Options › Extended Options › Size Select › Select**.
2	Select **Thoracic**, **Respirable** or **Inhalable**. The main menu appears.
3	Fit the inlet for that fraction, as described below.

Note

Filter sample. To collect a concurrent sample for gravimetric analysis, put a clean, pre-weighed 37 mm filter in the filter cassette before you fit it. Check the flow rate each time you use a new filter (see Checking the flow rate (p. 15)).

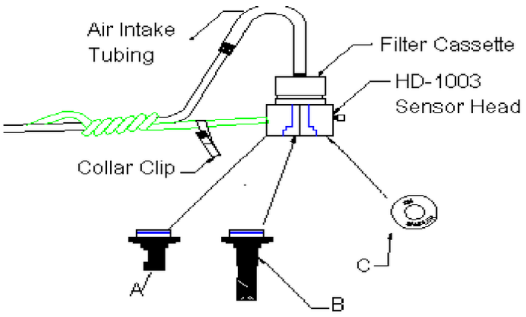


Figure 4. Sampling inlets on the sensor head: **A** thoracic, **B** respirable, **C** inhalable. The air intake tubing runs from the filter cassette; the collar clip holds the sensor head in the breathing zone.

Thoracic inlet

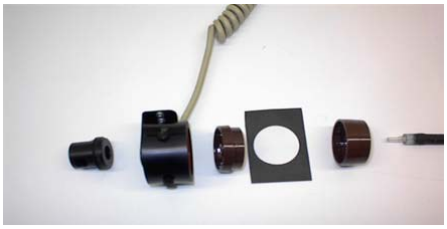


Figure 5. Parts for thoracic sampling, from left to right: thoracic sampling inlet, sensor head, filter cassette (inlet half), 37 mm filter, filter cassette (outlet half), air intake tubing.

Step	Action
1	Take the sensor head off its lapel bracket.
2	**Note** The inlet has plastic threads. Take care not to cross-thread it, and always screw it in and out — never pull it. Screw the thoracic sampling inlet into the bottom of the sensor head.
3	Attach the filter cassette to the top of the sensor head.
4	Connect the air intake tubing to the filter cassette.



Figure 6. Sensor head mounted on its lapel bracket.

Respirable inlet

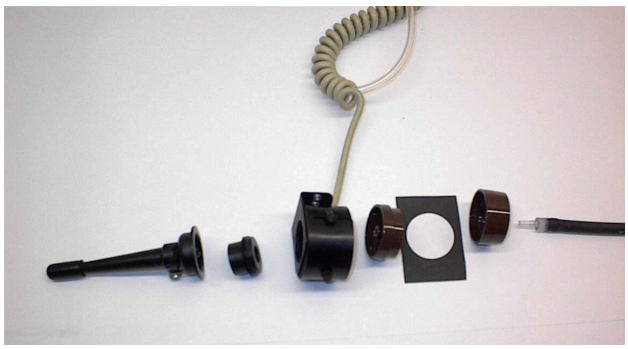


Figure 7. Parts for respirable sampling, from left to right: GS cyclone, cyclone adapter (GSA-202), sensor head, filter cassette (inlet half), filter, filter cassette (outlet half), air intake tubing.

Step	Action
1	Take the sensor head off its lapel bracket.
2	Screw the cyclone adapter (GSA-202, Cat. No. 770-313) into the bottom of the sensor head.
3	Push the GS cyclone into the adapter.
4	Attach the filter cassette to the sensor head and connect the air intake tubing to the cassette.

Note
The GS-3 cyclone needs a flow rate of 2.75 L/min. The GS-1 cyclone can also be used, at 2.0 L/min, for a respirable cut point of 4 µm. Set the flow before sampling (see Checking the flow rate (p. 15)).

Inhalable inlet

For inhalable dust the monitor uses the front half of an IOM sampler as its entry: the IOM front plate, the IOM cassette front and the cassette grid. The IOM sampling adapter (IA-202) adds a rubber washer, a filter ring and an end cover adapter.

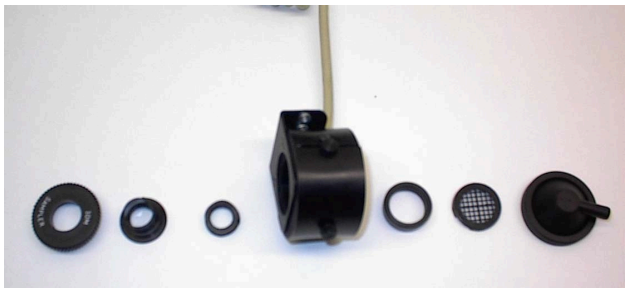


Figure 8. Parts for inhalable sampling, from left to right: IOM front plate, IOM cassette front, rubber washer, sensor head, filter ring, cassette grid, end cover adapter.

Step	Action
1	Take the sensor head off its lapel bracket.
2	Insert the rubber washer into the IOM cassette front. Place the cassette front in the inlet of the sensor head and screw the IOM front plate over it into the sensor head.
3	Fit the cassette grid onto the filter ring, then push the end cover over the grid and filter ring. This assembly takes the place of the filter cassette on top of the sensor head.

Step	Action
4	Connect the air intake tubing to the end cover.

> **Note**
> The IOM inlet needs a flow rate of 2.0 L/min. If you use the IOM Adaptor to mount an IOM sampling head, follow the instructions supplied with the adaptor.

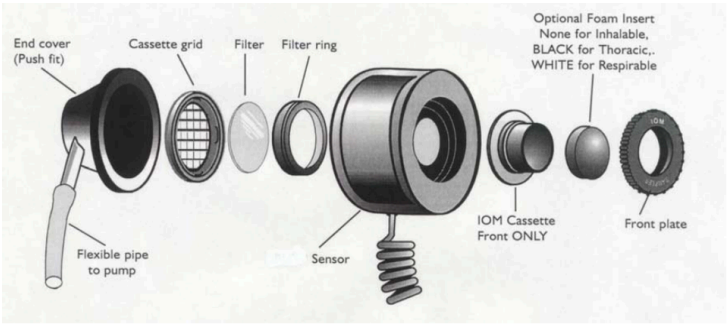


Figure 9. The IOM sampling adapter, taken apart: end cover adapter (push fit), cassette grid, filter ring, IOM cassette front, rubber washer and front plate, with the sensor.

Running the pump for a check

The flow and span checks run the internal pump through a short measurement in 1-second mode:

Step	Action
1	In the main menu, select **Run**.
2	**NOTICE** **Overwrite** erases all stored data. Download the data to a PC first (see Downloading data (p. 22)). Select **1 Second**, then **Overwrite**, and confirm with **Yes**.
3	Answer **No** to the security code.
4	Select **Sample/Rec**. The pump starts. Let it run for at least 2 minutes to stabilise.
5	Press **ENTER** to stop the pump when the check is finished.

Checking the flow rate

Each inlet separates its fraction correctly only at its design flow rate:

Inlet	Flow rate
Thoracic sampling inlet	2.0 L/min
Inhalable inlet (IOM)	2.0 L/min
Respirable inlet, GS-3 cyclone	2.75 L/min
Respirable inlet, GS-1 cyclone (4 µm cut point)	2.0 L/min

You need a flowmeter, for example a chek-mate flowmeter (see Checking and calibration (p. 32)), and the filter cassette with the filter you will sample with.

Step	Action
1	Connect the flowmeter: • **Thoracic or inhalable sampling:** fit the thoracic sampling inlet to the sensor head. Connect one end of a piece of tubing to the thoracic inlet and the other end to the flowmeter. • **Respirable sampling:** fit the respirable inlet to the sensor head. Put the GS cyclone into the cover of the calibration chamber (code CH-103) and screw the cover on tight. Connect the flowmeter to the 90° nylon fitting of the chamber, and the sensor head to the chamber's Tygon tubing. For details, see the instructions supplied with the calibration chamber.
2	Start the pump as in Running the pump for a check (p. 15) and let it run for at least 2 minutes.
3	Read the flowmeter. If it shows the flow rate in the table above, the flow is correct. If not, adjust it (see Adjusting the flow rate (p. 16)).
4	Stop the pump with **ENTER**, disconnect the flowmeter and its tubing, and fit the inlet you will sample with.



Figure 10. Checking the flow with the respirable inlet: sensor head connected to the calibration chamber CH-103, the GS cyclone inside the chamber.

Adjusting the flow rate

Step	Action
1	With the pump running and the flowmeter connected, find the flow adjustment screw on the bottom of the monitor, next to the charging jack.
2	Turn the screw clockwise to increase the flow, or anticlockwise to decrease it, until the flowmeter shows the required flow rate.
3	Record the flow rate.
4	Stop the pump with **ENTER**, disconnect the flowmeter and its tubing, and fit the inlet you will sample with.

Auto-zero

Auto-zero sets the measuring baseline to zero while particle-free air passes through the sensor. Run it before every new series of measurements, with a fully charged battery and with the inlet you will sample with.

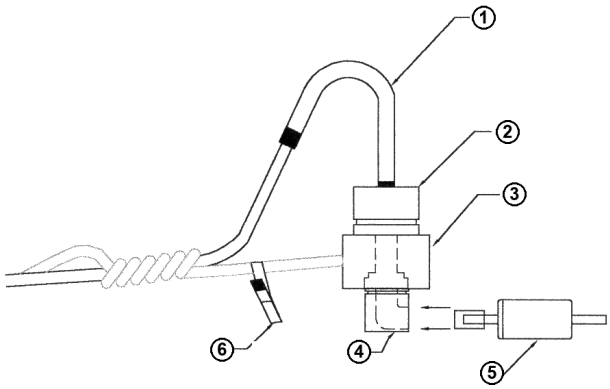
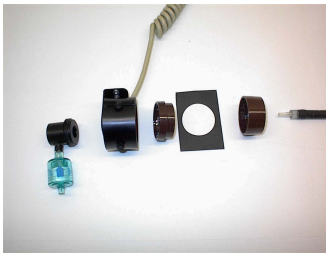


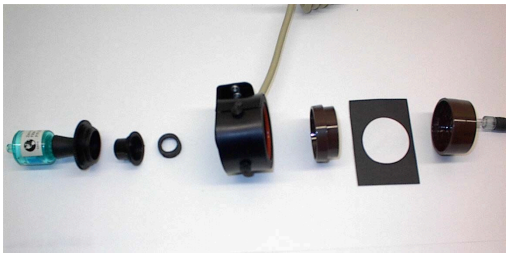
Figure 11. Sampling train with the zeroing filter (thoracic inlet shown).
1 Air intake tubing · **2** Filter cassette · **3** Sensor head · **4** Thoracic sampling inlet · **5** Zeroing filter · **6** Collar clip

Step	Action
1	Check that the inlet for the fraction you will sample is fitted, with the filter cassette and the air intake tubing (see Selecting the fraction and fitting the inlet (p. 12)).
2	Fit the zeroing filter: • **Thoracic:** push the zeroing filter (ZF-102) into the thoracic sampling inlet (Figure 12a). • **Inhalable:** push the inhalable zeroing filter (ZA-202A) into the front of the IOM front plate (Figure 12b). • **Respirable:** remove the cyclone and push the zeroing filter (ZF-102) into the bottom of the cyclone adapter GSA-202 (Figure 12c).
3	In the main menu, select **Auto Zero**, then **Auto-Zero**. The Auto-Zeroing screen appears.
4	Wait about 50 seconds while the monitor sets its baseline. The main menu appears when it has finished.
5	Remove the zeroing filter. The monitor is ready for sampling (p. 17).

a Thoracic



b Inhalable



c Respirable



Figure 12. Zeroing filter in place for **a** thoracic, **b** inhalable and **c** respirable sampling.

Sampling

Before you start

Check	See
The battery is fully charged.	Checking the battery (p. 11)
The date and time are correct.	Date and time (p. 12)
The alarm level is set, if you sample with the alarm.	Alarm level (p. 12)
The right fraction is selected and its inlet fitted.	Selecting the fraction and fitting the inlet (p. 12)
The flow rate is correct for the inlet.	Checking the flow rate (p. 15)

Check	See
The auto-zero is done.	Auto-zero (p. 16)

Starting a measurement

Step	Action
1	In the main menu, select **Run**.
2	Select the sample interval. The monitor takes a reading every second and stores the average over the interval; the interval sets how long the memory lasts. Always set it here, through **Run**: **Interval** — **Maximum sampling time** **1 Second** — 6 hours **2 Seconds** — 12 hours **10 Seconds** — 60 hours
3	**NOTICE** **Overwrite** erases the data of all previous runs. Download them to a PC first (see Downloading data (p. 22)). Select the storage type: • **Continuation** stores the run under the next free location code (see Location codes (p. 19)). • **Overwrite** erases all stored data in all locations and starts again at location 001. Confirm with **Yes**; **No** cancels without touching the memory.
4	Choose whether to protect the data with the security code: **No** skips it. **Yes** asks for the code **1209**: enter it digit by digit with **UP**, **DOWN** and **ENTER**. With the code set, nobody can view, print or download the data without it.
5	Clip the monitor to the worker's belt, and clip the sensor head to the collar, in the breathing zone.
6	Start the measurement: select **Sample/Rec** to sample without the alarm, or **Sample/Rec-ALM** to sample with it. The pump starts and the measuring screen appears.



Figure 13. Sensor head with the inhalable inlet, clipped to a worker's collar.

The measuring screen

```
Loc: 001     EXPOSURE
Date: TUE 12-JAN-97
Time: 07:23:38
Conc: T  2.75 mg/m3
```

Figure 14. Measuring screen (example).

Line	Shows
Loc	Location code of the run, where the data are stored
Date, **Time**	Clock of the monitor
Conc	Fraction sampled (**T** thoracic, **R** respirable, **I** inhalable) and current concentration

Write down which site or person each location code belongs to; the monitor stores only the code.

> **Note**
> A negative concentration can mean that the baseline is no longer at zero. Stop the measurement and run an auto-zero (p. 16).

Stopping a measurement

Press **ENTER**. The pump stops and the main menu appears. If you started with the security code, the monitor asks for the code **1209** before it stops. A measurement also ends when the battery runs low. Plan runs within the maximum sampling time of the interval you chose.

Location codes

Every run gets its own location code, shown on the measuring screen. The memory holds 21 500 data points, shared among up to 999 locations.

Storage type	Effect
Continuation	Uses the next code. If locations 001 and 002 hold data, the new run is stored as 003.
Overwrite	Erases all locations and stores the new run as 001.

Scale factor from a filter sample

The monitor reads dust like its calibration dust. For a different dust, a scale factor makes later readings match the gravimetric result. You need a pre-weighed filter from the cassette behind the sensor head, sampled during a run, and its gravimetric result as a time-weighted average (TWA).

scale factor = TWA from the filter ÷ TWA shown by the monitor

Take the monitor's TWA for the same run from **Review Data** (see Reviewing stored data (p. 20)). Example: the filter gives 5 mg/m³ and the monitor shows 2.5 mg/m³; the scale factor is 5 ÷ 2.5 = 2, entered as 02.00.

Step	Action
1	Select **Special Functions › System Options › Extended Options › Size Select › Apply Scale**.
2	Select the fraction you sampled and have the gravimetric result for: **Respirable**, **Thoracic** or **Inhalable**.
3	The screen shows the default scale 01.00. Enter the scale factor with **UP**, **DOWN** and **ENTER**. The monitor returns to the Apply Scale screen.

The factor applies to the following samples in the same type of atmosphere. **Size Select › Restore Default** returns to the factory scale. For a respirable scale factor, the gravimetric result must come from an IOM sampler with foam insert and filter. To correct data afterwards on the PC instead, see Applying a correction factor (p. 26).

Reviewing stored data

The monitor computes the statistics of each run itself, so you can read the results on site without a PC. For plots, reports and the individual readings, download the data to DustComm Pro (see Communication (p. 21)).

Statistics per location

Display	Meaning
Date	Date of the run
Start, Stop	Times the run started and ended
MAXIMUM Sample	Highest concentration, with the time it occurred
MINIMUM Sample	Lowest concentration, with the time it occurred
T.W.A.	Time-weighted average concentration, with the elapsed time it covers
S.T.E.L.	Short-term exposure level: the highest average concentration over a 15-minute period

Step	Action
1	Select **Review Data** › **Statistics**.
2	If the memory holds several locations, the Review Location screen appears. Select **Review Loc** to review the location shown, or **New Location** to choose another one.
3	For **New Location**: the Location Select screen shows the range of stored locations, for example 001 thru 002. Enter the location code digit by digit with **UP**, **DOWN** and **ENTER**, and press **ENTER** after the last digit.
4	The Scanning Memory screen appears. The first time a location is reviewed, scrolling dots show that the monitor is computing the statistics.
5	The first of five statistics screens appears. Press **DOWN** to page forwards and **UP** to page back.

Erasing the memory

NOTICE

Erasing deletes all data points in all locations. Download the data you still need first (see Downloading data (p. 22)).

Step	Action
1	Select **Special Functions** › **System Options** › **Erase Memory**.
2	Select **Yes** to erase the memory, or **No** to cancel without erasing.

CHAPTER 5

Communication

DustComm Pro transfers the stored data to a Windows PC, shows statistics and plots, exports a comma-delimited text file for spreadsheet programs such as Microsoft Excel and corrects the data for dust that differs from the calibration dust.

Installing the software

The installation takes less than 5 minutes. The PC needs Windows ME or later, 4 MB of free disk space and 8 MB of RAM.

Step	Action
1	Close all open programs, insert the installation medium supplied with the monitor and open it in the file explorer.
2	Open the folder **DustComm V1.2** and double-click **Setup**.
3	Follow the steps of the installation wizard.

Start the program from its desktop icon or from **DustComm Pro 1.2** in the Windows start menu. A sample data file (.dcm) is installed with it for trying out the functions.

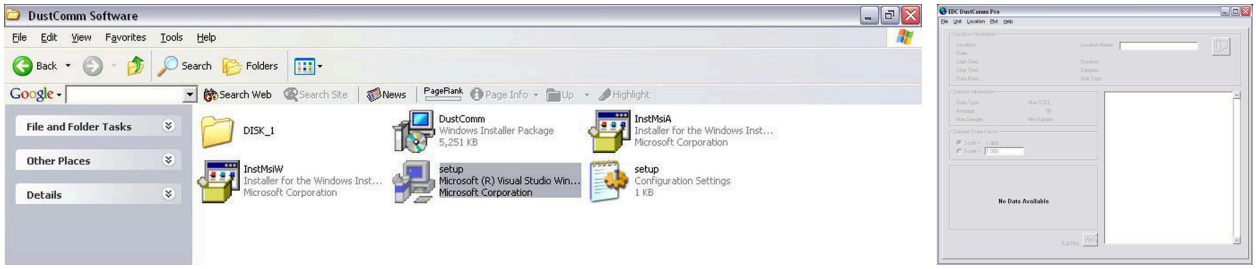


Figure 15. Left: the folder with **Setup** selected. Right: DustComm Pro just after it has started.

Menus

Menu commands shown in light type are not available for the current task.

Menu	Command	What it does
File	**Open**	Loads a project file you saved earlier.
	Save	Writes your changes into the open file, keeping its name.
	Save As	Stores a file that has no name yet, or a copy under another name or in another folder.
	Close	Shuts the current file.
	Export	Writes the data to a text file that a spreadsheet program can read.
	Exit	Quits DustComm Pro.
Unit	**Download**	Pulls the stored data in from the monitor.
	Properties	Sets which instrument to read and which COM port of the PC to use.
Location	**Notes**	Lets you type remarks about the open file.
	Print	Sends the location on screen to the printer.
Plot	**Review**	Brings back a plot you saved earlier.
Help	**Register**	Enters the software and the monitor in the registration.

Menu	Command	What it does
	About	Displays the version of DustComm Pro.

Opening and saving project files

DustComm Pro keeps each download as a project file, sorted by time, with all values in mg/m³. Files are saved in the Documents folder unless you choose another folder.

To	Select
Open a file	**File** › **Open**, then double-click the file.
Save a new file, or save under a new name or location	**File** › **Save As**, type a file name and select **OK**. The title bar shows the new name.
Save changes under the same name	**File** › **Save**. To close the program use **File** › **Exit**.

Downloading data

A download takes three steps: connect the cable, prepare the PC, then send the data from the monitor.

Connecting the cable

Step	Action
1	Connect the supplied RS-232 cable to the monitor.
2	Connect the other end to a COM port (9-pin serial port) of the PC, and make sure both connectors are tight; a loose connection can interrupt the transfer. If the PC has only USB ports, use a serial-to-USB adapter.

Preparing the PC

Step	Action
1	Start DustComm Pro.
2	Select **Unit** › **Properties**. Choose your instrument and the COM port the cable is connected to, then select **OK**.
3	Select **Unit** › **Download**. The download window appears, ready to receive.

Sending the data from the monitor

Step	Action
1	On the monitor, select **Review Data** › **Download** › **To Dust Data Collector** and press **ENTER**.
2	The Transmitting screen appears, and the progress bar on the PC grows as the data arrive.
3	When the transfer is complete, the monitor returns to the **To Dust Data Collector** screen; you can switch it off. On the PC the data appear in a new project, one tab per location code at the bottom of the window. Save the project.

Note
Data recorded with the security code switched on can only be viewed, printed or downloaded with the code 1209.

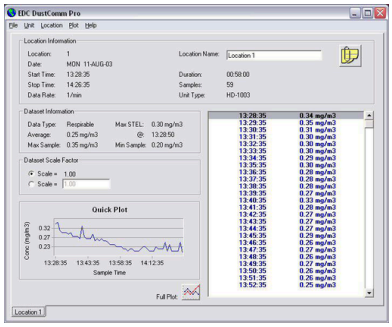


Figure 16. A project file after the data have been transmitted.

If the download fails

- Check that both cable connectors are screwed tight.
- Check in **Unit › Properties** that the COM port is the one the cable is connected to.
- If the PC has more than one 9-pin port, connect the cable to another port and try again; you may have to try every port.
- If you use a USB port, check that you use a suitable USB-to-serial adapter.
- As a last test, receive the data with a terminal program instead of DustComm Pro.

If the transfer still fails, contact Analyt-MTC (see Service, warranty and contacts (p. 33)).

The project window

The project window shows one location at a time, in five sections:

Section	Content
Location Information	Date and time, start and stop time, data rate, duration, number of samples and instrument. A box for naming the location, and a shortcut for adding notes.
Dataset Information	Type of data, average, maximum and minimum sample, and maximum short-term exposure level (STEL).
Dataset Scale Factor	The scale factor applied to the data (see Applying a correction factor (p. 26)).
Quick Plot	A small preview of the plot, with the **Full Plot** button below it.
Location Data	Every stored concentration in mg/m³, with its time.

Exporting to a spreadsheet

A project must be open.

Step	Action
1	Select **File › Export**.
2	In the **Export Locations** window, select **All**, or the range of locations to export, and select **OK**.
3	In the **Export To** window, type a file name and select **Save**.
4	In the spreadsheet program, choose **Open**, set the file type to **All files** and double-click the exported file.

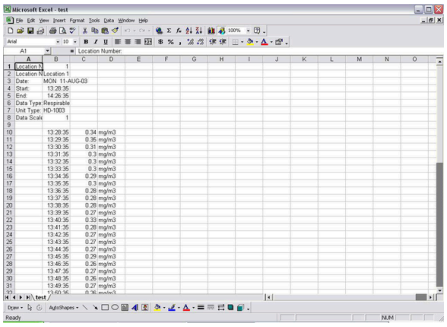


Figure 17. Exported data opened in a spreadsheet program.

Plotting the data

Select the **Full Plot** button below the Quick Plot to plot the location shown. To reopen a plot you have saved, select **Plot › Review**. The plot window has a button bar along the top:

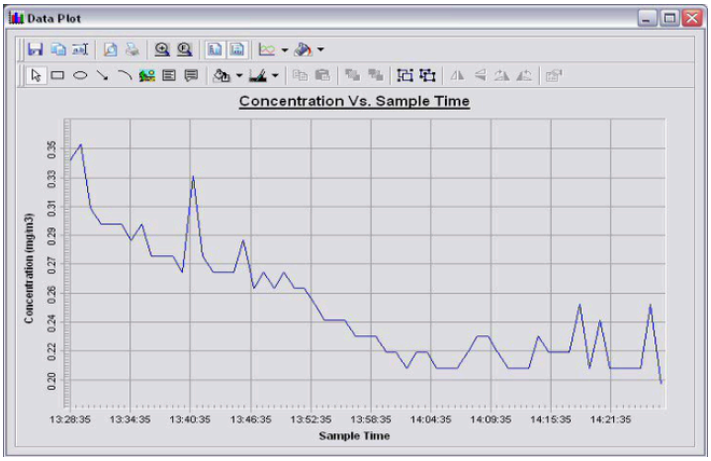


Figure 18. A full plot: concentration against sample time.

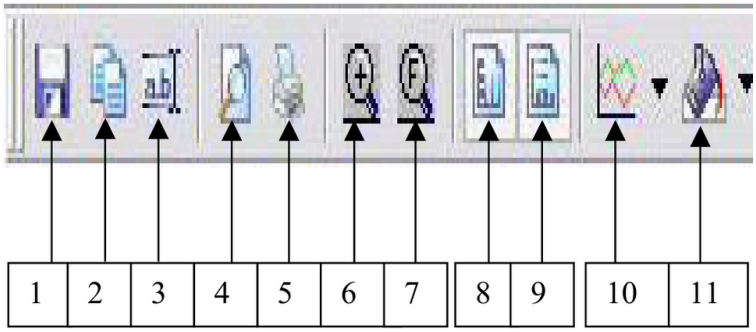


Figure 19. The button bar of the plot window, numbered as in the table.

No.	Button
1	Store the plot as a DustComm Pro chart file (*.dcc)
2	Copy the plot as a bitmap image
3	Give the plot a title or change it
4	Set up the printed page
5	Send the plot to the printer
6	Zoom in: drag a frame over the part you want to enlarge
7	Go back to the whole plot
8	Turn the vertical grid lines on or off

No.	Button
9	Turn the horizontal grid lines on or off
10	Change the chart style, for example bars or a line
11	Change the colour of the graph

A second toolbar annotates the plot:

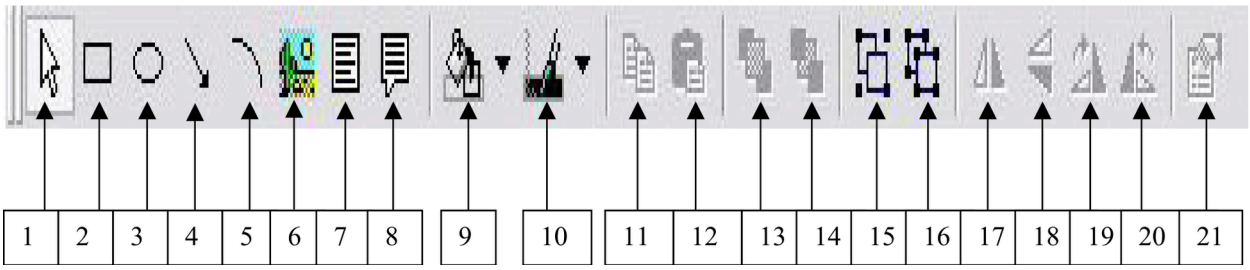


Figure 20. The annotation toolbar, numbered as in the table.

No.	Button
1	Pointer tool
2	Insert squares
3	Insert ovals
4	Insert arrows
5	Insert arched lines
6	Insert a picture: draw its box, right-click it, choose **Properties**, open the **Picture** tab and select the picture
7	Insert a text box
8	Insert a callout with text
9	Colour of squares, ovals, text boxes and callouts
10	Colour of the text in text boxes and callouts
11	Copy
12	Paste
13	Bring to front
14	Send to back
15	Group
16	Ungroup
17	Flip left to right
18	Flip upside down
19	Rotate clockwise
20	Rotate anticlockwise
21	Properties of the selected item

Editing the title

Step	Action
1	Plot the location.
2	Select the **Edit Title** button (3) on the button bar.
3	Type the title in the window that opens and select **OK**. The plot shows the new title.

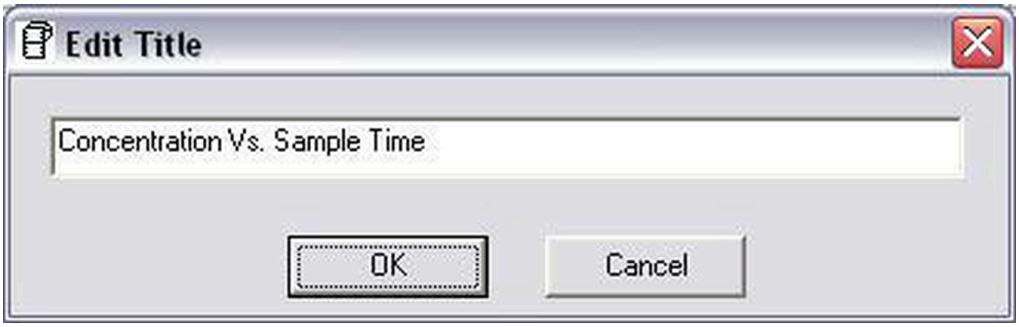


Figure 21. The **Edit Title** window.

Applying a correction factor

A correction factor adjusts the readings to a gravimetric reference measured at the same place and time: **correction factor = gravimetric concentration ÷ concentration read by the monitor**.

Step	Action
1	In the Dataset Scale Factor section, select the second **Scale =** box, type the correction factor and press **Enter**. All data points of the project are multiplied by the factor.
2	To remove the correction again, select the first **Scale =** box.

CHAPTER 6

Calibration and verification

Three user checks keep the readings trustworthy: the flow rate, which sets the cut point of the inlet and the volume through the filter; the zero baseline; and the span, checked against the calibration standard. The flow check and the auto-zero belong to the preparation of a measurement and are under Operation (see Checking the flow rate (p. 15) and Auto-zero (p. 16)); the span check follows here. The full calibration is done at the factory once a year.

Check	When
Checking the flow rate (p. 15)	Each time you use a new gravimetric filter, and whenever you change the inlet.
Auto-zero (p. 16)	Before each new series of measurements.
Span check (p. 27)	When you use the monitor for the first time; once a month in normal use; after the monitor has been dropped or damaged.
Factory calibration	Once a year — contact Analyt-MTC (see Service, warranty and contacts (p. 33)).

Span check

The span check compares the monitor with the calibration standard, a light-scattering insert that gives a constant reading, its "k" value, printed on it. It checks the factory calibration; it does not change it.

Check in a clean environment, with clean sensor optics (see Cleaning the sensor optics (p. 29)) and a fully charged battery. A calibration standard bought separately has no k value for your monitor yet: determine and assign one before the first check, following the instructions supplied with the standard.

NOTICE

- The span check starts the pump with **Overwrite** and erases all stored data. Download the data first.
- A step left out of the procedure can give a wrong reading. Follow every step of the procedure.

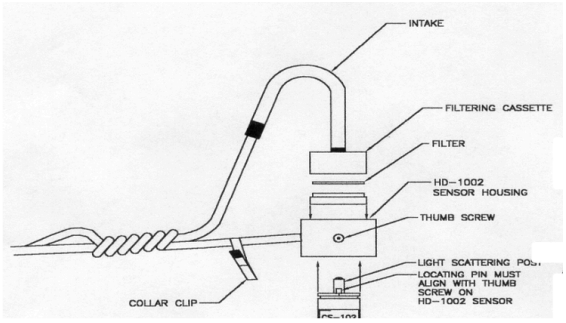


Figure 22. The monitor with the calibration reference: thoracic inlet with the zeroing filter for the auto-zero, and the calibration reference in the sensor housing for the span check, its locating pin in the slot.

Step	Action
1	Fit the thoracic sampling inlet to the sensor head, attach the filter cassette and connect the air intake tubing.
2	Select the respirable fraction: **Special Functions › System Options › Extended Options › Size Select › Select › Respirable**.
3	Run the pump for at least 2 minutes, then stop it (see Running the pump for a check (p. 15)).

Step	Action
4	Push the zeroing filter into the thoracic inlet and run an auto-zero (p. 16).
5	Unscrew the thoracic inlet from the sensor head and disconnect the air intake tubing.
6	Insert the calibration standard into the sensor head. The locating pin on the standard must slide into the locating hole on the sensor head.
7	Start the pump again in the same way, and leave it running.
8	Compare the concentration on the display with the k value printed on the calibration standard. • **Within ±10 %:** the monitor has passed. Stop the pump, remove the calibration standard and refit the inlet you sample with. • **More than ±10 % off:** repeat the check to rule out an error. If the values still disagree, contact Analyt-MTC: the monitor needs recalibration.

CHAPTER 7

Maintenance

Dust settling on the lenses of the optical sensor falsifies the readings. Keeping the optics clean is the main maintenance task you do yourself; charging the battery is described in Charging the battery (p. 11), and replacing it follows in Replacing the battery pack (p. 30).

Cleaning the sensor optics

How often the optics need checking depends on the dust load:

Typical concentration (TWA)	Check the optics
2–3 mg/m³	Every 48 hours of use
Lower	Weekly or monthly, depending on the load

You need low-pressure air (a blower bulb or compressed air), a soft lint-free cloth, cotton swabs and a little isopropyl alcohol. The cleaning kit, Cat. No. 770-305B, contains a bulb, swabs and lens tissue.



Figure 23. Removing the sensor cover.

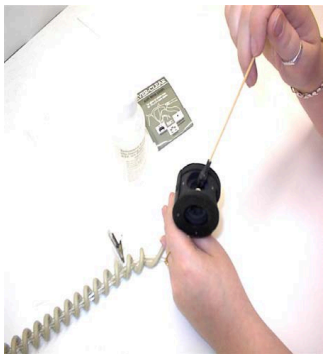


Figure 24. Cleaning the lens covers with a cotton swab.



Figure 25. The cleaning kit: isopropyl alcohol, cotton swabs, lens tissue and low-pressure air.

Step	Action
1	Undo the three thumbscrews of the sensor cover and remove the cover (Figure 23).
2	Unscrew the sampling inlet from the bottom of the sensor head.
3	Check the inside of the sensor cover for dust. Blow it away with low-pressure air, or wipe it off with a soft lint-free cloth.

Step	Action
4	**Note** Do not let any alcohol run into the inside of the monitor. Use only a slightly moistened swab. Check the glass lens covers for dust. Blow it away with low-pressure air, or wipe the glass with a cotton swab moistened with a little isopropyl alcohol (Figure 24).
5	Refit the sampling inlet and the sensor cover, and tighten the three thumbscrews snugly.

Note
Clean optics are a condition for the span check (p. 27): clean them before you check the span. The yearly factory calibration is arranged by Analyt-MTC (see Annual calibration (p. 33)).



Figure 26. Left: blowing dust off with low-pressure air. Right: applying isopropyl alcohol to a cotton swab.

Replacing the battery pack

Step	Action
1	Switch the monitor off. The battery pack cannot be taken off its plate, so replace the whole battery plate.
2	Remove the two thumbscrews under the belt clip on the back plate and slide the battery plate out of the monitor.
3	Unplug the nylon connector of the battery from its mating plug.
4	Plug the nylon connector of the new battery plate into the mating plug.
5	Slide the battery plate, the right way round, into the battery compartment.
6	Insert the two thumbscrews and tighten them to secure the battery plate.

CHAPTER 8

Specifications

Measurement

Measuring range	0.01–200 mg/m³
Accuracy	±10 % against NIOSH Method 0600 (respirable dust)
Precision	±0.02 mg/m³
Calibration	Factory calibration against NIOSH Method 0600 with SAE fine test dust (Arizona Road Dust); scale factor adjustable per fraction
Particle size range	0.1–10 µm respirable · 0.1–50 µm thoracic · 0.1–100 µm inhalable (IOM)
Fractions	Thoracic, respirable, inhalable, with interchangeable inlets
Displayed values	Current concentration, TWA, STEL, minimum, maximum
Checks in the field	Auto-zero with zeroing filter; span check with calibration standard

Sampling

Pump	Internal; flow adjustable with the flow adjustment screw
Flow rate	2.0 L/min with the thoracic or inhalable (IOM) inlet or the GS-1 cyclone; 2.75 L/min with the GS-3 cyclone
Filter sample	37 mm filter cassette in line, directly behind the sensor

Display and data

Display	Liquid crystal display (LCD), 4 lines of 20 characters
Alarm	Audible, level set by the user
Sample intervals	1 s, 2 s or 10 s (maximum sampling time 6, 12 or 60 h)
Memory	21 500 data points in up to 999 locations
Data protection	Security code
Data output	RS-232; DustComm Pro software for Windows

Power, environment and dimensions

Battery	Rechargeable NiMH battery pack, 6.0 V, mounted on a removable battery plate
Operating time	Up to 8 h
Charging time	Approx. 16 h with the monitor switched off
Operating temperature	32–120 °F (0–50 °C)
Humidity	Up to 95 % RH, non-condensing
Dimensions	9 × 3.5 × 2.5 in (22.9 × 8.9 × 6.4 cm)
Weight	3 lb (1.4 kg)

CHAPTER 9

Ordering information

Order from Analyt-MTC with the order codes.

The manufacturer's codes help you identify a part; for a part without an order code, ask Analyt-MTC.

Inlets and filters

Description	Order code	Mfr code
Respirable dust cyclone inlet	Ask Analyt-MTC	RS-103
GS-3 cyclone	225-103	—
Cyclone adapter, required to fit the GS-3 cyclone to the sensor head	770-313	GSA-202
IOM sampling adapter: washer, filter ring, end cover	Ask Analyt-MTC	IA-202
IOM sensor inlet	Ask Analyt-MTC	IS-104
IOM sampling head with 25 mm cassette	225-70A	—
Filter cassette blanks, 37 mm, opaque	Ask Analyt-MTC	CAS-103
Polyvinyl chloride (PVC) filter, 37 mm, 5.0 µm	225-806	—
Thoracic sampling inlet	Ask Analyt-MTC	TS-103
Zeroing filter	Ask Analyt-MTC	ZF-102
Inhalable zeroing filter	Ask Analyt-MTC	ZA-202A

Checking and calibration

Description	Order code	Mfr code
Calibration chamber, for checking the flow with the respirable inlet	Ask Analyt-MTC	CH-103
Medium flow chek-mate flowmeter, 0.5–5 L/min	375-0550	—
Flowmeter	Ask Analyt-MTC	FM-103
Calidaptor, for checking the flow through the IOM sampling head	391-01	—
Cleaning kit: bulb, swabs and lens tissue	770-305B	KK-101
Calibration reference (calibration standard), for the span check	Ask Analyt-MTC	CS-103

Monitor, power and data

Description	Order code	Mfr code
HAZ-DUST IV monitor kit, contents as in Checking the contents (p. 9)	770-4004K	HD-1004
Carrying case	Ask Analyt-MTC	DCC-104
Tripod stand	Ask Analyt-MTC	TP-104
RS-232 computer interface cable	Ask Analyt-MTC	CC-102
Battery charger, 110 V	Ask Analyt-MTC	BC-104-110
Battery charger, 220 V	Ask Analyt-MTC	BC-104-220
Battery pack	Ask Analyt-MTC	BP-104
Media CD-ROM: DustComm Pro software and the manual	Ask Analyt-MTC	CD-104

CHAPTER 10

Service, warranty and contacts

Analyt-MTC is your contact for everything concerning the HAZ-DUST IV: technical questions, the annual factory calibration, spare parts and accessories, repairs and warranty claims. Any work inside the enclosure beyond the tasks in this manual is service work for trained personnel (see Service work (p. 6)).

Contact

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Germany

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info@analyt-mtc.de

French Subsidiary

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France

+33 3 89 41 47 78

info@analyt-mtc.fr

www.analyt-mtc.com

Before you contact Analyt-MTC

Have the following at hand so Analyt-MTC can help you quickly:

- the model and serial number of the monitor;
- the firmware version shown on the title screen when you switch the monitor on;
- the result of the last span check;
- what happened, with the location codes concerned — or the downloaded project file.

Annual calibration

Have the monitor recalibrated at the factory once a year, and whenever it fails the span check (p. 27). Ask Analyt-MTC to arrange it, and plan the time without the monitor accordingly.

Returning a monitor

Before you send the monitor for calibration, repair or under warranty, ask Analyt-MTC how to return it and what to include. Download any data you still need to a PC first.

Warranty

The warranty terms of Analyt-MTC apply. Make warranty claims to Analyt-MTC.

Disposal

Do not dispose of the monitor with household waste. Dispose of it as electrical and electronic equipment under local regulations (WEEE). Remove batteries first where fitted and dispose of them separately.

APPENDIX A

Menu map

All menus of the monitor, starting from the main menu (press **ENTER** on the title screen). Each submenu also has a **Cancel** entry, not listed here. The right-hand column shows where each function is described.

Menu	Entry	Next screens	See
RUN			
Run	**1 Second** / **2 Seconds** / **10 Seconds**	Sample interval	Starting a measurement (p. 18)
Memory storage	**Overwrite** / **Continuation**	Overwrite: confirm **Yes** / **No**	
Security	**Yes** / **No**	Yes: enter code 1209	
Sample Record	**Sample/Rec** / **Sample/Rec-ALM**	Measuring screen	
REVIEW DATA			
Review Data	**Statistics**	**Review Loc** / **New Location** › Location Select; then five statistics screens	Statistics per location (p. 20)
	Download	**To Dust Data Collector** › Transmitting	Downloading data (p. 22)
SPECIAL FUNCTIONS			
Special Functions	**Date/Time**	**View Date/Time**; **Set Date/Time** › confirm **Set Date/Time** or **Cancel**	Date and time (p. 12)
	Set Alarm	Alarm concentration	Alarm level (p. 12)
	System Options	Menu below	
System Options	**Sample Rate**	Sample interval, as in **Run**; this manual sets it through **Run**	Starting a measurement (p. 18)
	Erase Memory	**Yes** / **No**	Erasing the memory (p. 20)
	Extended Options	Menu below	
Extended Options	**Battery Status**	Battery Level, in volts	Checking the battery (p. 11)
	Size Select › **Select**	**Respirable** / **Thoracic** / **Inhalable**	Selecting the fraction and fitting the inlet (p. 12)
	Size Select › **Apply Scale**	**Respirable** / **Thoracic** / **Inhalable** › Scale 01.00	Scale factor from a filter sample (p. 19)
	Size Select › **Restore Default**	Default scale	
AUTO ZERO			
Auto Zero	**Auto-Zero**	Auto-Zeroing (about 50 s), then main menu	Auto-zero (p. 16)

APPENDIX B

Particle size conventions

The tables give, for each fraction, the percentage of airborne particles of a given aerodynamic diameter that the fraction includes. The diameter at which half the particles are included is the cut point: 100 µm for inhalable, 10 µm for thoracic and 4 µm for respirable dust.

Inhalable

Diameter, µm	Included, %
0	100
1	97
2	94
5	87
10	77
20	65
30	58
40	54.5
50	52.5
100	50

Thoracic

Diameter, µm	Included, %
0	100
2	94
4	89
6	80.5
8	67
10	50*
12	35
14	23
16	15
18	9.5
20	6
25	2

Respirable

Diameter, µm	Included, %
0	100
1	97
2	91
3	74
4	50
5	30
6	17
7	9
8	5
10	1

* Same cut point as EPA PM-10.

US reference values (NIOSH and OSHA)

The source lists the US agency methods and limit values below for dusts the monitor is used on. They are US values, printed for reference only: set the alarms to the limit values that apply where you measure (see Alarm level (p. 12)). An asterisk means: refer to the agency method.

Dust or hazard	Agency	Reference	TWA	STEL
alpha-Alumina (Respirable fraction)	OSHA	CIM	5 mg/m³	
alpha-Alumina (Total dust)	OSHA	CIM	15 mg/m³	
Aluminum, Pyro powders	OSHA	CIM	*	
Aluminum (Respirable fraction)			5 mg/m³	
Ammonium nitrate	OSHA	CIM	*	
Ammonium sulfamate (Respirable dust)	OSHA	CIM	5 mg/m³	
Ammonium sulfamate (Total dust)	OSHA	CIM	15 mg/m³	
Ammonium sulfamate (Total dust)	OSHA	ID 188	15 mg/m³	
Bismuth telluride, Se-Doped	OSHA	ID 121	5 mg/m³	
Bismuth telluride, Undoped (Respirable dust)	OSHA	ID 121	5 mg/m³	
Bismuth telluride, Undoped (Total dust)	OSHA	CIM	15 mg/m³	
Boron oxide (Total dust)	OSHA	ID 125G	15 mg/m³	
Boron oxide (Total dust) (Particulates, Total)	NIOSH	0500	10 mg/m³	
Carbon black	NIOSH	5000	3.5 mg/m³	

Dust or hazard	Agency	Reference	TWA	STEL
Carbon black	OSHA	ID 196	3.5 mg/m³	
Chromium, Metal & Insol cpds	OSHA	ID 121	1 mg/m³	
Chromium, Metal & Insol cpds	OSHA	ID 125	1 mg/m³	
Chrysene	OSHA	58	0.2 mg/m³	
Coal dust (<than 5 % SiO2)	OSHA	CIM	2.4 mg/m³	
Coal dust (>than 5 % SiO2)	OSHA	ID 142	10 mg/m³	
Coal tar pitch volatiles	OSHA	58	0.2 mg/m³	
Copper dust	NIOSH	7029	1 mg/m³	
Copper, Dusts & Mists	OSHA	ID 125G	1 mg/m³	
Copper, Dusts & Mists	OSHA	ID 121	1 mg/m³	
Copper (Elements)	NIOSH	7300	1 mg/m³	
Copper fume	NIOSH	7029	0.1 mg/m³	
Copper fume	OSHA	ID 121	0.1 mg/m³	
Copper fume	OSHA	ID 125G	0.1 mg/m³	
Cotton dust (Raw)	OSHA	CIM	1 mg/m³	
Crag herbicide (Respirable dust)	OSHA	CIM	5 mg/m³	
Crag herbicide (Total dust)	NIOSH	5(S356)	10 mg/m³	
Crag herbicide (Total dust)	OSHA	CIM	15 mg/m³	
Cresol, All isomers	NIOSH	2546	10 mg/m³	
Cresol, All isomers	OSHA	32	15 mg/m³	
Cyanide (as Cn)	OSHA	ID 120	5 mg/m³	
Fluorides (Aerosol & Gas)	NIOSH	7902	2.5 mg/m³	5.0 (HF)
Glass, Fibrous dust	OSHA	CIM	*	
Glycerin mist (Particulates)	NIOSH	0600	*	
Glycerin mist (Respirable)	OSHA	CIM	5 mg/m³	
Glycerin mist (Total dust)	OSHA	CIM	15 mg/m³	
Grain dust (Oats, Wheat & Barely)	OSHA	CIM	10 mg/m³	
Graphite, Synthetic (Respirable dust)	OSHA	CIM	5 mg/m³	
Graphite, Synthetic (Total dust)	OSHA	CIM	15 mg/m³	
Iodine (Particulates)	OSHA	ID 212	*	0.1
Kaolin (Respirable dust)	OSHA	CIM	5 mg/m³	
Kaolin (Total dust)	OSHA	CIM	15 mg/m³	
Lead	NIOSH	7082	<0.1 mg/m³	
Lead	NIOSH	7105	<0.1 mg/m³	
Lead	NIOSH	7700	<0.1 mg/m³	
Lead (Elements)	NIOSH	7300	<0.1 mg/m³	
Lead, Inorganic fumes & dusts (as Pb)	OSHA	ID 121	0.05 mg/m³	
Lithium (Elements)	NIOSH	7300	*	
Lithium hydride	OSHA	CIM	25 µg/m³	
Magnesium oxide fume (Total dust)	OSHA	ID 121	15 mg/m³	
Manganese (Elements)	NIOSH	7300	1 mg/m³	3 mg/m³
Manganese fume (as Mn)	OSHA	ID 121	*	5 mg/m³
Methoxychlor (Total Dust)	OSHA	CIM	15 mg/m³	

Dust or hazard	Agency	Reference	TWA	STEL
Oil mist (Mineral)	OSHA	ID 128	5 mg/m³	
Oil mist (Mineral)	OSHA	ID 178SG	5 mg/m³	
Oil mist (Vegetable) (see Dust, Total and Respirable nuisance)				
Pentaerythritol (Total dust)	OSHA	CIM	15 mg/m³	
Pentaerytritol (Respirable dust)	OSHA	CIM	5 mg/m³	
Picloram (Tordon), Respirable dust	OSHA	CIM	5 mg/m³	
Picloram (Tordon), Total dust	OSHA	CIM	15 mg/m³	
Plaster of Paris (see Dust, Respirable nuisance)	OSHA	CIM		
Portland cement (Respirable dust)	OSHA	ID 142	5 mg/m³	
Portland cement (Total dust)	OSHA	ID 142	15 mg/m³	
Respirable nuisance	OSHA	CIM	5.0 mg/m³	
Respirable nuisance (Particulates)	NIOSH	0600	*	
Total nuisance	OSHA	CIM	15 mg/m³	
Total nuisance (Particulates)	NIOSH	0500	10 mg/m³	
Rouge (Respirable dust)	OSHA	CIM	5 mg/m³	
Rouge (Total dust)	OSHA	CIM	15 mg/m³	
Silica, Amorphous	OSHA	CIM	20 mppcf	
Silica, Crystalline tripoli, Respirable dust	OSHA	ID 142	0.05 mg/m³	
Silicon carbide (Respirable dust)	OSHA	CIM	5 mg/m³	
Silicon carbide (Total dust)	OSHA	CIM	15 mg/m³	
Silicon (Respirable dust)	OSHA	CIM	5 mg/m³	
Silicon (Total dust)	OSHA	CIM	15 mg/m³	
Soapstone (Respirable dust)	OSHA	CIM	20 mppcf	
Soapstone (Total dust)	OSHA	CIM	6 mg/m³	
Wood dust (except Western red cedar)	OSHA	CIM	*	
Wood dust (Western red cedar)	OSHA	CIM	2.5 mg/m³	
Zinc bromide (see Dust, Total and Nuisance)			*	
Zinc oxide dust (see Dust, Total & Respirable)	OSHA	CIM		
Zinc oxide fume	OSHA	ID 121	5 mg/m³	
Zinc oxide fume	OSHA	ID 125	5 mg/m³	
Zinc oxide fume	OSHA	ID 143	5 mg/m³	
Zinc stearate (Respirable dust)	OSHA	CIM	5 mg/m³	
Zinc stearate (Total dust)	OSHA	ID 121	15 mg/m³	
Zinc stearate (Total dust)	OSHA	ID 125	15 mg/m³	
Zirconium cpds (as Zr)	OSHA	ID 121	5 mg/m³	

Terms

µm	Micrometre, one millionth of a metre
ARD	Arizona Road Dust, the test dust used for the factory calibration
L/min	Litres per minute
mg/m³	Milligrams per cubic metre

NIOSH	US National Institute for Occupational Safety and Health; its analytical methods are cited by number (0500, 0600)
STEL	Short-term exposure level: the highest concentration averaged over a 15-minute period
TWA	Time-weighted average: the average concentration over a period of time

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