ANALYT MESSTECHNIK




OPERATING MANUAL

# SKC HAZ-DUST 7204 Particulate Monitor

Set-up, zero and span checks, sampling and data download with the HAZ-DUST 7204 personal dust monitor, which combines real-time measurement with a gravimetric filter sample, with the DustComm Pro software, maintenance and ordering information.

AMTC-MN-0025

Rev. 2 · October 2026

# About this manual

The SKC HAZ-DUST® 7204 is a personal dust monitor that does two jobs at once. A sensor head worn in the breathing zone measures the dust concentration by light scattering and shows it on a colour touch screen every second, while the monitor's internal, flow-compensated pump draws the same air through a filter cassette for gravimetric analysis in the laboratory. Interchangeable inlets select the inhalable, thoracic or respirable fraction.

This manual takes you from unpacking to a downloaded data set: power and battery, the monitor's settings, setting up the inlet, filter and flow, the zero and span checks, sampling, and transferring the data to a PC with the DustComm Pro software. Later chapters cover maintenance, troubleshooting, technical data, the order numbers of accessories and spare parts, and the particle size conventions.

Read Safety (p. 6) before you use the monitor for the first time. For a first sample, follow Commissioning (p. 10), Preparing the sampling train (p. 17), Zero check (p. 22), Span check (p. 34) and Sampling (p. 23) in that order.

The manual applies to the HAZ-DUST 7204 monitor, model HD-7204, supplied as the kit. Analyt-MTC supplies, services and supports the monitor; for questions, calibration, repairs and spare parts see Service, warranty and contacts (p. 42).

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: **Start**.
- A menu path such as **Settings › Data Recording** means that you open each entry in turn.

## Abbreviations

| Abbreviation | Meaning |
|---|---|
| **CIM** | Chemical Information Manual of OSHA, cited as the reference method in Appendix A |
| **COM** | Serial communication port |
| **CSV** | Comma-separated values (text file format) |
| **EPA** | US Environmental Protection Agency |
| **GPS** | Global positioning system |
| **IOM** | Institute of Occupational Medicine; here the IOM inhalable sampler |
| **mppcf** | Million particles per cubic foot of air |
| **PC** | Personal computer |
| **RH** | Relative humidity |
| **SAE** | Society of Automotive Engineers (SAE fine test dust) |
| **USB** | Universal Serial Bus |

## How this manual marks information

**⚠ WARNING**

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

**⚠ CAUTION**

A hazardous situation which, if not avoided, could result in minor or moderate 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.

Two keys appear on almost every screen: the green **checkmark** saves the entry and goes back one screen, and the **back arrow** goes back without saving.

## Document information

| | |
|---|---|
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| Rev. | Date | Change |
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| 2 | October 2026 | Quality programme: new document type, number and identity pages. |
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CHAPTER 1

# Safety

Read this chapter before you use the monitor for the first time. The HAZ-DUST 7204 runs on a lithium-ion battery and is worn by the person being sampled. The rules in this chapter protect that person, the monitor itself and the quality of your data.

## Intended use

Use the monitor only to measure and sample airborne particulate, as described in this manual, and only with the accessories listed in Ordering information (p. 41). The manufacturer cannot foresee every way the instrument might be used; the user is responsible for its use.

## Hazardous locations

**⚠ WARNING**

Operating or charging the monitor in a hazardous location, or changing its battery pack there, can ignite an explosive atmosphere. An ignition can cause fire, explosion or injury. Do not operate the monitor in a hazardous location, and never charge it there. Remove and replace the battery pack only in an area known to be non-hazardous.

## Battery pack

The monitor runs on a rechargeable lithium-ion (Li-Ion) battery pack. Use only the battery pack and the charger supplied with the monitor, or the replacements listed in Power and data (p. 41).

**⚠ WARNING**

A damaged, short-circuited or overheated lithium-ion battery pack is a fire hazard. It can catch fire or explode and cause burns. Do not open, disassemble, short-circuit or crush the battery pack. Do not heat it above 212 °F (100 °C) or put it in a fire. Tampering with the pack in any of these ways can also affect warranty claims (see Warranty (p. 43)). Keep battery packs out of the reach of children, and in their original packaging until you use them. Dispose of used battery packs promptly, following local recycling or waste regulations.

**NOTICE**

An unapproved battery pack can damage the monitor and can affect warranty claims (see Warranty (p. 43)). Use only the battery pack and the charger supplied with the monitor, or the replacements listed in Power and data. Removing the battery pack from a monitor that is switched on loses the time, date and other settings. Switch the monitor off before you remove the battery pack.

## Service work

You may replace the external parts — the inlet filter, the battery pack and the belt clip — fit and change the sampling inlets, check the flow, zero and span, and clean the sensor optics as described in Maintenance (p. 36). Everything inside the monitor's enclosure is service work for trained personnel; contact Analyt-MTC (see Service, warranty and contacts (p. 42)).

**⚠ WARNING**

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

**Note**

Opening the monitor, or not following the safety messages in this manual, can affect warranty claims. The terms of Analyt-MTC apply (see Warranty (p. 43)). Do not open the monitor, and follow every safety message in this manual.

## Stored data

Three functions erase stored data sets: **Data Deletion** erases all data sets, **Clear Run** also erases the run titles, aerosol profiles and calibration spans, and the recording mode **Overwrite Logs** replaces the last data set with each new one. The monitor asks you to confirm a deletion, but the data cannot be recovered afterwards.

**NOTICE**

Data Deletion, Clear Run and the recording mode Overwrite Logs erase stored data sets. Erased data cannot be recovered. Transfer the data you need to a PC first (see Downloading data (p. 28)). Do this before you delete or clear data sets, or switch to Overwrite Logs.

CHAPTER 2

# Product description

## How the monitor works

Dust exposure is traditionally measured by drawing air with a pump through a 25 mm or 37 mm membrane filter, which is then weighed or analysed in a laboratory. The result is accurate and the dust remains available for chemical analysis, but it arrives days after the sample.

The HAZ-DUST 7204 adds a real-time measurement to the filter sample. Air is drawn through the sensor head, where an infrared light source and a detector register the light scattered by the particles. The monitor detects the particles once every second, calculates the mass concentration and shows it on the touch screen, together with the time-weighted average (TWA), the short-term exposure level (STEL) and the minimum and maximum. Every value is stored for later analysis.

The filter cassette sits directly on the sensor head, so the same air passes through both (Figure 1). The monitor's flow-compensated pump draws it; the monitor clips to the worker's belt or pocket, and the sensor head attaches in the breathing zone. Because the filter result is a gravimetric reference for the real-time readings, it can be used to correct them for dust that differs from the calibration dust (see Calibration factor (p. 35)).




**Figure 1.** The monitor with the sensor head (left). The filter cassette sits on top of the sensor, the inlet below it; the signal cable and the sample tubing connect the sensor head to the monitor.



**Figure 2.** Traditional gravimetric measurement (filter cassette) and real-time measurement (sensor head) in one sampling train: the filter cassette sits on the sensor head.

## Checking the contents

The kit is delivered in a hard carrying case. Check the delivery against the list below. If anything is missing, contact Analyt-MTC (see Service, warranty and contacts (p. 42)).

- HAZ-DUST 7204 monitor, with the sensor head; the IOM inhalable inlet is fitted to the sensor at the factory
- Thoracic sampling inlet, detachable

- Opaque filter cassette holder
- Open-faced sampling adapter
- Zeroing filter
- Battery charger with US, UK, Asian and European plug adapters
- USB drive with the DustComm Pro software and the manufacturer's instruction manual
- Calibration certificate
- Hard carrying case

The respirable cyclone, the span check reference and the flow verification equipment are not part of the delivery (see Ordering information (p. 41)).

## The main screen

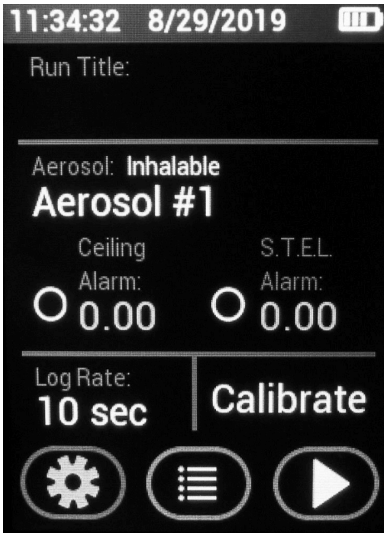



**Figure 3.** The main screen. The date and run title on the screen photos are demonstration values.

The main screen appears when the monitor has started. From top to bottom it shows:

- **Status bar:** time, date and battery status.
- **Run Title:** the name of the next data set (see Naming the data set (p. 12)).
- **Aerosol:** the active aerosol profile and its size fraction (see Aerosol profiles (p. 12)).
- **Ceiling** and **S.T.E.L. Alarm:** the alarm levels of the profile.
- **Log Rate:** the storage interval; touch it to change it.
- **Calibrate:** the zero check, the span check and the pump flow adjustment.

The three icons at the bottom are:

- **Settings** (gear): language, data recording, data deletion, system formats, date, time, live feed, GPS, cellular, Clear Run and the About screen. GPS and cellular apply only to monitors with the optional wireless functions.
- **History** (list): the stored data sets (see Reviewing stored data (p. 25)).
- **Start** (play): starts the pump and the sample, and opens the real-time graph.

CHAPTER 3

# Commissioning

A new, fully charged battery runs the monitor for about 22 hours. Charge it completely before each use: a run that starts on a part-charged battery may end before the shift does.

## Switching on and off

- **On:** press the **ON/OFF** key. The start-up screen appears, then the main screen.
- **Off:** stop the sample first, then press the **ON/OFF** key. While a sample is running, the monitor cannot be switched off — this protects the run from being ended by accident.
- **Automatic switch-off:** a monitor that is not sampling switches itself off after 5 minutes without use, to save the battery.

> **Note**
> Before a sample, let the switched-on monitor run for at least 2 minutes so that it can stabilise, then run a zero check (see Zero check (p. 22)).

## Battery status

The battery symbol at the top right of the screen has four bars that disappear as the battery discharges.

| Bars | Charge remaining |
|---|---|
| 4 | 75–100 % |
| 3 | approx. 50–75 % |
| 2 | approx. 25–50 % |
| none | Low battery: the monitor registers a fault and the status lights flash red. It switches off when the battery is exhausted; the data recorded until then is kept, and the fault is counted as an event in the history. |

A monitor with a low battery does not start a sample.

## Charging the battery

Charge only with the charger supplied with the monitor. It comes with plug adapters for US, UK, Asian and European outlets. A full charge takes about 3 hours. Charge the battery:

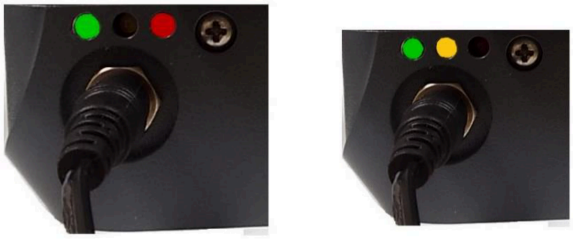
- when you receive the monitor, and when it comes back from service and calibration;
- whenever the charge drops below 50 % (two bars), so that the monitor does not switch off during a run;
- every two months while the monitor is stored — more often when it is stored at 70 °F (21 °C) or warmer, because heat makes the battery discharge faster.

**⚠ WARNING**

Charging the monitor in a hazardous location can ignite an explosive atmosphere. An ignition can cause fire, explosion or injury. Never charge the monitor in a hazardous location (see Hazardous locations (p. 6)).

Three status lights next to the charging socket show the charging state (Figure 4): **green and red** while charging, **green and yellow** when charged.

The run time of 22 hours applies to a new, fully charged battery at 2 L/min without a filter, at 70 °F (21 °C). Under other conditions the run time may differ.



a b

**Figure 4.** Charging lights. **a** Green and red: charging · **b** Green and yellow: charged.

CHAPTER 4

# Operation

Operation runs from the settings to the downloaded data: set up the monitor and its aerosol profiles; prepare the sampling train and verify the flow; run the zero check; take the sample; then transfer the data to a PC with DustComm Pro.

Set the language, date and time once when you take the monitor into use. Before each sample, check the run title, the aerosol profile and the log rate on the main screen.

## Naming the data set

Each sample is stored as a data set under the run title shown on the main screen. When you switch the monitor on for the first time the run title is empty. Touch **Run Title**, type a name and confirm with the checkmark. The keyboard always uses the English alphabet. After the monitor is switched off and on again, the last name is shown again; earlier data sets are kept in the history (see Reviewing stored data (p. 25)).

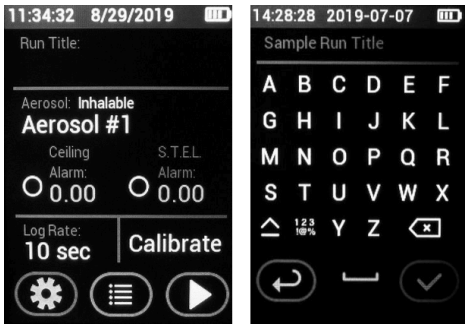



**Figure 5.** Naming the data set. Left: main screen with **Run Title** selected. Right: keyboard.

## Aerosol profiles

An aerosol profile holds the settings for one kind of dust. The monitor has 16 profiles, named Aerosol 1 to Aerosol 16 at the factory; give each one a name of your own. Each profile contains:

- **Aerosol Name**
- **Particle Size:** inhalable, thoracic, respirable or custom. It sets the size fraction and the flow rate (see Choosing the size fraction (p. 17)).
- **Cal Factor:** the calibration factor (see Calibration factor (p. 35)); 1.000 leaves the readings unchanged.
- **Units:** mg/m³ or µg/m³.
- **Ceiling Alarm** and **S.T.E.L. Alarm** (see Alarms (p. 13)).

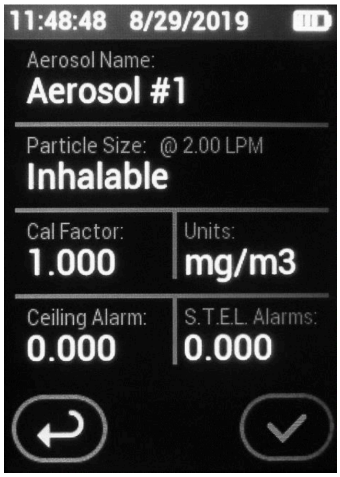



**Figure 6.** An aerosol profile: inhalable fraction at 2.00 L/min, calibration factor 1.000, units mg/m³, no alarms set. The date and run title on the screen photos are demonstration values.

### Creating or changing a profile

1. On the main screen, touch **Aerosol**. The list of profiles appears. To use an existing profile, select it.
2. To create or change a profile, select it and touch the pen. Touch each field to change it: the name, the particle size, the calibration factor, the units and the alarms.

> **NOTICE**
>
> The changes are lost if you do not save them on every screen. The checkmark saves only the screen you are on and takes you back one screen. Touch the checkmark on every screen on the way back to the main screen — three screens in all.

3. Confirm each entry with the checkmark, or touch the back arrow to leave without saving.

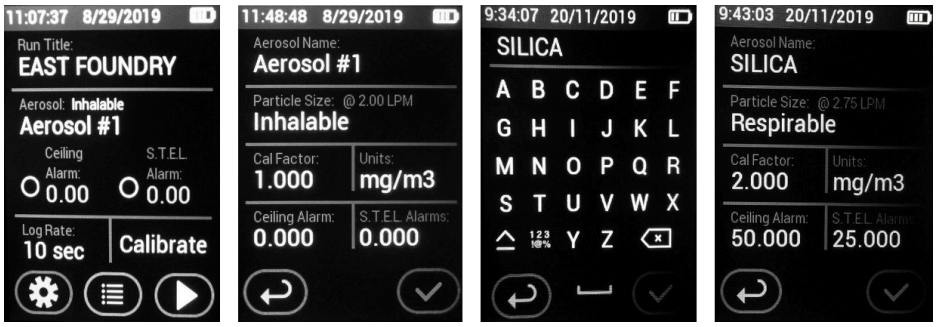



**Figure 7.** Creating a profile, left to right: main screen; a profile's entries; keyboard for the name; the new profile with its particle size, calibration factor, units and alarm levels.

## Alarms

The monitor gives an audible alarm when the dust concentration reaches a set level. Each profile has two alarm levels: a **Ceiling** alarm and a **S.T.E.L.** (short-term exposure level) alarm. Set them to the limit value that applies to the dust you are sampling and to your site, or to your own action level. During the sample, the real-time graph shows both levels as lines and changes colour when they are reached (see Viewing the measurement (p. 24)).

1. On the main screen, touch **Aerosol**, select the profile and touch the pen.
2. Touch **Ceiling Alarm** or **S.T.E.L. Alarm** and enter the level. To change the units, touch **Units**. Confirm with the checkmark.
3. Touch the checkmark on the profile screen too, and on each following screen, or the alarm is not saved.

> **Note**
>
> The highest alarm level is 500 mg/m³, or 500 000 µg/m³ when the profile uses µg/m³ — the top of the measuring range.




**Figure 8.** Setting an alarm, left to right: main screen with **Aerosol** selected; list of profiles with the pen; profile with the alarm entries; number pad; the highest alarm level in mg/m³ and in µg/m³.

## Language

The monitor is set to English at the factory. It also offers French, German, Spanish and Chinese. Touch **Settings** › **Language**, select the language and touch the checkmark, or the back arrow to leave without changing. The language changes the settings menus, the titles on the main screen and the zero check screens; the keyboard stays English.

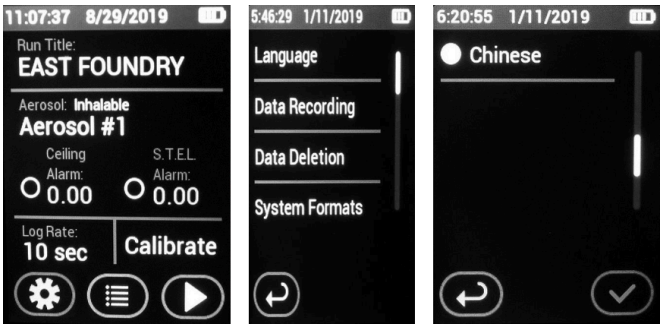



**Figure 9.** Selecting the language, left to right: main screen with **Settings**; settings with **Language**; list of languages.

## Date and time

The date and time are stored with every data set, so they must be right. The factory setting is US Eastern time, with a 12-hour clock and the date format MM/DD/YYYY; set your local time when you take the monitor into use, and adjust it for daylight saving time.

### Choosing the formats

1. Touch **Settings** › **System Formats**.
2. Touch **Time Formats** to choose the 12-hour or 24-hour clock, or **Date Formats** to choose MM/DD/YYYY, YYYY/MM/DD or DD/MM/YYYY.
3. Touch the checkmark to save, or the back arrow to leave without changing.

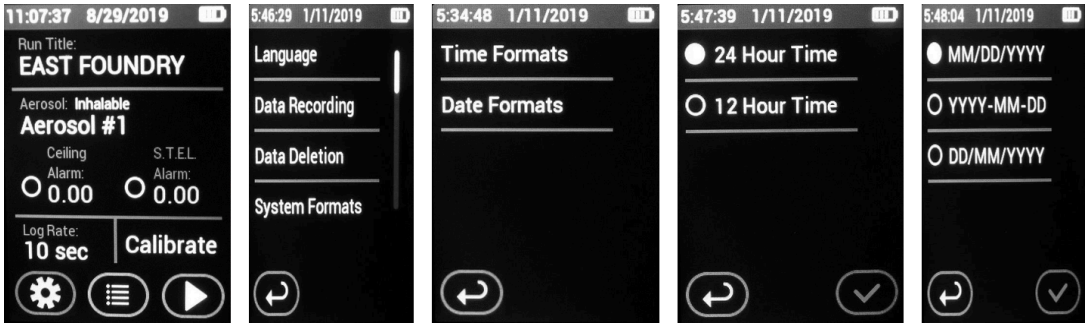



**Figure 10.** Choosing the formats, left to right: main screen with **Settings**; **System Formats**; **Time Formats** and **Date Formats**; 12- or 24-hour clock; date formats.

### Setting the date and time

1. Touch **Settings**, scroll down and touch **Date** or **Time**.
2. Enter the date or time and touch the checkmark to save, or the back arrow to leave without changing. The status bar shows the new setting.

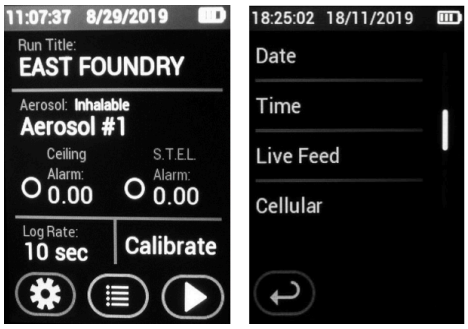



**Figure 11.** Setting the date and time. Left: main screen with **Settings**. Right: **Date** and **Time** in the settings list.

## Log rate

The log rate is the interval at which the monitor stores a value. A longer interval fills the memory more slowly. Touch **Log Rate** on the main screen and select the interval:

| Log rate | Memory lasts approx. |
|---|---|
| 1 s | 12 hours |
| 4 s | 25 hours |
| 10 s | 60 hours |
| 60 s | 15 days |

**NOTICE**

When the memory is almost full, the monitor shows a message and the sample stops. Transfer the data to a PC and/or delete data sets before you continue (see Deleting data (p. 25)).

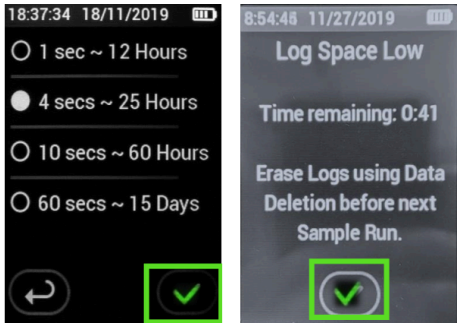



**Figure 12.** Left: log rates with the time the memory lasts. Right: message when the memory is almost full.

## Data recording

**NOTICE**

Overwrite Logs replaces the previous data set with each new one, and erased data cannot be recovered. Transfer the data you need to a PC first (see Downloading data (p. 28)).

Touch **Settings** › **Data Recording** and choose how new data sets are stored, then touch the checkmark to save or the back arrow to leave without changing:

- **Preserve Logs:** every data set is kept until you delete it.
- **Overwrite Logs:** each new data set replaces the previous one.

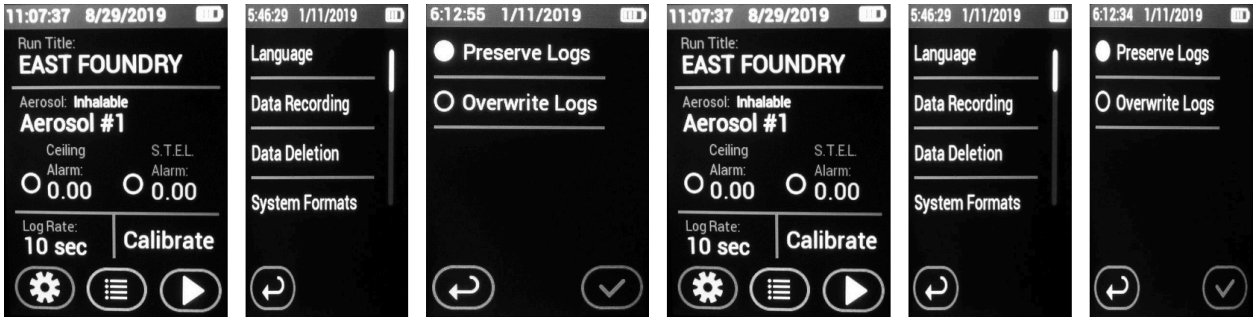



**Figure 13.** Data recording. Left three: **Settings**, **Data Recording**, **Preserve Logs** selected. Right three: the same path with **Overwrite Logs** selected.

## About screen

**Settings** › **About** shows the manufacturer, the model, the serial number, the firmware version and the date of the last service or calibration. Have this information at hand when you contact Analyt-MTC.

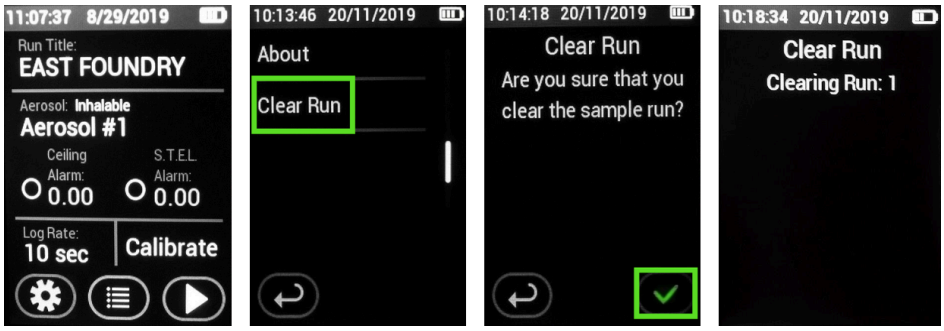


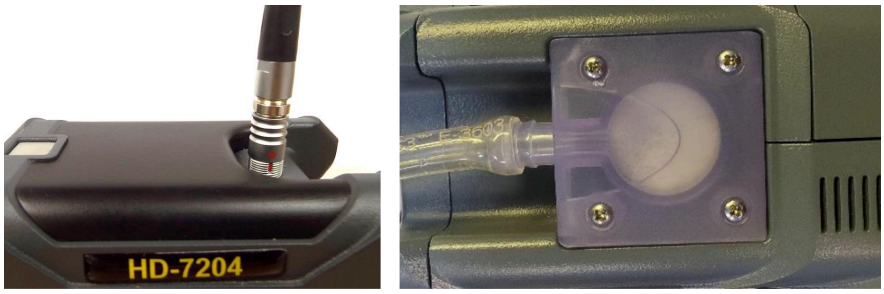

**Figure 14.** Clear Run, left to right: main screen with **Settings**; **Clear Run** in the settings list; confirmation; clearing.

# Preparing the sampling train

The sampling train runs from the inlet through the sensor head and the filter cassette to the pump in the monitor. Connect the sensor, choose the size fraction, fit the matching inlet and filter, and verify the flow before every sample.

## Connecting the sensor

1. Line up the red circle on the plug of the black signal cable with the red mark on the connector on top of the monitor, and push the plug in. Correctly aligned, it goes in easily.
2. Push the sample tubing onto the air intake on the side of the monitor.




a b

**Figure 15. a** Signal cable connector on top of the monitor · **b** Air intake on the side of the monitor, with the sample tubing.

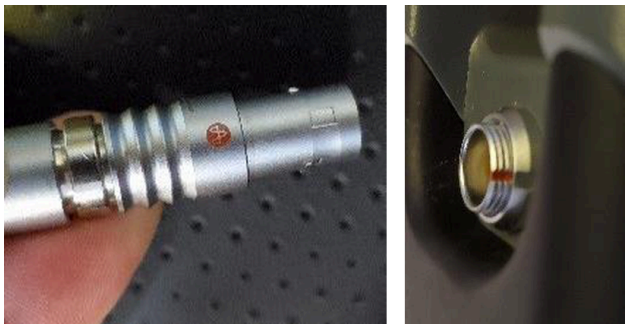


**Figure 16.** Left: plug of the signal cable, with its red mark. Right: the mating receptacle on top of the monitor.

> **Note**
> To disconnect the signal cable, grip the silver part of the plug, as close to the monitor as possible, and pull it straight up. Never pull on the cable.

## Choosing the size fraction

The inlet below the sensor head decides which particle size fraction reaches the sensor and the filter. Each fraction needs its own inlet and flow rate. When you select the fraction in the aerosol profile, the monitor sets the flow rate by itself.

| Fraction | Standard | Inlet | Flow |
|---|---|---|---|
| Thoracic | EPA PM-10 and IP-10 | Thoracic sampling inlet TS-104 | 2.0 L/min |
| Respirable | NIOSH 0600 | SKC GS-3 respirable cyclone with adapter GSA-204 | 2.75 L/min |
| Inhalable | NIOSH 0500 | SKC IOM inlet with adapter ring (fitted at the factory) | 2.0 L/min |
| Custom | — | Inlet of your choice | Your entry |

1. On the main screen, touch **Aerosol**. Select a profile you have already set up for the fraction, or select a profile and touch the pen to set one up.

2. Touch **Particle Size** and select **Inhalable**, **Thoracic**, **Respirable** or **Custom**. Set the other entries of the profile as required (see Aerosol profiles (p. 12)).
3. Touch the checkmark on each screen back to the main screen — three screens in all.
4. Fit the matching inlet and the filter cassette as described below.

> **Note**
> For a gravimetric sample at the same time, put a filter in the filter cassette. Pre-weighed and preloaded cassettes of your choice can also be used.




**Figure 17.** The three inlets. **a** Thoracic inlet, pushed into the bottom of the sensor head, with the filter cassette on top · **b** Respirable: GS-3 cyclone (left), adapter GSA-204 and sensor head · **c** Inhalable: IOM inlet on the sensor head, with a 37 mm filter cassette and the sample tubing.




**Figure 18.** The sampling inlet system. Left: sensor head with the filter cassette on top, the air intake and the sample tubing. Right, left to right: thoracic inlet, respirable inlet, inhalable inlet (not to scale).

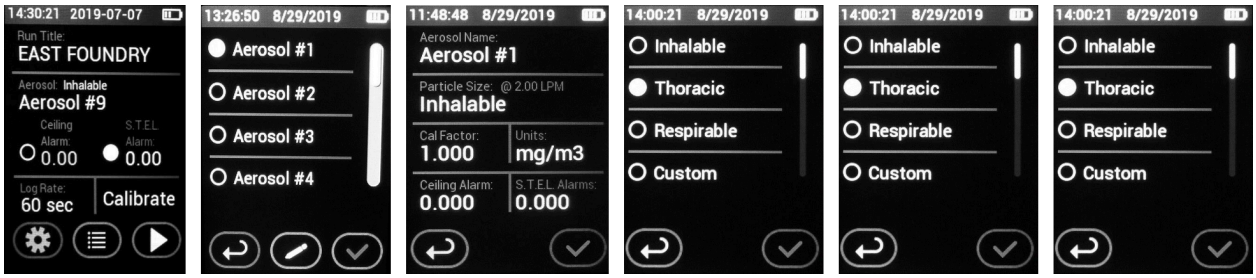



**Figure 19.** Selecting the particle size, left to right: main screen with **Aerosol**; list of profiles with the pen; profile entries; particle size list with **Thoracic**, **Respirable** and **Inhalable** selected.



**Figure 20.** Left to right: thoracic inlet; GS-3 cyclone on the sensor head, black thumbscrew to the side; sensor head for the inhalable fraction with a 37 mm or 25 mm cassette, black knurled thumbscrews in position.

### Thoracic fraction

1. Select a profile with the particle size **Thoracic**. The flow changes to 2.0 L/min.
2. Push the thoracic inlet into the bottom of the sensor head, pointing forward.
3. Fit the filter cassette on top of the sensor head.
4. Push the sample tubing onto the top of the filter cassette.
5. Verify the flow (see Verifying the flow (p. 21)).

### Respirable fraction

The SKC GS-3 cyclone needs the adapter GSA-204 to fit the sensor head. The adapter is normally already in the cyclone; if it is not, push it into the cyclone first.

1. Select a profile with the particle size **Respirable**. The flow changes to 2.75 L/min.
2. Push the cyclone with its adapter into the bottom of the sensor head, with the black thumbscrew of the cyclone to the side.
3. Fit the filter cassette on top of the sensor head.
4. Push the sample tubing onto the top of the filter cassette.
5. Verify the flow (see Verifying the flow (p. 21)).

### Inhalable fraction

The SKC IOM inlet is fitted to the sensor head at the factory. With the sensor upright, as delivered, the monitor takes a 37 mm filter cassette; for a 25 mm IOM cassette the sensor head must be turned to a horizontal position (see Fitting a 25 mm IOM cassette (p. 19)).

1. Select a profile with the particle size **Inhalable**. The flow changes to 2.0 L/min.
2. Remove any other inlet from the sensor head.
3. Fit the 37 mm filter cassette and connect the sample tubing, with the two black knurled thumbscrews of the sensor head in the position shown in Figure 17c.
4. Verify the flow (see Verifying the flow (p. 21)).

### Fitting a 25 mm IOM cassette

You need the IOM inhalable sampling head IS-104, the IOM adapter ring IA-204 and the hex key supplied with them. For the IOM sampler itself, follow its own instructions.

1. Unclip the signal cable and the tubing from the plastic clips on the back of the lapel bracket. Remove the two black knurled thumbscrews and take the sensor head off the bracket. Remove any inlet that is fitted.

2. Peel the protective tape off the gasket inside the adapter ring.
3. Place the adapter ring over the front of the IOM cassette and press it on firmly, so that the cassette front makes firm, even contact with the gasket.
4. Tighten the four set screws on the outside of the adapter ring with the hex key. The screws must sit below the surface of their holes, for an airtight fit.
5. Push the IOM with its adapter ring into the back of the sensor head with a push-and-twist movement, so that its O-ring seals airtight. The barbed tube connector must point down, in line with the signal cable.
6. Mount the sensor head on the lapel bracket in a horizontal position and secure it with the two thumbscrews. The back of the bracket stops the IOM from backing out.
7. Keep the flow at 2.0 L/min (particle size **Inhalable**) and verify it.




a b c

**Figure 21.** Fitting a 25 mm IOM cassette. **a** Sensor head on the lapel bracket, with the retaining clips and the two thumbscrews · **b** Adapter ring IA-204 (left) and IOM sampling head IS-104 · **c** Sensor head refitted horizontally on the lapel bracket.

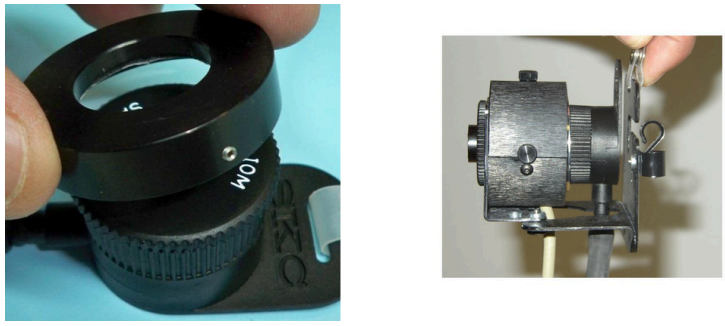



**Figure 22.** Left: adapter ring IA-204 pressed onto the IOM cassette front, set screw. Right: sensor head refitted horizontally on the lapel bracket; the back of the bracket stops the IOM from backing out, the barbed tube connector points down.

## Verifying the flow

The volume sampled through the filter is flow rate times time, so a wrong flow gives a wrong gravimetric result and, at the inlet, a wrong size cut. The flow shown on the monitor is its target value; only a flowmeter tells you the flow that actually passes. Verify the flow with a flowmeter before each sample.

1. Select the size fraction and fit the inlet, the filter cassette and the tubing as described above.
2. Remove the inlet and push the flow adapter FA-104 (metal stub with tubing) into the bottom of the sensor head.
3. Connect the free end of the adapter's tubing to the flowmeter (Figure 23).
4. On the main screen, touch **Calibrate** › **Pump Flow**. The screen shows the target flow.
5. Compare the flowmeter reading with the target. If they differ, touch **+** or **−** until the flowmeter shows the target flow, then touch the checkmark.
6. Take out the flow adapter and refit the inlet.

> **Note**
> **+** and **−** change the flow the pump actually delivers, not the target shown on the monitor. Watch the flowmeter while you adjust.




a b

**Figure 23.** Verifying the flow. **a** Flow adapter FA-104 in the bottom of the sensor head · **b** Monitor, sensor head and flowmeter (SKC chek-mate shown) connected.




**Figure 24.** Calibrating the flow, left to right: main screen with **Calibrate**; **Pump Flow**; target flow with **+** and **−**.

## Custom flow rate

For an inlet with another flow rate, select **Custom** as the particle size of the profile and enter the flow rate. Verify it with a flowmeter as above.

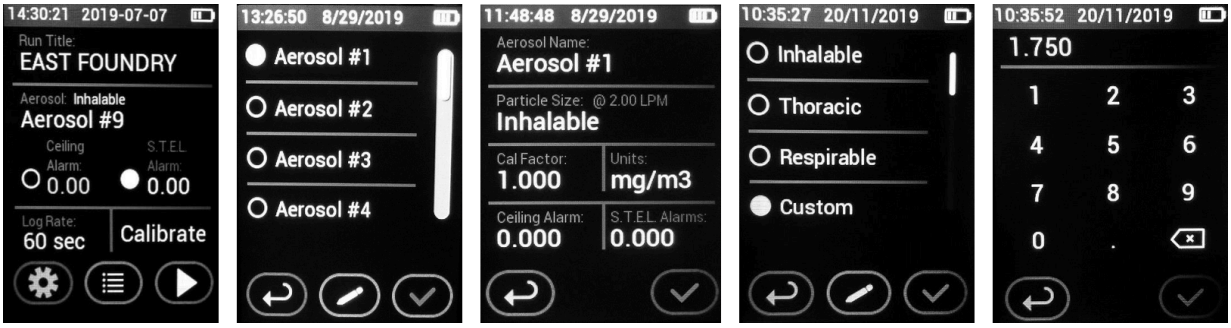



**Figure 25.** Custom flow rate, left to right: main screen with **Aerosol**; list of profiles with the pen; profile entries; particle size **Custom**; number pad for the flow rate.

## Zero check

The zero calibration, or auto zero, sets the measurement baseline to zero mg/m³ (or µg/m³). It passes or fails. Run it:

- before every new data set, after the monitor has run for at least 2 minutes;
- after cleaning the sensor optics.

The sensor head must be connected. A zeroing filter on the inlet supplies particle-free air; where it goes depends on the size fraction:

| Fraction | Zeroing filter |
|---|---|
| Thoracic | Push the zeroing filter ZF-102 into the thoracic inlet. |
| Inhalable | Push the zeroing filter ZA-7204 into the front of the IOM front plate. |
| Respirable | Remove the cyclone and push the zeroing filter ZA-7204 into the sensor head, as for the inhalable fraction, with the sensor head turned through 90°. |




**Figure 26. a** Zeroing filter ZA-7204 on the IOM inlet · **b** Zeroing filter ZF-102 in the thoracic inlet.

1. On the main screen, touch **Calibrate › Zero**. The screen asks you to fit the zeroing filter.
2. Fit the zeroing filter as in the table and touch the checkmark.
3. The zero check runs for 50 seconds; the screen counts down and shows the number of stable readings. To pass, the monitor needs three consecutive stable readings: the screen shows **Stable Readings: 1** after three and **Stable Readings: 2** after six.
4. At the end, the screen reports whether the zero check passed. If it failed, touch the checkmark to run it again, or the back arrow to leave.
5. Remove the zeroing filter and refit the inlet.

**Note**
If the zero check fails twice in a row, the monitor has a fault. Contact Analyt-MTC (see Service, warranty and contacts (p. 42)).

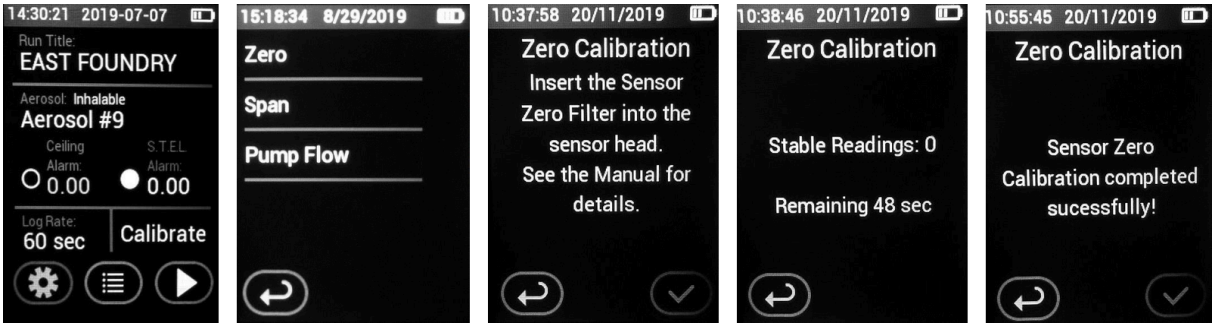



**Figure 27.** Zero check, left to right: main screen with **Calibrate**; **Zero**; prompt to insert the zeroing filter; stable readings and the remaining time; zero completed successfully.

# Sampling

## Before you start

| Check | See |
|---|---|
| The battery is fully charged. | Charging the battery (p. 11) |
| The correct particle size is selected in the aerosol profile. | Choosing the size fraction (p. 17) |
| The matching inlet and the filter cassette are fitted, and the flow is verified. | Verifying the flow (p. 21) |
| The date and time are correct. | Date and time (p. 14) |
| The zero check has passed. | Zero check (p. 22) |

The other settings — run title, units, alarms, log rate and language — should be set as well, but the monitor also samples without them.

## Starting and stopping a sample

**WARNING**

Operating the monitor in a hazardous location can ignite an explosive atmosphere. An ignition can cause fire, explosion or injury. Do not operate the monitor in a hazardous location (see Hazardous locations (p. 6)).

1. On the main screen, touch **Start**. The pump starts, the sample begins and the screen shows the real-time measurement.
2. Clip the monitor to the worker's belt and attach the sensor head in the breathing zone.
3. To end the sample, touch the **Stop** key. The monitor asks you to confirm; touch the checkmark. The data set is stored in the history.

**Note**
While a sample is running, only the real-time views are available. To reach the menus, stop the sample.




**Figure 28.** Stopping a sample. Left: the **Stop** key on the real-time screen. Right: **Confirm End Run?**

## Viewing the measurement

During a sample the monitor offers three views. The sample opens with the first:

- **1-second rolling graph:** run title, real-time mass concentration, elapsed time, and the **Pause** and **Stop** keys.
- **10-second rolling graph:** the same items.
- **Statistics:** run title, aerosol profile, average, 8-hour TWA, minimum, maximum, ceiling and STEL alarm levels, log rate, start time, particle size, flow and elapsed time.

When alarm levels are set, the graph shows the STEL level as a yellow line and the ceiling level as a red line. The bars are blue while the concentration is below both levels, turn yellow when the STEL level is reached and red when the ceiling level is reached.

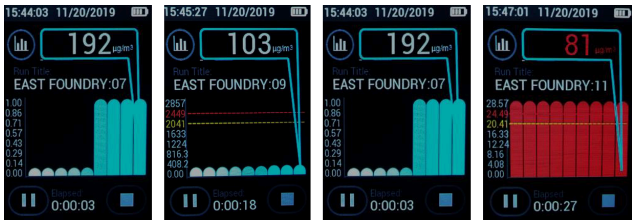



**Figure 29.** Real-time rolling graphs. The bars are blue below the alarm levels. With the alarms set, the graph shows the STEL level as a yellow line and the ceiling level as a red line (second from left); at the ceiling level the bars turn red (right). The date and run title on the screen photos are demonstration values.

## Faults during sampling

The monitor signals a fault with its status lights in the corners of the case (Figure 30).

**Flow fault — purple lights flashing.** The pump can no longer hold the flow within ±5 %, usually because the tubing is kinked or the filter is overloaded. If this lasts 3 to 10 seconds, the pump stops. After 20 seconds it tries to restart, up to 5 times. If the flow recovers, the sample continues; if it has not recovered within 5 minutes, the monitor ends the sample.

**Battery fault — red lights flashing.** The battery is low. Charge it (see Battery status (p. 10)).

Each fault is counted as an event in the data set (see Reviewing stored data (p. 25)).




a b

**Figure 30. a** Flow fault: purple lights · **b** Battery fault: red lights.

## Reviewing stored data

Touch **History** on the main screen. The screen shows the statistics of one data set: run title with the data set number, date, start time, duration, aerosol profile and average concentration. Touch the left or right arrow to move to an earlier or a later data set; the number after the run title counts down as you go back.

The **Events** box shows how many faults occurred during the data set. It does not distinguish between flow and battery faults. The upload key below it sends the data set to the PC (see Downloading data (p. 28)).




**Figure 31.** History screen, data set 3 of the run title "EAST FOUNDRY", with no events. The date and run title on the screen photos are demonstration values.

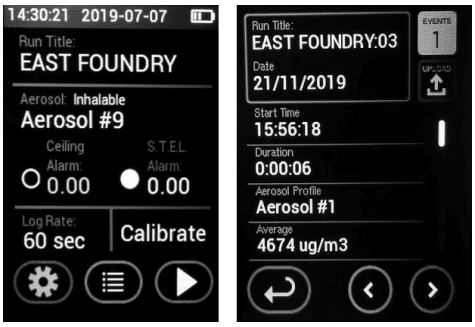



**Figure 32.** Left: main screen with **History**. Right: a data set with a fault counted under **Events**.

## Deleting data

**NOTICE**

Deleted data cannot be recovered. Transfer the data you need to a PC first.

### Deleting all data sets

1. Touch **Settings › Data Deletion**.
2. The monitor asks you to confirm. Touch the checkmark to delete all data sets, or the back arrow to keep them. Run titles, aerosol profiles and other entries are kept; the history is empty afterwards.

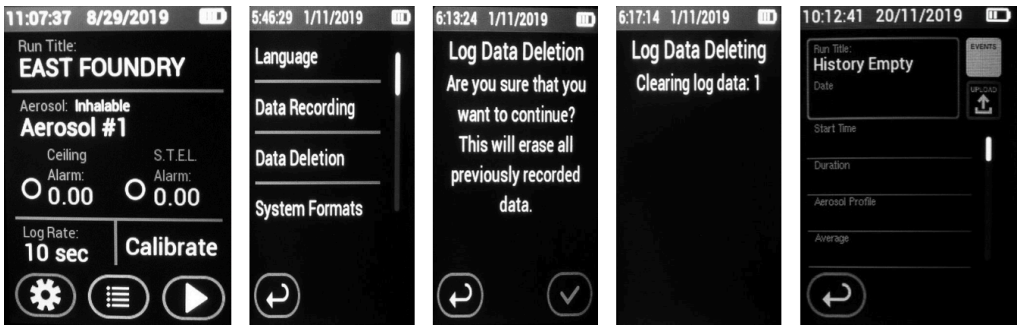



**Figure 33.** Deleting all data sets, left to right: main screen with **Settings**; **Data Deletion**; confirmation; deletion running; empty history.

### Clearing the monitor (Clear Run)

**Clear Run** deletes all data sets like **Data Deletion**, and also your own entries: run titles, aerosol profiles and calibration spans. It returns the monitor to its factory state. Touch **Settings › Clear Run**; when the

monitor asks whether you are sure, touch the checkmark to clear it, or the back arrow to leave.

CHAPTER 5

# Communication

## DustComm Pro software

DustComm Pro transfers the stored data sets from the monitor to a Windows PC and turns them into statistics, plots and reports. It exports the data as a comma-delimited file for spreadsheet programs such as Microsoft Excel, corrects them for dust that differs from the calibration dust, and can show the measurement live on the PC.

### Installing the software

The software and the data transfer from the HAZ-DUST 7204 work only on Windows 10; earlier Windows versions are not supported. The installation takes less than 5 minutes.

1. Start Windows and close all open programs.
2. Insert the USB drive supplied with the monitor into a free USB port and open it in the file explorer.
3. Open the folder **DustComm Pro** and double-click **Setup**.
4. Follow the steps of the installation wizard.

> **Note**
> During the installation Windows shows several warning pop-ups, because DustComm Pro is not a program Windows knows. Answer each one with **Continue** or **OK**; the installation then completes. Start the program from the list of all programs.

A sample data file (.dcm) is installed with the program, so you can try out its functions before you have data of your own.

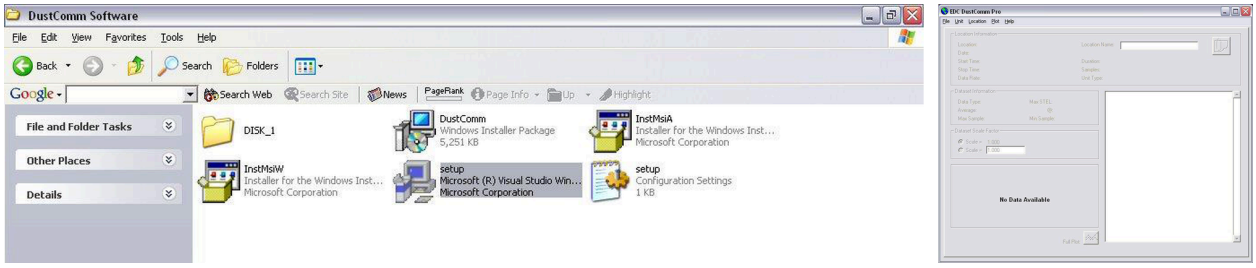



**Figure 34.** Left: the DustComm Pro folder with **Setup** on the USB drive. Right: DustComm Pro after start, before data are loaded.

## Menus

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

| Menu | Command | What it does |
|---|---|---|
| **FILE** | | |
| | **Open** | Opens a saved project file. |
| | **Save** | Saves changes to the open file under its current name. |
| | **Save As** | Saves the open file for the first time, or under a new name or in a new place. |
| | **Close** | Closes the open file. |
| | **Export** | Saves the data as a text file for a spreadsheet program. |
| | **Exit** | Closes the program. |
| **UNIT** | | |
| | **Properties** | Selects the instrument and the PC's COM port. |
| | **Download** | Receives the data from the monitor. |
| | **Live Feed** | Shows the measurement live (see Live feed (p. 32)). |
| **LOCATION** | | |
| | **Notes** | Adds notes to the open file. |
| | **Print** | Prints the location currently shown. |
| **PLOT** | | |
| | **Review** | Opens a saved plot. |
| **HELP** | | |
| | **Register** | Registers the software. |
| | **About** | Shows information about the program. |

## 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.

- **Open a file: File › Open**, then double-click the file.
- **Close the program: File › Exit**, or the **X** at the top right of the window.

| If you are saving … | select |
|---|---|
| a project for the first time, or an existing project under a new name or in a new place | **File › Save As**, type a file name and select **OK**. The title bar shows the new name. |
| changes to a project under the same name and in the same place | **File › Save** |

## Downloading data

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

> **Note**
> A download is not possible while the live feed is on. Switch it off first (see Live feed (p. 32)).

### Connecting the cable

1. Connect the micro USB cable supplied with the monitor to the monitor.
2. Connect the other end to a USB port of the PC.
3. Check that both plugs are firmly in. A loose connection can interrupt the transfer.

### Preparing the PC

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

1. On the monitor, touch **History**, then the upload key.
2. The progress bar on the PC grows as the data arrive.
3. When the transfer is complete you can switch the monitor off. On the PC the data appear in a new project, one tab per data set at the bottom of the window. Save the project.




**Figure 35.** Uploading, left to right: main screen with **History**; data set with the upload key; **History Upload** screen.

## The project window

The project window shows one data set (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 STEL. |
| Dataset Scale Factor | The scale factor applied to the data (see Applying a correction factor (p. 32)). |
| 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. |

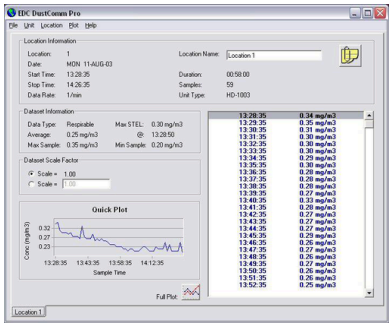



**Figure 36.** Project window after a download, with the sections described in the table above.

## Exporting to a spreadsheet

Spreadsheet programs read the data once you have exported them as a .CSV text file. A project must be open.

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.

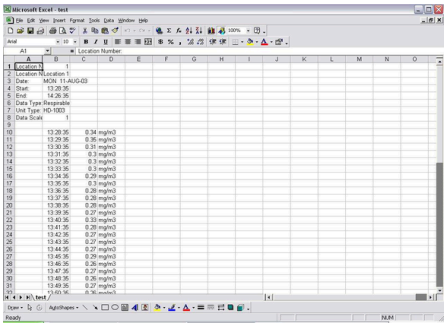


**Figure 37.** Exported data opened in a spreadsheet program.

## 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:

| No. | Button |
|---|---|
| 1 | Save the plot as a DustComm Pro chart (*.dcc) |
| 2 | Copy the plot to a bitmap |
| 3 | Edit the title of the plot |
| 4 | Page setup |
| 5 | Print the plot |
| 6 | Zoom: drag from point to point over the part you want to enlarge |
| 7 | Return to the full plot |
| 8 | Show or hide vertical grid lines |
| 9 | Show or hide horizontal grid lines |
| 10 | Graph type, for example bar or line |
| 11 | Graph colour |

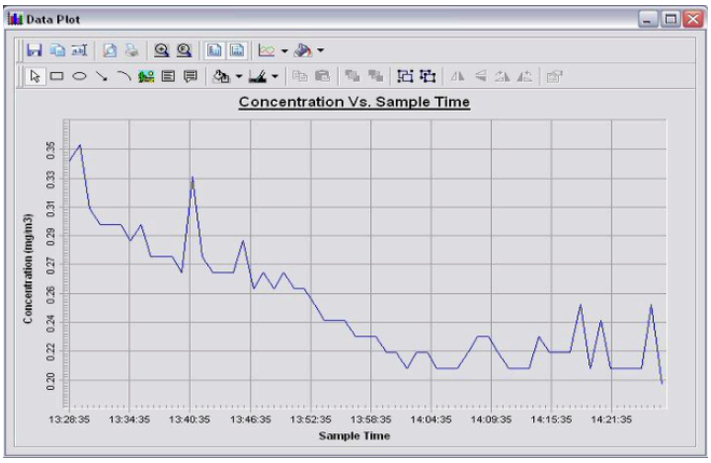



**Figure 38.** A full plot of a location: concentration against sample time.

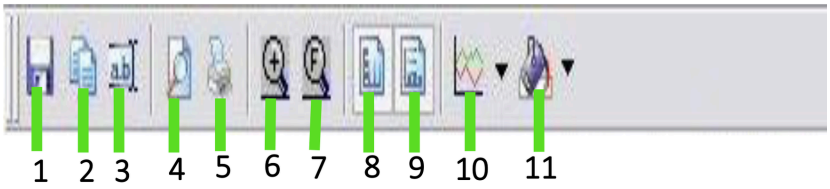



**Figure 39.** The button bar of the plot window, numbered as in the table.

A second toolbar annotates the plot:

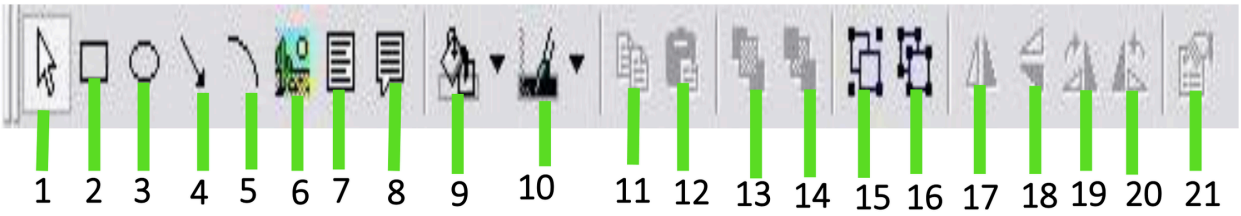



**Figure 40.** The annotation toolbar, numbered as in the table.

| 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

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.

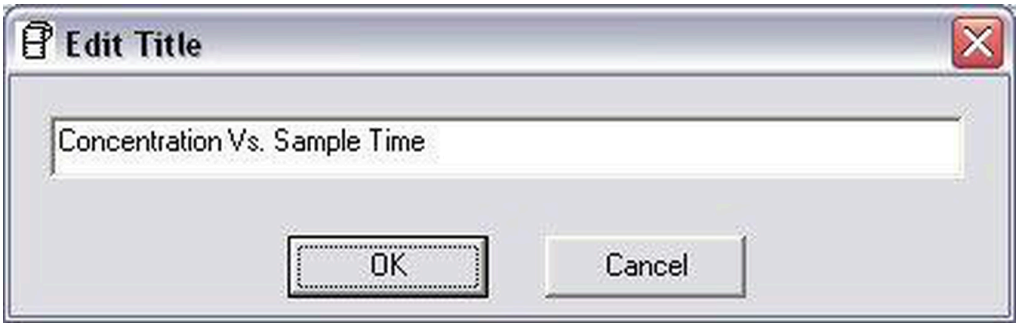



**Figure 41.** The **Edit Title** window.

## Applying a correction factor

A correction factor adjusts the readings to a gravimetric reference — on the HAZ-DUST 7204, the filter sampled in the same run. Calculate it as:

**correction factor = gravimetric concentration ÷ concentration read by the monitor**

A calibration factor entered in the monitor's aerosol profile is not transferred with the data; enter it here.

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

## Live feed

With the live feed, the PC shows the concentration values and the graph in real time while the monitor samples. The monitor must be connected to the PC by the USB cable, unless the optional wireless equipment was purchased with it.

1. On the monitor, touch **Settings › Live Feed › Live Data USB**. With the optional wireless equipment, select **Live Data Wireless** instead.
2. Connect the monitor to the PC with the micro USB cable, or connect the optional wireless modem.
3. In DustComm Pro, set the COM port as for a download (**Unit › Properties**), then select **Unit › Live Feed**.
4. Select **Record**.

> **Note**
> Switch the live feed off again before you download stored data.

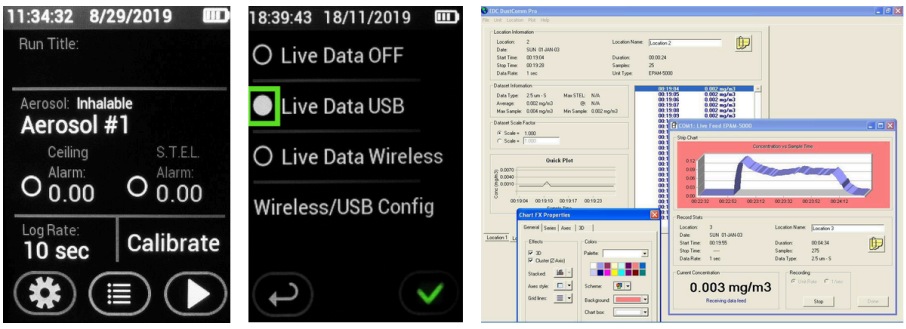



**Figure 42.** Live feed. Left: main screen with **Settings**. Centre: **Live Data USB** selected. Right: the live feed in DustComm Pro.

## If the download fails

- Check that the USB cable is firmly connected at the monitor and at the PC.

- Select **Unit › Properties** and check the COM port. It must match the port the PC has assigned to the cable: look it up in the Windows Device Manager.
- DustComm Pro offers COM ports 1 to 10 only. If the PC assigns a higher number, unplug the cable and try other USB ports until the Device Manager shows a port from 1 to 10.

CHAPTER 6

# Calibration and verification

The span check confirms that the optical sensor still responds as it did at the factory; run it once a month. The zero check, which sets the baseline of the sensor with particle-free air before every new data set, is part of operation (see Zero check (p. 22)).

## Span check

The span check uses the calibration reference CS-7204 to confirm that the monitor is within ±10 % of its factory calibration. The monitor switches its infrared light source on and off and records a high and a low reading; if they do not match because the light source is no longer stable, the check fails.

Run the span check:

- once a month in normal use;
- after the monitor has been dropped or damaged;
- when you first use the monitor, to confirm the factory calibration.

Run it in reasonably clean air, with a fully charged battery. The span check does not replace the annual factory calibration (see Annual calibration (p. 42)).



**Figure 43.** Calibration reference CS-7204 inserted in the sensor head.

1. Insert the calibration reference into the sensor head (Figure 43).
2. On the main screen, touch **Calibrate** › **Span**. The screen asks you to insert the calibration reference; touch the checkmark.
3. The Sensor Span Check screen appears and the check runs for 30 seconds. At the end, the screen reports whether the monitor passed.
4. If it passed, remove the calibration reference. If it failed, run the check again.

**Note**
Always remove the calibration reference before you start a sample.

**Note**
If the span check fails a third time, the monitor needs factory service. Contact Analyt-MTC (see Service, warranty and contacts (p. 42)).

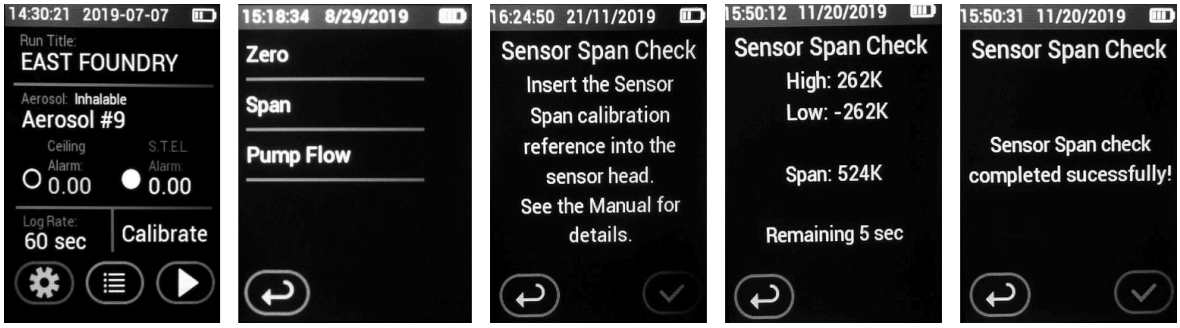



**Figure 44.** Span check, left to right: main screen with **Calibrate**; **Span**; prompt to insert the calibration reference; **Sensor Span Check** running; check completed successfully.

## Calibration factor

Real-time light-scattering monitors are calibrated with a standardised test dust. The HAZ-DUST 7204 is calibrated with ISO 12103-1 A2 fine test dust, also known as Arizona road dust. Dust at a workplace scatters light differently, so the monitor's reading can differ from the true mass concentration. A calibration factor corrects for this.

Normally a cross calibration needs two instruments: a gravimetric reference sampler and a real-time monitor. The HAZ-DUST 7204 is both: its pump draws the air through the filter on the sensor head, so the filter result of a run is the reference for the same run. Have the filter analysed, and calculate:

**calibration factor = filter TWA ÷ monitor TWA**

For example, if the filter gives a TWA of 5 mg/m³ and the monitor showed a TWA of 2.5 mg/m³, the factor is 5 ÷ 2.5 = 2.00. Enter it as the **Cal Factor** of the profile for the next samples in the same atmosphere.

> **Note**
> A calibration factor entered in the monitor is not transferred to DustComm Pro. To correct data on the PC, enter the factor there as well (see Applying a correction factor (p. 32)).




**Figure 45.** Entering the calibration factor, left to right: main screen with **Aerosol** selected; list of profiles with the pen; the profile's entries with **Cal Factor**; keyboard.

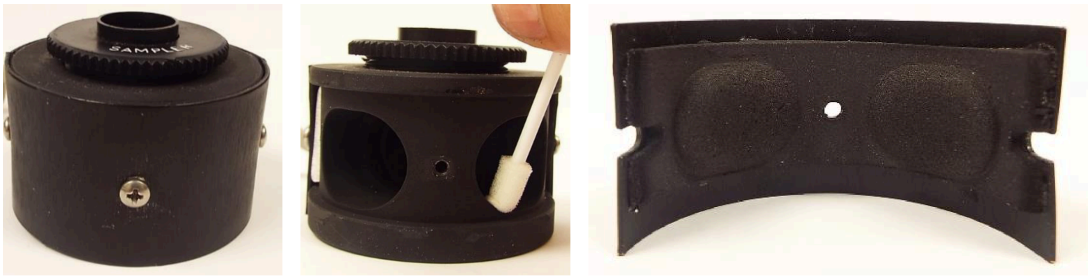
CHAPTER 7

# Maintenance

Two maintenance tasks are yours: cleaning the sensor optics and changing the battery pack. Check the span once a month (see Span check (p. 34)) and have the monitor calibrated at the factory once a year (see Annual calibration (p. 42)).

## Cleaning the sensor optics

Dust on the optics of the sensor head falsifies the readings. Clean them regularly — after every 8 hours of use when the average concentration is above 1 mg/m³. You need the cleaning kit (bulb, foam-tip swabs and moistened wipes, see Checking and cleaning (p. 41)) and a small Phillips screwdriver.



a b c

**Figure 46. a** Sensor head: screws holding the optical shield · **b** Cleaning the lens with a foam-tip swab, shield removed · **c** Optical shield: blow off its inside with the bulb.

**NOTICE**

A cotton swab scratches the lens. Liquid cleaning agents can get behind the lenses, and too much cleaning damages the optical paint. Each of these damages the optics and can affect warranty claims (see Warranty (p. 43)). Clean the lens only with a foam tip swab, never with a cotton swab. Do not use liquid cleaning agents on the optics. Clean the optics only as often as this chapter says.

1. Remove the three silver 4-40 Phillips screws that hold the optical shield to the sensor. The sensor has two shields: remove only the shield opposite the signal cable, and leave the other in place.
2. Look for dust or residue on the sensor and inside the shield. Blow it off with the bulb.
3. Clean the lens with a foam-tip swab.
4. If necessary, clean the outside of the sensor head and the monitor gently with a moistened wipe from the kit.
5. Refit the optical shield with its three screws.
6. Run a zero check (see Zero check (p. 22)).




**Figure 47.** Cleaning kit KKB-101: bulb blower, foam-tip swabs and wipes.

## Replacing the battery pack

**⚠ WARNING**

Changing the battery pack in a hazardous location can ignite an explosive atmosphere. An ignition can cause fire, explosion or injury. Remove and replace the battery pack only in an area known to be non-hazardous. Read the warnings in Hazardous locations (p. 6) and Battery pack (p. 6) first.

**NOTICE**

Removing the battery pack from a running monitor loses the time, date and other settings. Switch the monitor off before you remove the battery pack.



a b

**Figure 48. a** Battery pack housing at the end of the monitor · **b** Housing removed: battery in its tray, with the connector to the monitor.

1. Switch the monitor off.
2. Remove the two screws from the battery pack housing. Wiggle the housing gently and pull it off.

   **Note**
   Taking the battery out of its tray can affect warranty claims. Leave the battery in its tray, and always replace the complete battery pack.

3. The battery is connected to the monitor by a black plastic connector. Press its latch and pull the connector apart.
4. Fit the new battery pack in the reverse order: connect the plug until the latch engages, push the housing on and refit the two screws.
5. Charge the new battery pack completely before use (see Charging the battery (p. 11)), and set the date and time if they were lost (see Date and time (p. 14)).

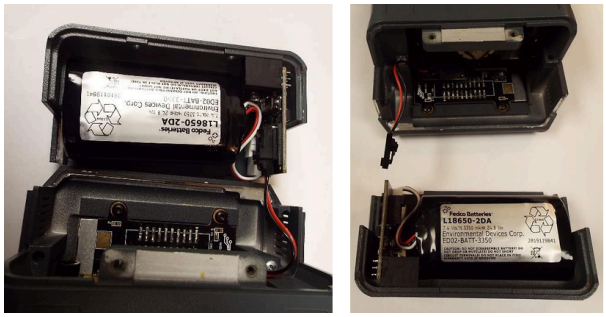



**Figure 49.** Left: battery pack in the opened housing, with its connector. Right: the battery pack taken out of the tray.

## Other parts

The inlet filter and the belt clip are external parts that you may also replace. For these parts and for any work inside the monitor, contact Analyt-MTC (see Service, warranty and contacts (p. 42)).

CHAPTER 8

# Troubleshooting

## Problems and remedies

| Problem | Remedy |
|---|---|
| The status lights flash purple and the pump stops. | Flow fault. Check the tubing for kinks and the filter for overloading. The pump restarts by itself — see Faults during sampling (p. 24). |
| The status lights flash red. | The battery is low. Charge it — see Charging the battery (p. 11). |
| The sample does not start. | A monitor with a low battery does not sample. Charge the battery. |
| A message appears and the sample stops: the memory is full. | Transfer the data to a PC and delete data sets — see Deleting data (p. 25). Choose a longer log rate (p. 15) for long runs. |
| The monitor cannot be switched off. | A sample is running. Stop it first — see Starting and stopping a sample (p. 23). |
| Changed settings are lost. | Touch the checkmark on every screen on the way back to the main screen — see Creating or changing a profile (p. 13). |
| The zero check fails. | Check that the sensor head is connected and the zeroing filter fitted, and run it again. If it fails twice, contact Analyt-MTC. |
| The span check fails. | Run it again, in clean air, with a fully charged battery. If it fails a third time, the monitor needs factory service: contact Analyt-MTC. |
| The readings seem wrong, although the zero check passed. | Clean the sensor optics and run a zero check — see Cleaning the sensor optics (p. 36). |
| Readings differ from the gravimetric filter result. | The dust differs from the calibration dust. Enter a calibration factor — see Calibration factor (p. 35). |
| The download to the PC fails. | Switch the live feed off, check the cable and the COM port — see If the download fails (p. 32). |
| The data on the PC are not corrected with the calibration factor. | The factor is not transferred; enter it in DustComm Pro — see Applying a correction factor (p. 32). |

If none of these remedies helps, contact Analyt-MTC (see Service, warranty and contacts (p. 42)). Do not open the monitor.

CHAPTER 9

# Specifications

## Measurement

| | |
|---|---|
| Model | HD-7204 |
| Measuring principle | Light scattering (infrared), one detection per second, with a concurrent gravimetric filter sample |
| Sensing range | 0.001–500 mg/m³ (1–500 000 µg/m³) |
| Accuracy | ±10 % |
| Precision | 0.02 mg/m³ |
| Calibration | NIOSH 0600 with SAE fine test dust (ISO 12103-1 fine test dust, Arizona road dust) |
| Particle size range | Respirable 0.1–10 µm · thoracic 0.1–50 µm · inhalable (IOM) 0.1–100 µm |
| Displayed values | Real-time concentration in mg/m³ or µg/m³; average, 8-hour TWA, STEL, minimum, maximum; flow; rolling graphs |
| Alarms | Audible; ceiling and STEL levels, set per aerosol profile |

## Pump and flow

| | |
|---|---|
| Pump flow rates | Internal, flow-compensated pump; set automatically: respirable 2.75 L/min · thoracic 2.0 L/min · inhalable 2.0 L/min; custom flow by entry |
| Flow control | Within ±5 % at:<br>1.0 L/min against up to 70 in. $H_2O$<br>2.5 L/min against up to 55 in. $H_2O$<br>5.0 L/min against up to 20 in. $H_2O$ |
| Filter cassettes | 25 mm or 37 mm |

## Data

| | |
|---|---|
| Log rate | 1, 4, 10 or 60 s |
| Memory | 43 000 data points; up to approx. 15 days at a 60 s log rate |
| Output | Micro USB; optional wireless |
| Software | DustComm Pro, for Windows 10 |
| Display languages | English, French, German, Spanish, Chinese |

## Power, operating conditions and dimensions

| | |
|---|---|
| Battery | Rechargeable lithium-ion battery pack |
| Operating time | 22 hours or more (new battery, fully charged, 2 L/min without filter, 70 °F (21 °C)) |
| Charging time | 3 hours |
| Automatic switch-off | After 5 minutes without use, when not sampling |
| Operating temperature | 32–120 °F (0–50 °C) |
| Humidity | Up to 95 % RH, non-condensing |
| Dimensions, monitor | 3.5 × 2.25 × 4.75 in |
| Dimensions, sensor head | 1.75 × 1.5 in |
| Weight | 1.12 lb |

CHAPTER 10

# 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.
For the contents of the kit, see Checking the contents (p. 8).

## Monitor, inlets and filters

| Description | Order code | Mfr code |
|---|---|---|
| Thoracic sampling inlet | Ask Analyt-MTC | TS-104 |
| Respirable inlet: SKC GS-3 cyclone | 225-103 | RS-104 |
| Adapter for the GS-3 cyclone, required to fit it to the sensor head | 770-313 | GSA-204 |
| Inhalable inlet: SKC IOM sampling head | Ask Analyt-MTC | IS-104 |
| Adapter ring for the IOM sampling head | Ask Analyt-MTC | IA-204 |
| Open-faced sampling adapter | Ask Analyt-MTC | 17-174 |
| Carrying case | Ask Analyt-MTC | CC-104 |
| 37 mm opaque filter cassettes, empty | Ask Analyt-MTC | CAS-102 |
| 37 mm mixed cellulose ester (MCE) filters, 0.8 µm, pack of 50 | Ask Analyt-MTC | EDC-1931A |

## Checking and cleaning

| Description | Order code | Mfr code |
|---|---|---|
| Calibration standard (calibration reference), for the span check of the optical sensor | 770-327 | CS-7204 |
| Zeroing filter, for the thoracic inlet | Ask Analyt-MTC | ZF-102 |
| Zeroing filter, for the IOM inlet and the respirable set-up | Ask Analyt-MTC | ZA-7204 |
| Flow adapter, metal stub with tubing, for verifying the flow | Ask Analyt-MTC | FA-104 |
| Flowmeter | Ask Analyt-MTC | FM-105 |
| Cleaning kit: bulb, foam-tip swabs and moistened wipes | Ask Analyt-MTC | KKB-101 |

## Power and data

| Description | Order code | Mfr code |
|---|---|---|
| Battery charger | Ask Analyt-MTC | BC-750 |
| Li-Ion battery pack | Ask Analyt-MTC | BP-750 / BP-7204 |

CHAPTER 11

# Service, warranty and contacts

Analyt-MTC is your contact for everything concerning the HAZ-DUST 7204: technical questions, the annual factory calibration, spare parts and accessories, repairs and warranty claims. Any work inside the monitor is service work for trained personnel (see Service work (p. 6)).

## Contact

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+49 7631 5545

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+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 that Analyt-MTC can help you quickly:

- the model, serial number, firmware version and date of the last calibration from Settings › About (see About screen (p. 16));
- what happened, with the run title and data set number concerned and the number of events — or the downloaded project file.

## Annual calibration

Have the monitor recalibrated at the factory once a year. A monitor that fails the span check three times also needs factory service. Ask Analyt-MTC to arrange it.

## 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. Transfer any data you still need to a PC first. The monitor contains a lithium-ion battery; ask your carrier about the shipping rules for lithium batteries.

**⚠ CAUTION**

A monitor, sensor head or accessory used at a workplace can carry harmful substances. These can harm the people who unpack and service them. Decontaminate the monitor, the sensor head and all accessories of any harmful substances before you send them back.

## Warranty

The warranty terms of Analyt-MTC apply. Make warranty claims to Analyt-MTC. Opening the monitor, using an unapproved battery pack, damaging the lens or not following the warnings in this manual can affect a claim; ask Analyt-MTC before you act if you are unsure.

## 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

# Particle sizes and glossary

## Particle size conventions

Each inlet collects a size fraction defined by a sampling convention: the percentage of particles of a given aerodynamic diameter that the fraction contains. The tables give the conventions the inlets are designed to follow.

### Inhalable particulate mass (IPM)

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

### Respirable particulate mass (RPM)

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

### Thoracic particulate mass (TPM)

| Diameter, µm | TPM, % |
|---|---|
| 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 |

* Same cut point as EPA PM-10.

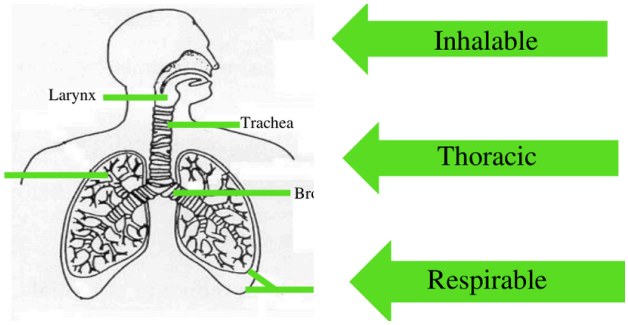



**Figure 50.** Where the size fractions are deposited: inhalable (nose, mouth and larynx), thoracic (trachea and bronchi), respirable (bronchioles and alveoli).

## 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 Alarms (p. 13)). 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 | |
| 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 | |

| Dust or hazard | Agency | Reference | TWA | STEL |
|---|---|---|---|---|
| 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 | |
| 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 | |

| Dust or hazard | Agency | Reference | TWA | STEL |
|---|---|---|---|---|
| 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 | |

# Glossary

| Term | Meaning |
|---|---|
| µm | Micrometre, one millionth of a metre. |
| ARD | Arizona road dust: ISO 12103-1 fine test dust, used to calibrate the monitor. |
| Auto zero | The zero check: sets the baseline with particle-free air from a zeroing filter. |
| Calibration factor | Factor that corrects the readings for dust that differs from the calibration dust: filter result divided by monitor result. |
| Data set | The values stored for one sample run, under a run title and number. |
| Inhalable particulate | Particulate with a 50 % cut point at 100 µm. |
| L/min | Litres per minute. |
| mg/m³, µg/m³ | Milligrams, micrograms per cubic metre. |
| NIOSH | US National Institute for Occupational Safety and Health. |
| OSHA | US Occupational Safety and Health Administration. |
| Respirable particulate | Particulate with a 50 % cut point at 4 µm. |
| Span check | Check of the optical sensor against the calibration reference: within ±10 % of the factory calibration. |
| STEL | Short-term exposure level: the highest dust concentration over a 15-minute period. |
| Thoracic particulate | Particulate with a 50 % cut point at 10 µm. |
| TWA | Time-weighted average: the average particulate concentration over a period of time. |

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