ANALYT MESSTECHNIK



INSTRUCTIONS FOR USE

SKC HAZ-SCANNER EPAS Air Monitoring Station

Setting up the station on its tripod with its power, inlet, meter and radio options, logging and retrieving data with the HAZCOMM-PRO software, alarms and reports, calibration checks, care of the impactor, and the specifications of the sensors.

AMTC-IN-0074

About this document

These instructions cover the SKC HAZ-SCANNER EPAS air monitoring station: a portable, battery-operated instrument that measures gases, particulates and other conditions of the ambient air in real time and logs the readings, together with its HAZCOMM-PRO software and its tripod, power, inlet, meter and radio options. Each station is built to the sensor specification of its customer, so your station may carry fewer sensors and options than these instructions describe.

Read Safety (p. 6) and Product and supplied items (p. 8) first. Before use (p. 13) takes you through installing the software, power, setting up the station and its options. Procedure (p. 35) starts with a quick start and then covers logging, retrieving data, reports, graphs and alarms. After use and sample handling (p. 44) covers the care of the impactor, the calibration checks and the gas treatment module. The sensor data are in Specifications (p. 49).

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

Conventions in these instructions:

- Buttons, menu entries and messages of the HAZCOMM-PRO software and of the instrument display are printed like this: **Retrieve Data**.
- "Instrument" means the HAZ-SCANNER unit in its case; "station" means the instrument with its tripod and the options mounted on it.

How these instructions mark information

⚠ 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.

Document information

Title	SKC HAZ-SCANNER EPAS Air Monitoring Station — Instructions for use
Document number	AMTC-IN-0074
Revision	Rev. 1 — October 2026
Applies to	HAZ-SCANNER EPAS air monitoring station with the HAZCOMM-PRO software (user guide version V.7.7)
Language	English
Manufacturer	SKC Inc.

Revision history

Rev.	Date	Change
1	October 2026	First issue.

SKC, HAZ-SCANNER, EPAS and HAZCOMM-PRO are trademarks of their owners. Other trademarks are the property of their respective holders. Information in these instructions is subject to change without notice. © 2026 ANALYT-MTC Messtechnik GmbH. All rights reserved.

Contents

1 Safety 6

Intended use 6

Safety messages 6

2 Product and supplied items 8

The station 8

Supplied items 9

Front panel 9

Connector panel 10

Particulate sensor and impactors 10

HAZCOMM-PRO software 11

3 Before use 13

Installing HAZCOMM-PRO 13

Charging and power 13

Storage 14

Choosing the location 14

Setting up the tripod TP-600 14

Inlet accessories 15

Power options 18

Optional meters 23

Wireless radio RM-105EXT 26

Preparing a USB thumb drive 32

Date, time and date format 33

Help and registration 33

Checking the flow with flow meter FM-105 34

4 Procedure 35

Switching on 35

Quick start 35

Logging from the front panel 36

Retrieving data 37

Viewing uploaded data 37

Graphing data 38

Viewing current data 39

Reports 40

Alarms 40

Uploading data to a USB thumb drive 42

Troubleshooting 42

5 After use and sample handling 44

Ending a session 44

Impactor care 44
Gas treatment module GTM-6000 45
Checking the particulate calibration 46
Calibrating the gas sensors 47

6 **Specifications** 49
Memory 49
Power 49
Particulates (PM) 49
Carbon monoxide (CO) 50
Carbon dioxide (CO2) 50
Nitric oxide (NO) 52
Nitrogen dioxide (NO2) 53
Ozone (O3) 53
Relative humidity 54
Temperature 55
Sulfur dioxide (SO2) 56
Wind direction 56
Wind speed 57
Wet bulb, rain gauge and ELF/EMF meter 57
Wireless radio RM-105EXT 58

7 **Ordering information** 59
Station 59
Particulate inlet, calibration and gas treatment 59
Tripod and power 59
Meters and sensors 60
Wireless 60

8 **Service and contacts** 61
Annual factory service 61
Disposal 61

CHAPTER 1

Safety

Read this chapter before you set up and use the station. Its safety messages are repeated in the steps where they apply.

Intended use

The HAZ-SCANNER EPAS is a portable ambient air quality monitor. It measures and logs gases such as nitrogen dioxide, sulfur dioxide, ozone and carbon dioxide, particulates, volatile organic compounds and other conditions of the air in real time, at a fixed location on its tripod. Use it only with the sensors, meters and accessories built or supplied for it. Sensors are added at the factory only: to add a new sensor, ask Analyt-MTC.

Safety messages

⚠ CAUTION

Hot inlet heater. The HA-600 inlet heater is hot when it is powered. Touching it can burn you. Handle it with care while it is switched on.

NOTICE

Anchor the tripod. In strong wind an unsecured station can move or fall. Set the tripod on a level surface and fasten each of its three feet with stakes or anchor bolts.

NOTICE

Battery polarity. A cable on the wrong terminal can damage the equipment. Connect the red cable to the positive terminal and the black cable to the negative terminal of the back-up battery.

NOTICE

Charger supply voltage. The external AC charger is set for 115 V AC or 230 V AC with the red switch at one end. A charger set for the wrong voltage can be damaged. Check the setting against your power source before you plug it in.

NOTICE

No connections while logging. A meter that is not switched on and connected when logging starts is not logged, and no sensor or meter can be connected while the station is logging. Connect and switch on all meters before you start logging, and stop logging before you move the station or disconnect a meter.

NOTICE

Particulate sensors in their own slots. Sensor A is for PM-10 or TSP (total suspended particulates), sensor B for PM-2.5. A sensor in the wrong slot gives wrong readings. Insert each impactor sleeve into its designated intake.

NOTICE

New spans are lost when the instrument is switched off. Zero, span, date format and alarm settings that are not programmed into the instrument return to the factory settings at the next power-off. Reprogram the instrument after each change and do not switch it off after you set limits and alarms.

NOTICE

Delete is permanent. Deleted records cannot be restored, and an improper delete can disable functions of the software. Use the Delete and Omit functions of HAZCOMM-PRO with care.

NOTICE

Weatherproof the antenna connections. Water enters an exposed RF (radio frequency) connection wherever the wrapping leaves air. Wrap every exposed RF connector as described under Remote station (transmitter) (p. 28).

CHAPTER 2

Product and supplied items

The HAZ-SCANNER EPAS is a portable, easily deployed monitor of ambient air quality. It gives direct readings in real time and logs them, for up to 14 simultaneous measurements in one battery-operated instrument.

The station

The station measures criteria pollutants such as nitrogen oxide, nitrogen dioxide, sulfur dioxide, ozone, carbon dioxide, particulates and volatile organic compounds (VOCs). Each station is built to its customer's sensor specification. Whatever sensors and meters it carries, the software is self-configuring and determines which are installed. Calibration data and the other technical data of each sensor are stored in battery-backed memory before the instrument is shipped. Switching the station off and on has no effect on the data stored in memory, but the calibration settings return to the factory settings unless you reprogram the instrument (see Troubleshooting (p. 42)).

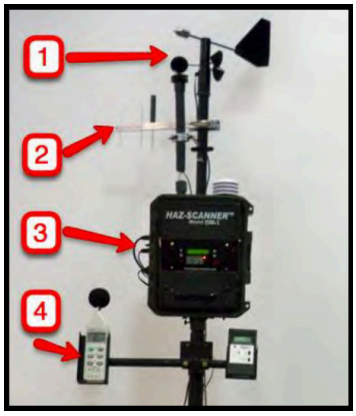


Figure 2-1. The station. Numbers as in the list.

The station is "plug and play": you do not assign sensors to channels or enter sensor data. Plug and play applies to replacing sensors originally purchased from the manufacturer; to add a new sensor, the instrument goes back to the factory for modification (ask Analyt-MTC).

Figure 2-1 shows a station on its tripod:

1. Wind speed and direction sensor (optional).
2. Remote access to the data; the picture shows the high-gain antenna, other antennas are available.
3. HAZ-SCANNER instrument with the internal gas sensors: CO and NO_2 as standard with the basic kit; special sensors are available.
4. Peripheral monitors (optional): sound, rain, atomic/nuclear radiation, solar irradiance, wind speed and direction.

Self-zeroing

The instrument zeroes itself every 60 minutes, more often when the temperature changes. You can tell when it happens because the internal pump sounds different. The self-zeroing takes 6 to 8 minutes. During these clean-air purges the sensors hold their last valid readings.

External meters

Several meters can be disconnected and used on their own. They then show their readings only on their built-in LCD; nothing is stored for later retrieval. The hand-held meters are normally mounted on the tripod, are switched on with their own switch and are typically powered by replaceable 9 V batteries. The meters and their installation are described under Optional meters (p. 23).

> **Note**
> The station collects the data of an external meter only if the meter is switched on and connected, or its status button has been pressed, before you start the station. You cannot connect a new sensor while the station is logging.

Supplied items

Each station is built to its customer's sensor specification, so the items supplied depend on the order. The basic kit carries the internal CO and NO_2 sensors. These items come with the station or with its options:

- The HAZCOMM-PRO software on a thumb drive with a serial number label (see Installing HAZCOMM-PRO (p. 13)).
- The trim stick for pushing the impactor out of its sleeve (see Removing and refitting the impactor (p. 44)).
- With the inlet heater HA-600: the charger of its external power pack.
- With the transport cart: bungee cords.
- With the solar panel and back-up battery options: the owner's manual of the charge controller.
- With the wireless radio option: the components listed under Wireless radio RM-105EXT (p. 26).

Front panel

The front panel runs the instrument in stand-alone use, without the software.

- **Power** (red) and **Start** (green) buttons switch the instrument on (see Switching on (p. 35)).
- **Scroll Up** and **Scroll Down** show the current sensor data.
- **Function** (1) shows the commands the instrument can carry out: **Log ON**, **Log OFF**, **Alarm Reset**, **Alarm Status**, **Clear Data**, **Remove USB** and **Data to USB**. Scroll to see each one.
- **Enter** (2) carries out the selected command.

Status lights:

- **Disk** blinks while data are written to the memory.
- **Logging** is on while the instrument logs data.
- **Power** is lit while the station is powered.

If you collect data at more than one location, note each change of location on the **Header** page.



Figure 2-2. Front panel. (1) Function. (2) Enter.

Note

The **Sampling** light blinks as the instrument takes samples: every 6 to 10 seconds when it is not logging, less often when it is logging. If it does not blink, the logger is not working.

NOTICE

Front panel or software, not both. Commands from the front panel while the software controls the instrument leave the software out of date. Use the front panel only in stand-alone use; if you have used it while connected, disconnect and reconnect in HAZCOMM-PRO.

Connector panel

The external meters plug into the connector panel on the side of the instrument. Figure 2-3 shows where each meter connects. Their part numbers are:

Peripheral	Mfr code
Wind speed and direction meter	HS-WS&D-6000
ELF/EMF (extremely low frequency/electromagnetic field) meter	HS-ELF-6000
Sound meter	HS-SM-6000
Rain gauge	RS-6000
Radiation meter	HS-AR-6000

Other external sensors and meters that can be connected: barometric pressure sensor HS-BP-6000, dew point sensor HS-DP-6000, solar radiance intensity meter HS-SR-6000 and Quest-compatible sound level meter ASLM-6000.

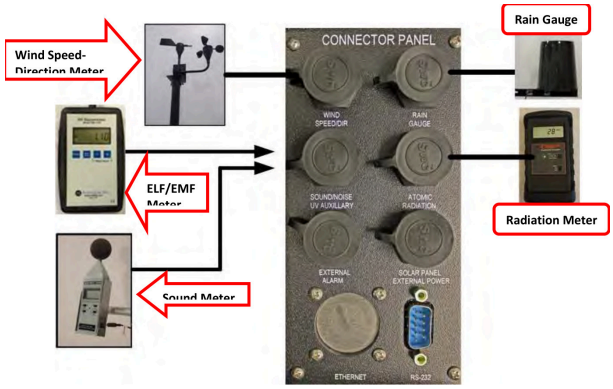


Figure 2-3. Peripheral connections on the connector panel.

Particulate sensor and impactors

The particulate (PM) sensor measures particle sizes of 1.0, 2.5, 4.0 or 10 µm. The size is set by the impactor inside the impactor sleeve, a small cylinder that you find in the instrument case. To change the size, replace the impactor in the sleeve. The PM10 impactor detects a wider range of particle sizes than the PM2.5 or PM-4.0 impactor. The impactor sizes are labelled on the sleeve.

The impactor consists of an impactor cup and an impactor jet, joined by three male pins on the jet that fit holes in the cup (Figure 2-5). It fits into the impactor sleeve, which fits into the particulate intake of the instrument.

An instrument can monitor two particulate sizes at once. It then has two particulate sensors, labelled sensor A (PM-10 or TSP) and sensor B (PM-2.5).

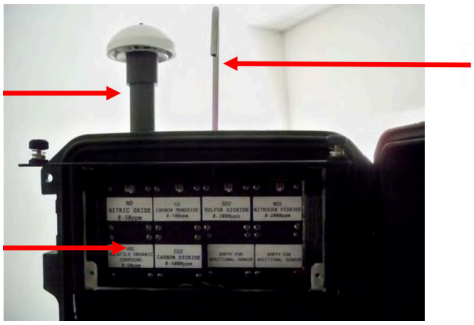


Figure 2-4. Particulate intake, gas sensor intake and gas sensor manifold.

NOTICE

Particulate sensors in their own slots. A sensor in the wrong slot gives wrong readings. After you put the impactor into its sleeve, insert the sleeve carefully into the intake designated for it.

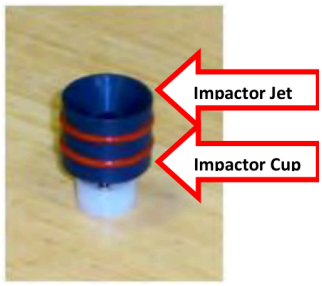


Figure 2-5. Impactor assembly: impactor jet and impactor cup.

HAZCOMM-PRO software

HAZCOMM-PRO controls and monitors HAZ-SCANNER instruments. It shows their sensor data in real time, creates graphical displays and generates detailed reports. The user name is **admin** and the password **admin**.

Term	Meaning
Header	Information about a data set that you enter on the Header screen: latitude and longitude, date, time, elevation, site comments, name of the person collecting the data, address or location of the site, sensor list, logger ID, alarm levels set, and more. The header can be printed on reports or on its own. Each data set can have its own header.
Header ID	A unique number that you assign.
Logger	The profile of an instrument in the software: its sensors, its serial number and the functions it can carry out, such as logging and graphing.
Logger ID	The serial number of the instrument.
Layout	A drop-down menu that leads to special functions, mainly for troubleshooting and calibration. For most functions use the navigation buttons.
Dashboard	The real-time display of the current sensor data. It is updated regularly to show changes in the data and alarms against your alarm thresholds.

Main page

The **Main** page has four primary functions:

1. **Connect** / **Disconnect**.
2. **Open Data File**: open a stored data file. Not possible while an instrument is connected.
3. **Start Logging** / **Stop Logging**. During the first 15 minutes after power-on the instrument warms up, and logging is disabled.
4. **Retrieve Data** from an instrument.

The **Preferences** page selects the COM port (**Port Name**) and sets e-mail alerts, the date and time format, the alarms and the location details. Two settings are used most:

- **Header**: the information about the data set, printed on the reports.
- **Set Alarms**: opens the alarm screen, where you set limits for all sensors. The limits are used in the reports and trigger the alarm module if the instrument has one. On the current data screen a sensor that exceeds its limit turns red (see Alarms (p. 40)).

Navigation

1. Menu buttons: use them whenever possible.
2. Main menu action and navigation buttons.
3. **Set Alarm** opens a screen for limits and alarms; **Timer Off** turns all alarms off.
4. The **Layout** menu: a quick way to the different views and functions. It is mainly for advanced troubleshooting and calibration; use the navigation buttons of the main page for the other functions.
5. The status bar shows different options. The number of records tells you where you are (Logger, Logger Sensors or Data).
6. **Preview** shows how the display prints from the upper menu; in most cases **Print** gives a printer-friendly view.

The blue **Continue** button gives you time to enter data before the software continues. If the software seems to stop, wait a few seconds: it may only be a pause. The **Zoom In** and **Zoom Out** buttons are at the bottom left of the screen.

Find

Find searches the database for the records you want. Multiple finds, constrained and extended finds and operators are all available. Besides the basic find of the **Find** side button, the **Requests** menu offers:

- **Saved Finds**: your saved and recent finds; click and hold the **Find** icon in the side bar.
- **Constrain Found Set**: runs the find in the current found set only and removes the matching items from it.
- **Extend Found Set**: runs the find in the omitted records only and adds the matching items to the found set.
- **Add New Request**: creates an OR find, for example headers 105 and 106.

After a find, **Omit Record** removes a single record from the found set, and **Show Omitted Only** switches to the omitted records. The **Insert: Operators** menu offers the logical operators of a find.

NOTICE

Delete is permanent. Deleted records cannot be restored, and an improper delete can disable functions of the software. Use the Delete and Omit functions with care.

CHAPTER 3

Before use

Install the software, charge the instrument, then set up the station with the inlet, power, meter and radio options it carries. Skip the sections for options your station does not have.

Installing HAZCOMM-PRO

Computer requirements:

- Windows XP or later (Windows Vista, 7, 8, 8.1, 10).
- At least 500 MB of free disk space.
- 2 GB of RAM.
- PC or Mac with one free serial COM port, or an external serial-to-USB adapter.

1. Create a folder named **Hazscanner** in the root of drive C:\ (Windows).
2. Unzip the contents of the supplied thumb drive into the Hazscanner folder (Windows) or into your Applications folder (Mac).
3. Create an **Uploads** folder on the desktop or in a directory of your choice.
4. Open the folder where the software was extracted and open the **HAZ-SCANNER** folder.
5. Right-click **Hazscanner.exe** and select **Create Shortcut**.
6. Use this shortcut to start the software.
7. Copy the contents of the supplied thumb drive to a new folder on the computer and keep the original thumb drive in a safe place.
8. Do not remove the serial number label from the thumb drive.

> **Note**
> Connect the serial-to-USB adapter to a USB port of the computer before you start HAZCOMM-PRO. The software needs a valid serial port when it starts.

Selecting the COM port. Before you connect, select the COM port in **Port Name** on the **Preferences** page. All active serial ports of the computer are listed. If the correct port is not listed, exit the software and restart the computer. If you still cannot select the correct port, check in the Windows Device Manager that the serial-to-USB adapter is configured correctly.

Charging and power

Charge the instrument battery for 24 hours before first use (LED green). The battery runs the instrument for 7 to 10 hours on average, depending on concentrations, alarm conditions and configuration.

- When the internal battery voltage falls below 10 V, the instrument switches off and stops collecting data to protect the data. Data already collected are kept. Connect the charger before you retrieve the data.
- If the battery voltage is below about 10 V when you switch on, the instrument does not fully power on. Connect the charger at once.

- When the battery is not fully charged, the display may show that the instrument runs in **Safe Mode**. Charge the battery fully so that all functions work.

The optional external back-up battery BUBP-6000 extends the logging time; recharge it when it is not in use. On its own it powers the station for about 3 to 5 days, depending on the configuration; together with the solar panel option it allows continuous use.

> **Note**
> Run the instrument without its battery where you can and use the battery for transport.

Storage

Storage conditions of the station and its sensors, from Specifications (p. 49):

- Particulate sensor: storage temperature −20 °C to 70 °C.
- CO, NO, NO_2 and SO_2 sensors: storage period 6 months at 3–20 °C, stored in a sealed pot.
- CO_2 sensor: storage temperature −20 °C to +50 °C.

Choosing the location

Select the sampling location carefully, install the station and make sure that it is physically secure. Until you start logging, the station samples every ten seconds, which helps you find the best location.

Setting up the tripod TP-600

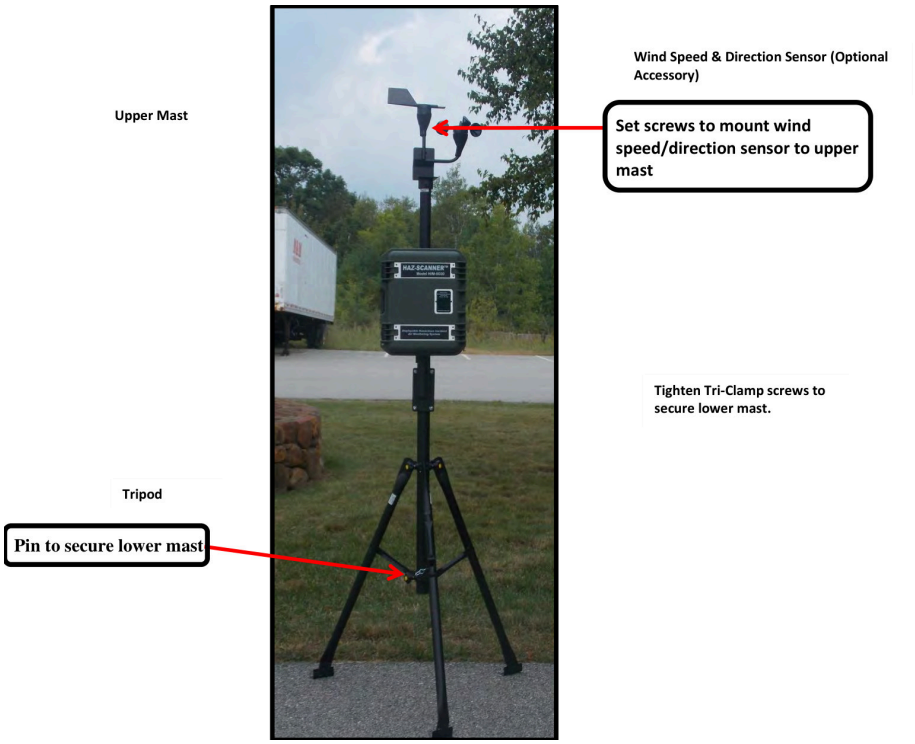


Figure 3-1. Tripod TP-600: upper mast with set screws for the wind sensor, lower mast secured by a pin and the tri-clamp screws.

NOTICE

Anchor the tripod. In strong wind an unsecured station can move or fall. Set the tripod on a level surface. For temporary use, drive ¼-inch stakes into the ground at an angle; for continuous use, bolt the tripod to cement pads with ¼-inch anchors. Fit a stake or bolt on each of the three feet.

1. Spread the tripod legs and flatten the feet.
2. Raise the tripod by pulling up the mast until the hole in the mast is above the leg bracket.
3. Tighten the thumb screws.
4. Insert the securing pin through the mast hole and push the securing clasp around the pin to hold it.
5. Tighten the thumb screws where the legs attach to the mast.
6. Place the instrument on the mounting arm and tighten the thumb screw.
7. Insert the height adjustment pin and tighten the compression nut.
8. Place the height adjustment pin in the mast hole.



Figure 3-2. Steps 1 to 4.



Figure 3-3. Steps 5 to 8.

Inlet accessories

Dust seal compression plate

1. Find the predrilled holes on top of the instrument case and remove the mounting screws.
2. Insert the dust seal compression plate into the impactor sensing inlet.
3. Align the screws with the predrilled holes and tighten them by hand or with a screwdriver until the plate presses on the impactor dust seal.

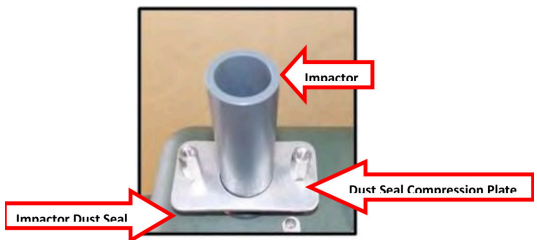


Figure 3-4. Dust seal compression plate in the impactor sensing inlet.

Precipitation cap PC-106

The precipitation cap is a shield against precipitation and sun. The particulate sensor works by light scattering, so infrared sun rays and precipitation can read as particulates. Precipitation here means not just rain but also light moisture, debris, sand, leaves, bird droppings and the like. The PC-106 protects against anything that falls from above. Place it on the impactor sleeve.



Figure 3-5. Precipitation cap PC-106.

Rain and moisture trap RT-600

The RT-600 adds protection against water and moisture entering the air intake in continuous outdoor monitoring. It is mandatory for unattended 24-hour monitoring where rain or high moisture is possible. It is used together with the PC-106, which comes as standard with a particulate sensor.

1. Locate the longer grey cylinder above the sight tube of the RT-600.
2. Push the PC-106 onto the grey cylinder above the sight tube.
3. Push the impactor sleeve IMS-105 onto the underside of the shorter grey cylinder.
4. Place the complete RT-600 assembly into the air intake of the instrument.
5. When water is trapped in the sight tube, remove the orange plug and let the water drain.
6. Refit the orange drainage plug. It keeps the inlet flow correct and closes the path to the sensor.

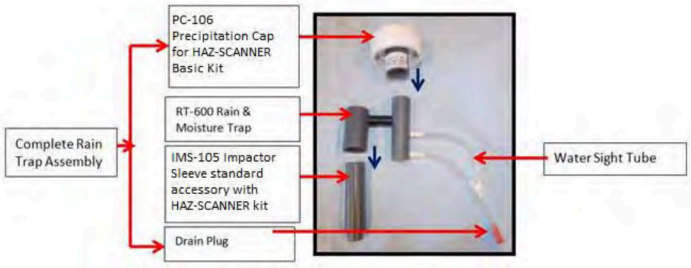


Figure 3-6. Rain and moisture trap RT-600.

Inlet heater HA-600

The HA-600 conditions the air temperature for particulate monitoring in high humidity, where the relative humidity is above 60 %. It evaporates the water from hydrophilic solid particles, so that the dry particulate matter is measured. It is especially useful in fog or mist. The heater is not effective above 95 % RH or in precipitation; for monitoring in rain, use the RT-600 rain trap. Use the heater where non-condensing moisture is above 50 %, and the rain trap where condensing moisture events such as rain, sleet or snow are likely. With both, place the rain trap on top of the inlet heater.



Figure 3-7. Inlet heater HA-600 components.

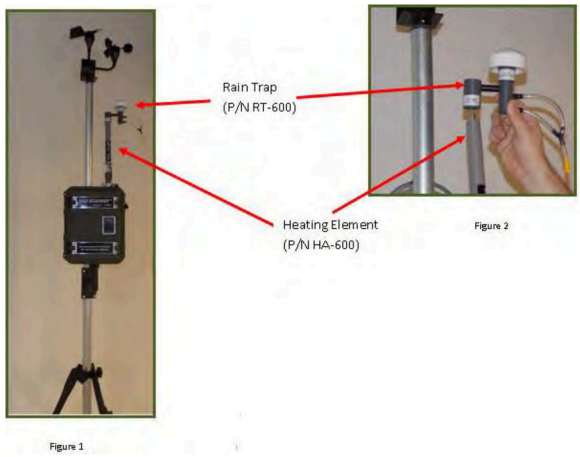


Figure 3-8. Rain trap on the inlet heater.

CAUTION

Hot inlet heater. The HA-600 is hot when it is powered. Touching it can burn you. Handle it with care while it is switched on.

1. Mate the connector of the heater cable with the cable of the external battery power pack.
2. Fit the inlet heater with its flow adapter onto the impactor sleeve.
3. If the internal battery powers the instrument, check that it is fully charged and that the power is on. A fully charged battery powers the instrument for about 10 hours.
4. The heater temperature is set for sampling at 2 L/min. Switch the HA-600 on with its power switch and let it warm up for 10 minutes before you sample particulates.
5. Charge the batteries of the external power pack only with the supplied charger and with the power pack switched off. The charger LED turns green when the batteries are fully charged.



Figure 3-9. Rain trap and inlet heater on the instrument.

Note

If you use the HA-600 continuously or for longer than 10 hours, you can connect the power pack charger directly to the heater power cable connector. With the back-up battery or solar panel options, connect the heater power connector to the EPC-BUBP-600 cable on the back-up battery.

Further notes on the heater power (Figure 3-10):

- The HA-600 battery charger can power the heater on its own.
- The HA-600 battery pack powers the heater for about 10 hours on a full charge.

- The HA-600 battery charger comes with several AC adapters and accepts 110 to 240 V AC.
- The HA-600 external power cable and the HA-600 output cable differ only in their bayonet connectors (male or female).

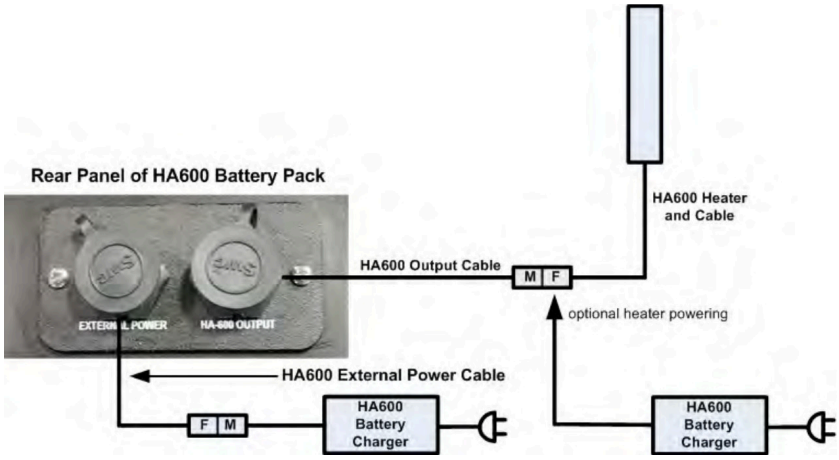


Figure 3-10. Inlet heater power connections.

Power options

Figure 3-11 to Figure 3-14 show the four ways of powering the instrument: from AC, from its internal battery, from the back-up battery, and from the solar panel with the back-up battery.

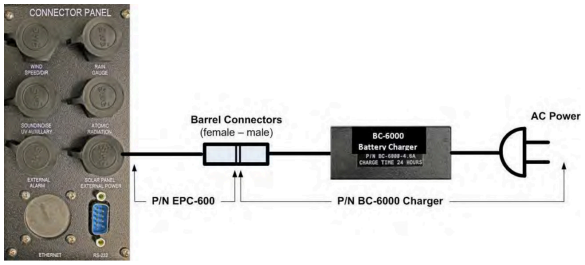


Figure 3-11. Basic AC power.

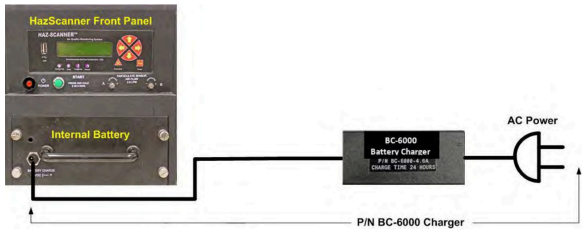


Figure 3-12. Charging the internal battery at the front panel.

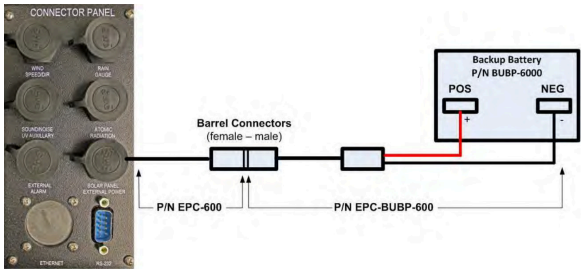


Figure 3-13. Back-up battery.

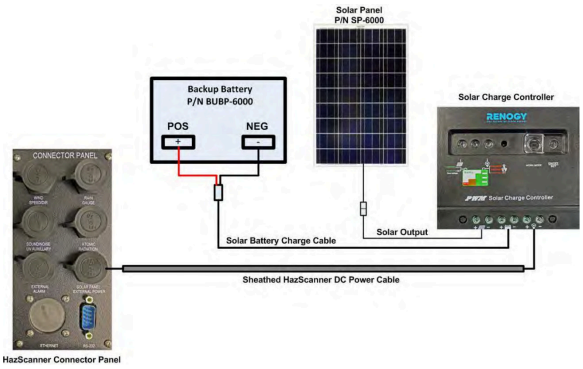


Figure 3-14. Solar panel and back-up battery.

External power connector EPC-600

The EPC-600 connects the instrument to the battery charger while the front cover is closed. One end plugs into the connector panel socket marked **Solar Panel/External Power**, the other into the BC-6000 universal battery charger.



Figure 3-15. EPC-600 connections.



Figure 3-16. BC-6000 universal battery charger.

Back-up battery connection EPC-BUBP-600

The EPC-BUBP-600 connects the 12 V DC/75 A AGM (absorbent glass mat) back-up battery BUBP-6000 to the instrument, with or without a solar panel. The standard solar panel needs about 20 hours of direct sunlight to charge the battery fully. The battery can also be charged from AC with the charger BC-BUBP-6000.

NOTICE

Battery polarity. A cable on the wrong terminal can damage the equipment. Connect the red cable to the positive terminal and the black cable to the negative terminal.

1. Connect the male bayonet connector of the EPC-BUBP-600 to the female bayonet connector of the EPC-600.
2. Connect the battery cable connectors of the EPC-BUBP-600 to the BUBP-6000: red to positive, black to negative.

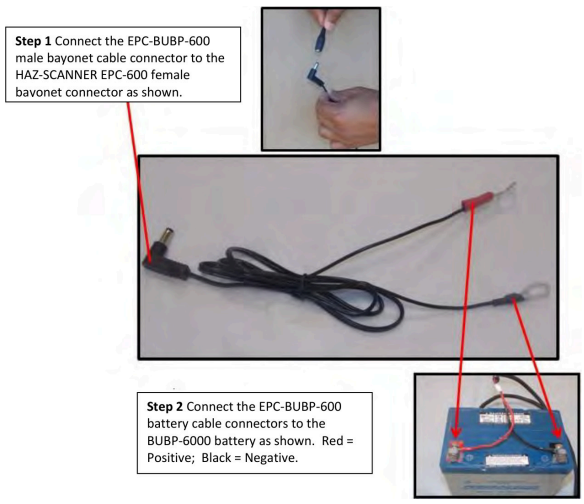


Figure 3-17. EPC-BUBP-600 connections.

Back-up battery BUBP-6000 and charger BC-BUBP-6000

The BUBP-6000 is a 12 V DC/75 A AGM back-up battery that powers the station with or without solar panels. The standard 80 W solar panel needs about 20 hours of direct sunlight to charge it fully. To charge it from AC, connect the external charger BC-BUBP-6000 to the battery with its clamps:

NOTICE

Charger supply voltage. The red switch at one end of the charger selects 115 V AC or 230 V AC. A charger set for the wrong voltage can be damaged. Check the setting against your power source before you plug it in.

1. Connect the red clamp to the positive terminal of the back-up battery.
2. Connect the blue clamp to the negative terminal.
3. Connect the charger to an AC power source. Charging takes about 10 hours, or until the charger LED turns green.

To connect the back-up battery to the instrument:

1. Connect the red cable of the EPC-BUBP-600 to the positive terminal of the battery.
2. Secure it with bolts (not included).
3. Connect the black cable to the negative terminal.
4. Secure it with bolts (not included).
5. Connect the EPC-600 cable to the connector panel socket labelled **Solar Panel External Power**.

Mounting the back-up battery on the tripod

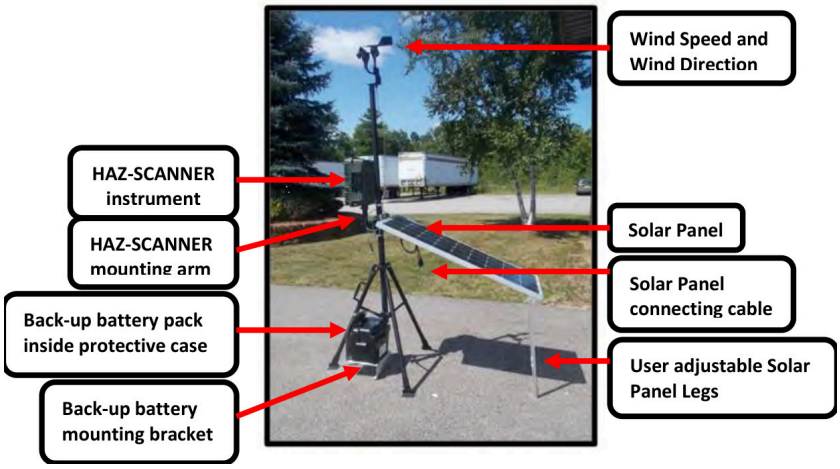


Figure 3-18. Station with solar panel and back-up battery on the tripod.

1. Remove the bracket thumb screws from the factory-fitted U-clamp on a lower tripod leg.
2. Locate the predrilled holes on the battery mounting plate.
3. Position the mounting plate, refit the thumb screws and tighten them.

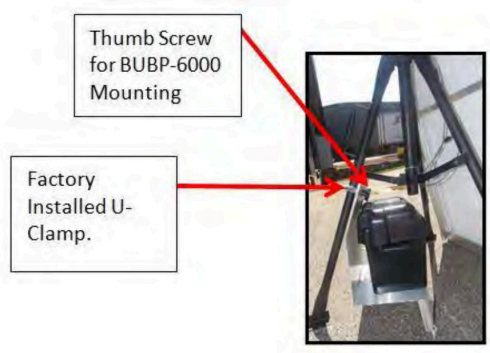


Figure 3-19. Back-up battery bracket on the tripod.

Transport cart for the back-up battery

1. Place the cart on the ground.
2. Put a hand under the cart handle and lift to extend it.
3. Place the back-up battery carefully on the cart platform.
4. Wrap the supplied bungee cords over battery and cart to secure the battery for transport.



Figure 3-20. Transport cart.

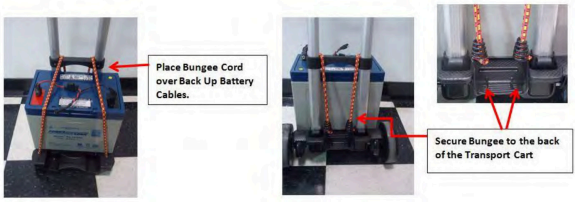


Figure 3-21. Securing the battery on the cart.

Solar panel SP-6000

The 100 W solar panel SP-6000 charges the battery when it is in direct sunlight. For long-term monitoring use it with the back-up battery BUBP-6000; the 12 V DC, 75 A battery typically powers a station for 3 to 5 days, depending on the configuration.

For maximum output, face the panel towards the sun. For permanent installations, orient the panel for your location: near Seattle, Washington, for example, point it south at about 45–50° in summer and about 63° in winter.

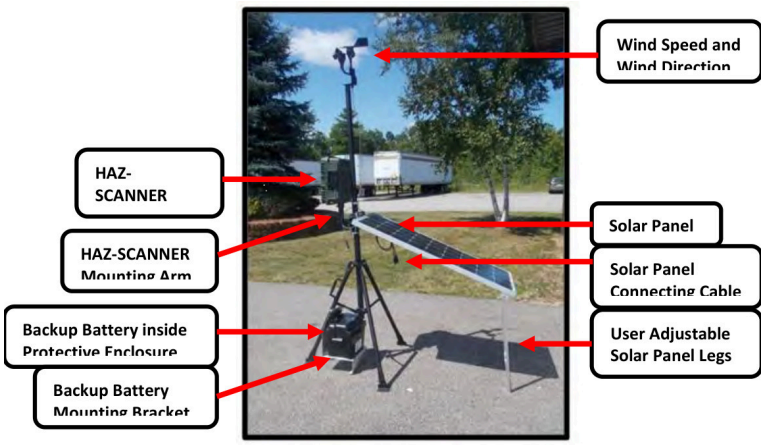


Figure 3-22. Solar panel on the tripod.

NOTICE

Anchor the tripod. In strong wind an unsecured station can move or fall. Secure the tripod feet with ground anchors or stakes, or bolt them to cement pads, as described under Setting up the tripod TP-600 (p. 14).

1. A factory-fitted U-clamp for the panel sits on the tripod directly behind the instrument mounting arm. Remove its thumb screws.
2. Locate the predrilled holes on the panel mounting plate and position the monocrystalline panel on the U-clamp.
3. Refit the thumb screws and tighten them.

4. Unfold the panel.
5. Unfold its stabilising leg and panel legs so that they touch the ground, and position the panel for the best sunlight.

Adjusting the tilt twice a year. Adjust the tilt of the panel twice a year, on the dates in Table 3-1. If your latitude is between 25° and 50°, the best summer tilt is the latitude × 0.93 − 21°, and the best winter tilt is the latitude × 0.875 + 19.2° (Table 3-2).

Table 3-1. Dates for adjusting the tilt.

	Northern hemisphere	Southern hemisphere
Adjust to the summer angle on	30 March	29 September
Adjust to the winter angle on	12 September	14 March

Table 3-2. Tilt angles by latitude.

Latitude	Summer angle	Winter angle	Average insolation on panel	% of optimum
25°	2.3	41.1	6.6	76 %
30°	6.9	45.5	6.4	76 %
35°	11.6	49.8	6.2	76 %
40°	16.2	54.2	6.0	75 %
45°	20.9	58.6	5.7	75 %
50°	25.5	63.0	5.3	74 %

Solar charge controller

The solar charge controller sits on the back-up battery BUBP-6000 and protects the battery against overcharge and over-discharge.

1. Attach the controller to the battery: align the Velcro on the back of the controller with the factory-fitted Velcro on top of the battery and press them together.
2. Locate the loose end of the blue-sheathed controller cable (its other end is factory-fitted to the controller).
3. Find the notch on the end of the cable.
4. Turn the notch to the 12 o'clock position and connect the cable to the connector panel socket labelled **Solar Panel External Power**.
5. Twist to lock it.
6. Locate the factory-fitted black-sheathed cable on the back of the solar panel.
7. Connect its other end (black and red wires) to the mating connector on the charge controller on top of the battery.



Figure 3-23. Charge controller and its cable.

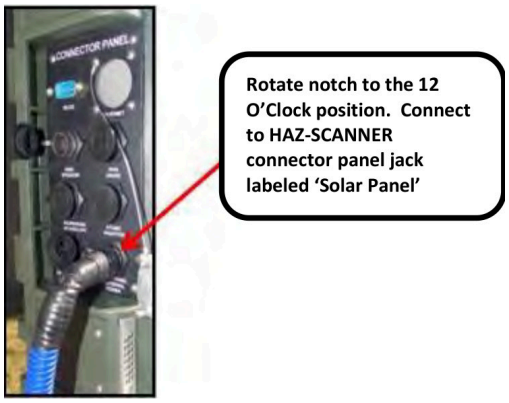


Figure 3-24. Controller cable on the connector panel.



Figure 3-25. Solar panel cable on the charge controller.

The owner's manual of the charge controller comes with the solar panel and back-up battery options.
Its LED indications:

Table 3-3. Charge controller LED indications.

Indicator	LED	State	Meaning
Solar	Green	On	Solar power is charging the battery
	Green	Blinking	The system is over voltage
Battery	Green	On	Battery level in the right range
	Green	Slowly flashing	Battery level full
	Orange	On	Battery level low
	Red	On	Battery over-discharged
Load	Orange	On	The load output is on
	Red	Slowly flashing	Overload
	Red	Blinking	Load short-circuited

Optional meters

Connect and switch on every meter before you start logging (see External meters (p. 9)). Figure 2-3 shows the connector panel.

ELF/EMF meter HS-ELF-6000

1. Make sure the batteries of the meter are fully charged.
2. Connect the black signal cable to the side of the meter.
3. Connect the 4-pin end of the cable to the connector panel socket marked **Sound/Noise UV Auxiliary**.



Figure 3-26. ELF/EMF meter.

Operation:

1. Press and hold the **Power** button to switch the meter on.

2. Magnetometer readings are based on the earth's magnetic field. Zero the meter either in a zero gauss chamber (not supplied) or by placing the probe precisely: lay it on a non-magnetic surface with its detection side down, pointing east to west, and pivot it slightly until the display reads zero.
3. Zero the meter by pressing and holding its **Auto Zero** button.
4. Connect the instrument to the computer running HAZCOMM-PRO and establish the serial connection.
5. In the **Layout** menu select **Terminal**, then click **Calibrate**.
6. Click **Zero Sensor**.
7. Place the meter in its mounting bracket on the tripod. You can also remove it for local measurements.
8. To measure, place the probe on the object with its detection side down.

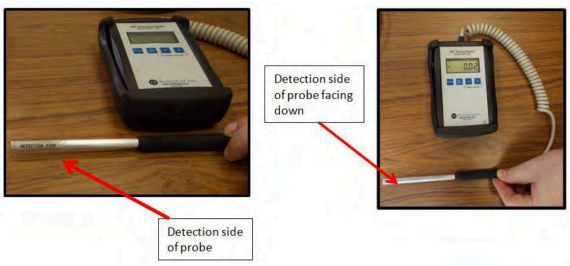


Figure 3-27. Placing the probe for zeroing.

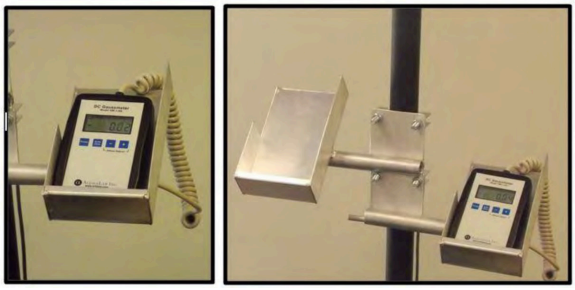


Figure 3-28. ELF/EMF meter on the tripod.

Rain gauge RS-6000

The RS-6000 is a tipping bucket rain gauge designed to the guidelines of the World Meteorological Organization. Rain enters the collector cone, passes a debris screen and collects in one chamber of the tipping bucket. The bucket tips when it has collected water equal to 0.01" (0.254 mm) of rainfall. As it tips, it closes a switch and brings the second chamber into position. The water drains out through the screened drains in the base.

Body and base are made of tough, UV-resistant plastic. The bucket pivots on low-friction bearings. Stainless steel adjustment screws under each chamber let you fine-tune the calibration. The base has predrilled mounting holes and a built-in levelling trough.

Attach the rain gauge to the tripod with the U-clamp.



Figure 3-29. Rain gauge RS-6000.

Atomic/nuclear radiation meter HS-AR-6000

1. Make sure the batteries of the meter are fully charged.
2. Plug the stereo jack of the signal cable into the meter.
3. Plug the 4-pin end of the cable into the connector panel socket labelled **Atomic Radiation**.
4. Switch the meter on. After 1 minute the meter beeps: it is ready for use. The instrument takes about 2 minutes to show the same counts per minute as the meter.
5. Place the meter in the meter cradle on the tripod.



Figure 3-30. Radiation meter.

Alarm unit AL-6000

Attach the alarm unit to the upper mast with the U-clamp provided and position it as you want. The unit has an audible alarm switch.

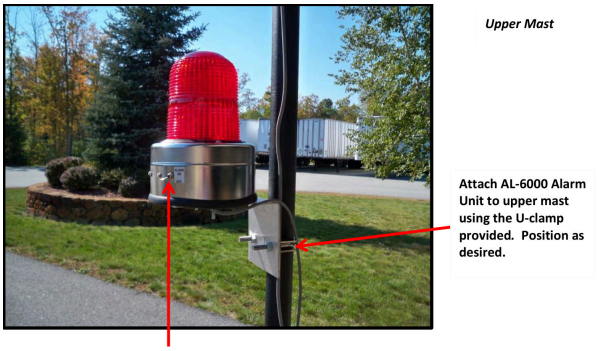


Figure 3-31. Alarm unit AL-6000.

Sound meter bracket HS-SM-6000

1. Fasten the sound meter bracket to the lower mast of the tripod with the U-clamp.
2. Connect the signal cable (ASLM-6000) to the sound meter and the instrument.
3. Operate the sound meter as described in its instruction manual.

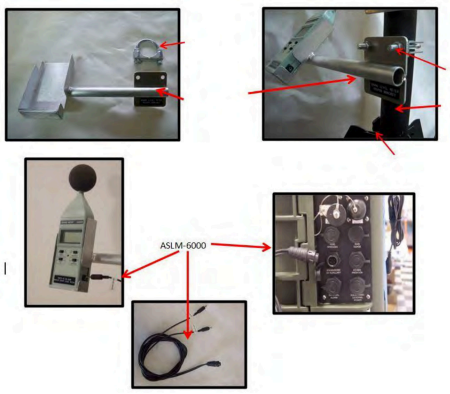


Figure 3-32. Sound meter on the tripod.

Wet bulb WS-WB-600

1. Place the U-clamp around the rear of the tripod.
2. Position the flat side of the U-clamp bracket against the mounting plate of the WB-600.
3. Put the nuts on the threaded ends of the U-clamp and tighten them with a wrench.
4. Connect the 4-pin power/signal cable of the WB-600 to the connector panel socket labelled **Sound/Noise UV Auxiliary**.

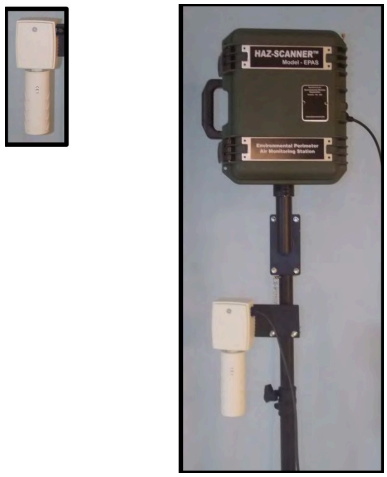


Figure 3-33. Wet bulb WS-WB-600.

Wind speed and direction sensor

1. Place the wind speed and direction sensor on top of the tripod upper mast and secure it with the screw, nut and thumb screw.
2. Line up the two ridges on the wind direction sensor and make sure the marks face north.

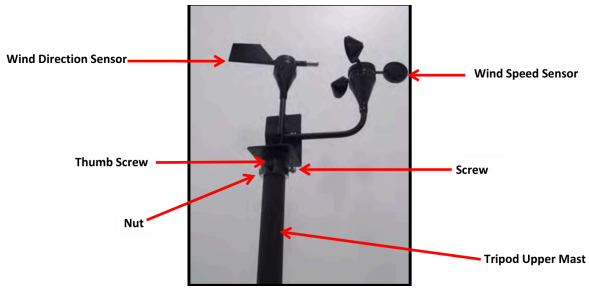


Figure 3-34. Wind sensors on the upper mast.

Wireless radio RM-105EXT

The RM-105EXT extended-range radio modems are an option for the station. They transmit 1 W digitally modulated RF signals in the 900 MHz ISM (industrial, scientific and medical) band. Omni-directional or high-gain Yagi antennas extend the distance between a computer and one or more instruments; reliable transmission over up to 5 miles (line of sight) is possible. Each modem has an integrated RS-232 serial modem that gives end-to-end serial connectivity. HAZCOMM-PRO fully supports the radios; all radio components are frequency-matched and programmed for HAZCOMM-PRO.

> **Note**
> The modem at a remote instrument is labelled "transmitter": it sends data to the base modem at the HAZCOMM-PRO computer, which is labelled "receiver".

Supplied components:

- 2 RM-105EXT radio kits: one modem for the computer and one for a remote instrument.
- 1 serial data cable of 25 ft for the base station, wired to the enclosure.
- 1 serial cable of 3 ft for the remote location, wired to the enclosure.
- 1 serial-to-USB adapter.
- 2 N-SMA cables of 10 ft (base and remote), wired to the enclosure.

- 2 extended-range omni-directional or Yagi antennas with mounting hardware.
- 1 power supply for each radio kit.
- 2 RM-105EXT/HAZ-SCANNER charger cables, wired to the enclosure.

> **Note**
> With the wireless network software option WNS-600, one Yagi antenna can be replaced with an omni-directional antenna for point-to-multipoint operation, depending on the RF path design.

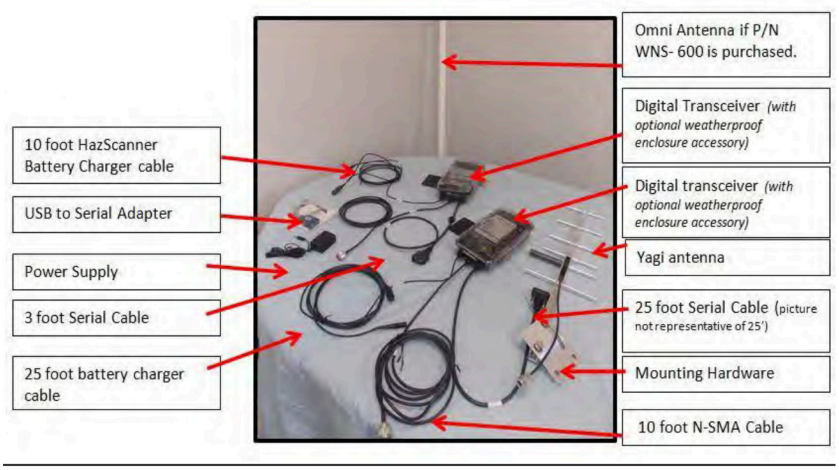


Figure 3-35. Base and remote radio components and cables.

Base station (receiver)

1. Insert the CD with the serial-to-USB adapter software and install the adapter drivers.
2. Attach the serial-to-USB adapter to a USB port of the computer, if needed. Use the same USB port each time.
3. Attach one end of the 25 ft serial data cable to the adapter or directly to a serial port of the computer.
4. Make sure the other end is connected to the serial connector of the modem inside the waterproof enclosure.
5. Connect the 25 ft modem power cable, wired inside the enclosure, to the supplied power supply.
6. Make sure the 10 ft N-SMA antenna cable is connected to the SMA connector of the modem inside the enclosure, without overtightening this connector.
7. For best performance, mount the antenna as high as possible and clear of nearby objects; higher antennas may need additional RF coaxial cable (ask Analyt-MTC for advice on your installation).
8. Weatherproof the exposed RF connections as described under Remote station (p. 28).

Remote station (transmitter)

NOTICE

Weatherproof the RF connections. Water enters an exposed RF connection wherever the wrapping leaves air. Wrap every exposed RF connector as follows:

1. Wrap the whole connection once or twice with 3M Scotch Super 88 or 88T PVC electrical tape (preferred over Super 33 for its temperature characteristics and its 20 % greater thickness). Overlap each turn well; leave the last turn loose and press it down so it does not unwrap. Leave no air cavities or openings.
2. Wrap the whole connection once or twice with 3M Scotch 2242 rubber electrical tape, pulled so hard that it turns from black to grey, tightly over the Super 88.
3. Wrap the whole connection once or twice again with Super 88.
4. Leave a 1 ft drip loop of cable at the antenna end of the line.

1. Charge the instrument battery fully: the battery LED turns from red to green. With radio equipment connected, the battery run time drops to about 5 hours.
2. Attach the 10 ft N-SMA cable from the bottom of the waterproof enclosure to the antenna.
3. Attach the 3 ft serial data cable from the radio enclosure to the DB9 serial connector of the instrument.
4. Connect the 10 ft power cable to the instrument power supply, which powers both the instrument and the radio.
5. Start logging from the computer or the front panel (see Quick start (p. 35)).

Depending mainly on the 900 MHz RF path, omni-directional antennas may be better than high-gain directional Yagi antennas; ask Analyt-MTC which antenna suits each link.

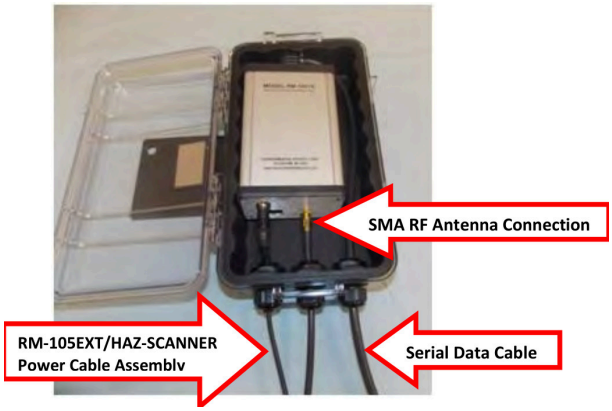


Figure 3-36. Cable connections to the radio modem.

Point-to-point and point-to-multipoint

With **View Current Data**, HAZCOMM-PRO shows the sensor dashboard, updates it once per minute and stores the data. In a point-to-multipoint system the software connects to and collects data from every networked instrument; each instrument connects to a single base radio. **Disconnect** disconnects all of them.

Unlike a point-to-point system, a point-to-multipoint system has one base modem (receiver) for two or more remote modems (transmitters), each connected to the serial interface of an instrument. In operation all modems communicate in both directions. The software addresses each instrument by changing the radio channel of the base modem and the address of the far-end modem: in Figure 3-37 it talks first to instrument 1, then switches channel and address to talk to instrument 2. Because the remote radios work on different channels, each link behaves as single-channel communication between the software and that instrument.

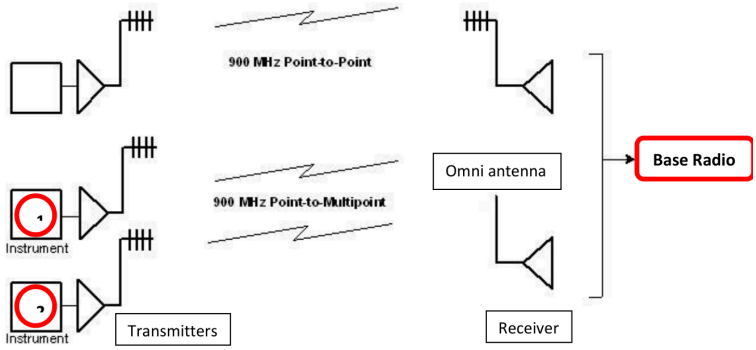


Figure 3-37. Point-to-multipoint architecture.

> **Note**
> Where the line of sight between the computer and a remote instrument is blocked, a specially configured 900 MHz repeater radio may be needed.

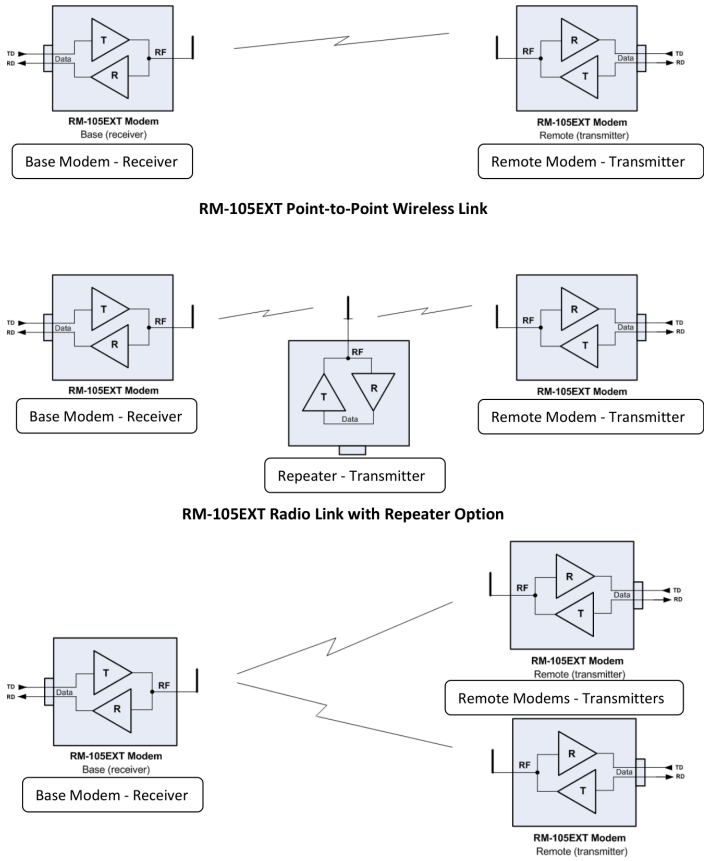


Figure 3-38. Radio topologies: point-to-point, with repeater, point-to-multipoint.

Weatherproof radio enclosure RM-105-WE

1. Put the U-clamp into the predrilled holes of the U-clamp bracket.
2. Place the flat side of the bracket against the rear of the tripod.
3. Tighten the nuts against the tripod.
4. Align the predrilled holes of the RM-105-WE mounting bracket with the U-clamp.

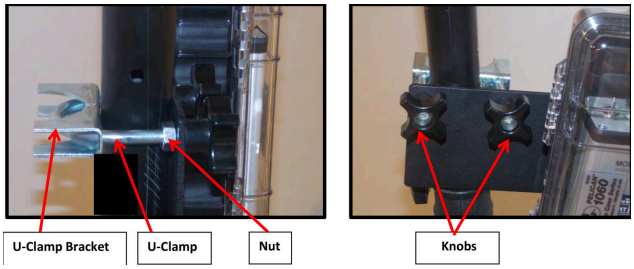


Figure 3-39. Radio enclosure on the tripod.

5. Tighten the knobs on the U-clamp.

Yagi antenna

1. The pivoting mounting plate is factory-fitted to the antenna. Remove its mounting nuts.
2. Align the predrilled holes of the pivoting mounting plate with the U-clamp bracket on the tripod.
3. Tighten the nuts with a wrench.
4. Pivot the antenna to the vertical and horizontal position you want.

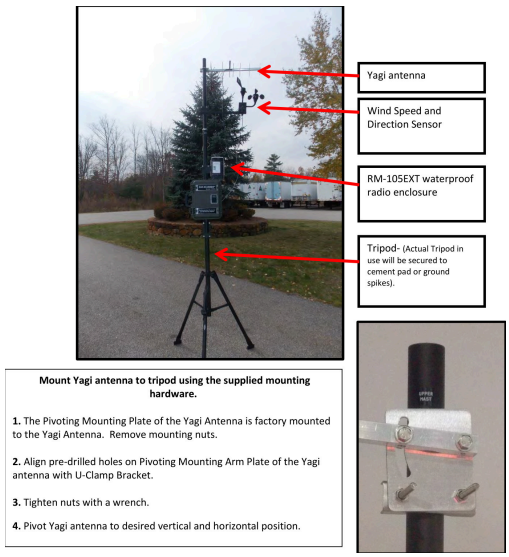


Figure 3-40. Yagi antenna on the tripod. In use, the tripod is secured to a cement pad or ground spikes.

Configuring HAZCOMM-PRO for radio links

1. Start HAZCOMM-PRO and click **Find** on the menu bar.
2. In the **Serial Number** field at the bottom of the screen, enter the serial number of the remote instrument.
3. In the **Layout** menu, select **Logger**.
4. On the **Logger Info** tab, type the RF channel of the first remote modem into the **HopperID** field.
5. Click the **Main** tab.
6. Connect the serial cable of the base radio to the serial port or serial-to-USB adapter of the computer.
7. Connect the serial cable of the remote modem to the serial interface of the instrument.
8. Click **Connect**.

> **Note**
> The serial cable between the computer and the base radio must not exceed 30 ft. To place the waterproof enclosure closer to the computer, you may need a longer RF cable between the base radio and the antenna; ask Analyt-MTC about the cable type, weatherproofing and other points.

> **Note**
> Repeat these steps for each remote instrument of a point-to-multipoint system. Each remote radio works on its own RF channel, called the "Hopper" channel in HAZCOMM-PRO. The software associates the base radio channel with each remote radio and selects automatically which instrument it connects to.

Powering the radios

With the solar panel option SP-6000:

1. Plug the male power jack of the EPC-BUBP-600 into the female jack on the back of the radio modem.

2. Connect the plus and minus leads of the EPC-BUBP-600 to the back-up battery: red to positive, black to negative.

> **Note**
> From DC sources, including the repeater option, the radios normally take their power directly from the back-up battery.

The radios can be powered from the BC-6000 battery charger, from the supplied RM-105EXT AC power supply, or from the back-up battery with or without the solar panel; a repeater can use AC or DC (Figure 3-41 to Figure 3-43).

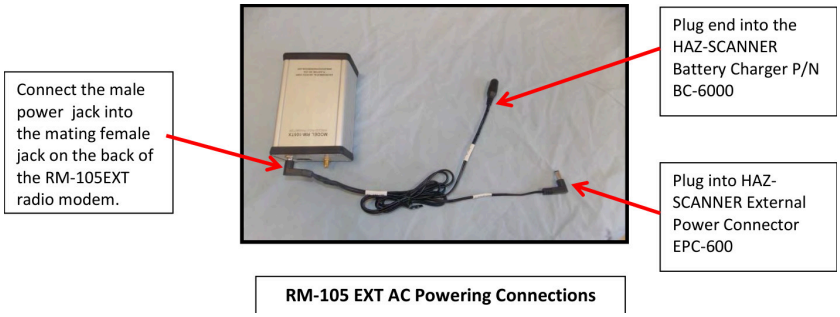


Figure 3-41. Radio AC power connections.

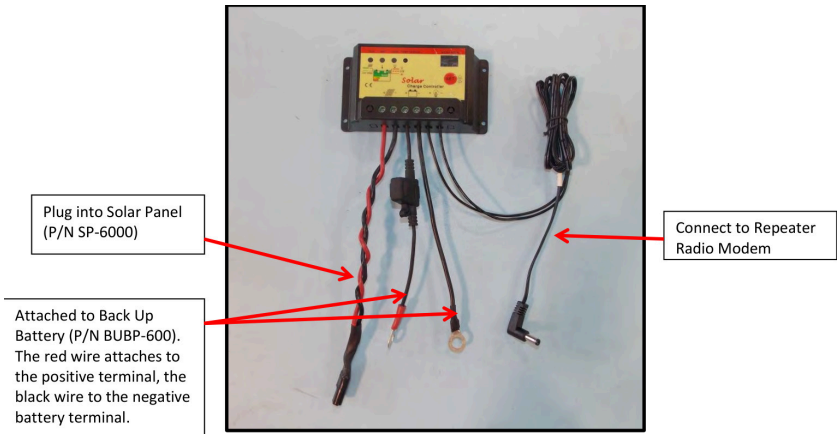


Figure 3-42. Solar power connections for a repeater radio.

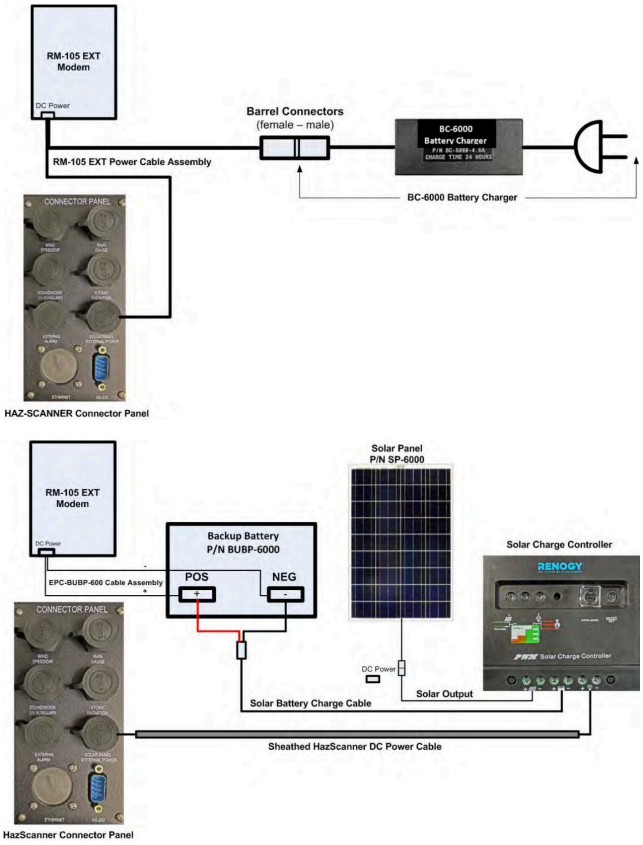


Figure 3-43. Radio modem AC and DC powering options.

Preparing a USB thumb drive

Thumb drives supplied with the software are preformatted. To use another thumb drive for data uploads, give it a single small partition with large clusters. You need the instrument, the thumb drive, a Windows computer with a free USB port and the free EaseUS Partition Master software.

> **Note**
> Partition Master lists every drive of the computer, including the Windows system drive and any removable drives. Identify the disk of your thumb drive before you change anything.

1. Connect the thumb drive to the computer and start Partition Master.
2. Right-click the disk of the thumb drive and click **Delete all Partitions**.
3. Confirm with **OK**. The task is added to the **Pending Operations** list; queued tasks run after you have defined them all.
4. Right-click the "unallocated" entry under the thumb drive and click **Create Partition**.
5. Set **Create as** = Primary and **File System** = FAT.
6. Drag the slider to set the size: the smaller the partition, the faster the logger responds; 2000 MB (2 GB) or less is recommended.
7. Check that "unallocated space before" is 0.0 and click **OK**.
8. Right-click the new "FAT16" entry under the thumb drive and click **Format Partition**.
9. Set **File System** = FAT and **Cluster size** = 32 KB, and click **OK**. A 32 KB cluster instead of the standard 4 KB reduces the number of clusters and so the read time; the smallest possible file is then 32 KB, which suits the few, large files of the instrument.

10. Click the large tick in the toolbar to apply the changes and confirm with **YES**.
11. If you are asked to restart the computer, select **NO**; it is not needed.

Table 3-4 gives the time the instrument needs to analyse and read a thumb drive before it can store data on it. A drive of 2 GB or less shortens the upload time.

Table 3-4. Typical read times of USB drives.

Drive capacity (MB)	Cluster size (KB)	Read time (s)
500	8	14
500	16	8
500	32	5
1000	16	14
1000	32	8
2000	32	14
4000	8	182
4000	16	93
4000	32	47

Date, time and date format

The date and time of the instrument and of HAZCOMM-PRO can be synchronised with the computer clock. The instrument must be connected to the software.

1. With the instrument connected, open the **Scripts** menu in the Windows menu bar and select **Set Date and Time**.
2. A message asks you to confirm. Click **OK**. A second message confirms that the date and time are set.

Switching the instrument off does not change the date and time unless they are reprogrammed or the internal battery is replaced. Normally you set them only once.

To change the date format, click **Preferences** in the main menu and choose the format. The software then prompts you to reprogram the instrument: select **Program** in the **Logger** menu. When you scroll through the instrument display, the new format shows. To set a date other than the computer date, ask Analyt-MTC.

NOTICE

Reprogram after the change. If the instrument is not reprogrammed, the date, time and date format return to the factory settings when it is switched off. Reprogram with the software connected to the instrument.

Help and registration

The **Help** menu contains basic information from these instructions. **Help/Registration** shows a registration form that you can send by e-mail with **email Form**; it sends customer details and basic system information. The form is sent only when the computer is connected to the instrument and to the internet; without the instrument, you can choose to send it anyway. Send the form before you contact technical support.

Checking the flow with flow meter FM-105

The particulate sensor air flow is 2.0 L/min. To check it, connect the FM-105 flow meter to the particulate inlet with its tube (Figure 3-44). Set the flow of sensor A or B with its adjuster (Figure 3-45): turn towards − to lower the flow and towards + to raise it.

> **Note**
> Hold the flow meter vertical while you measure.

> **Note**
> On newer instruments the flow adjusters are below the display panel.

To check the calibration of the particulate sensors before use, see Checking the particulate calibration (p. 46); to calibrate the gas sensors, see Calibrating the gas sensors (p. 47).



Figure 3-44. Flow meter on the instrument.



Figure 3-45. Flow adjusters A and B.

CHAPTER 4

Procedure

Control the station with HAZCOMM-PRO wherever you can. Use the front panel only when the instrument runs stand-alone.

Switching on

1. Press the red **Power** button briefly, then hold the green **Start** button for at least 5 seconds.
2. Scroll through the display with the scroll keys and check that the sensors work.

Switch the instrument on at least 15 minutes before you collect data. Switching it off resets the alarms, limits and spans.

Quick start

Log on to HAZCOMM-PRO with user name **admin** and password **admin**.

1. Charge the instrument battery for 24 hours (LED green).
2. Switch the station on at least 15 minutes before use, with the charger connected if needed.
3. On the **Preferences** page, check that the correct serial port is selected.
4. If the port of the serial-to-USB adapter is not shown, click the **Port Name** box and select the correct port.
5. When the **Change ports** dialog appears, click **Cancel**.
6. On the main screen, click **Connect** to start communication with one or more instruments.
7. When you connect, the software asks whether to keep the existing data file:
   - **Cancel**: and save the file, if the data file came from viewing data.
   - **Keep**: only if the data file was not saved before (not recommended).
   - **Close**: you are prompted to save the data file (recommended).

   NOTICE

   No connections while logging. A meter that is not switched on and connected when logging starts is not logged, and no sensor or meter can be connected while the station is logging. Connect and switch on all meters before you start logging.
8. Click **Start Logging**.
9. Wait a few moments for the instrument to log sensor data before you continue.
10. To upload the data, click **Retrieve Data** on the main screen. Depending on the size of the data file this can take a few moments.
11. When asked for the file location, select the **Uploads** folder and enter a meaningful file name or accept the default one.
12. To show the current sensor data, click **View Current Data** on the main screen. The dashboard (Figure 4-1) is refreshed at one-minute intervals; the screen flashes while data are retrieved, which is normal.

Note

If you have switched logging off since the last upload, create a new header; otherwise the data file shows no time gap. If you are not logging and the instrument holds no new data, you can use the old header or append the new data to the last upload.

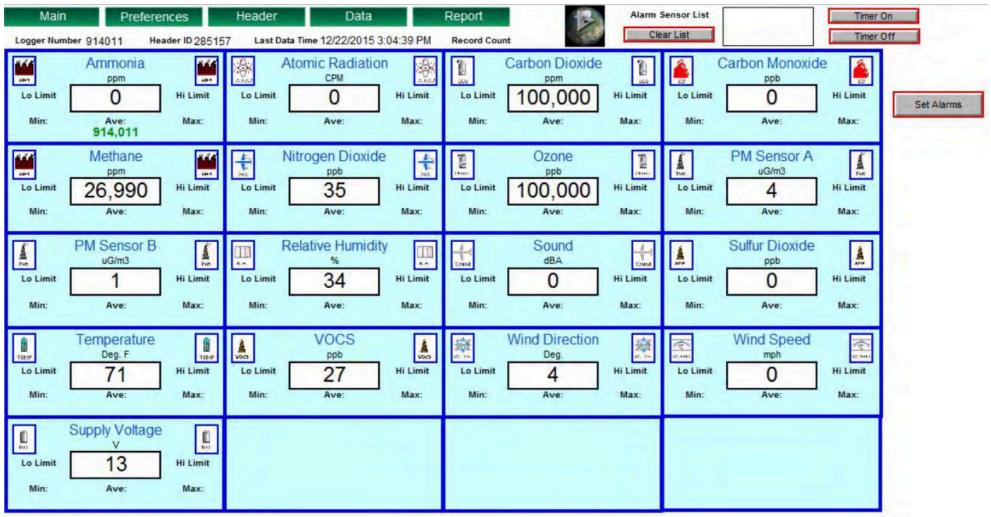


Figure 4-1. Current sensor data on the dashboard.

Note

The current data are refreshed about once a minute while the instrument logs and every 6 seconds when it does not.

Logging from the front panel

Note

Switch the station on 20–30 minutes before a logging session; the NO (nitric oxide) sensor needs the instrument powered for 24 hours.

NOTICE

No connections while logging. A meter that is not switched on and connected when logging starts is not logged, and no sensor or meter can be connected while the station is logging. Connect and switch on all meters before you start logging.

If you use the front panel while HAZCOMM-PRO is connected, disconnect and reconnect in the software so that it is up to date.

Logging on. The **Clear Data** function erases all old data; upload the data before you start a new session.

1. Scroll through the display and check that the sensor values look reasonable.
2. Press **Function**.
3. If needed, select **Log On** with the scroll buttons.
4. Press **Enter**.
5. Scroll to the screen with the record count. The count updates after 1 minute.

Logging off. Stop logging before you move the station or disconnect a meter.

1. Press **Function**.
2. If needed, select **Log Off** with the scroll buttons.
3. Press **Enter**.

Retrieving data

Retrieve Data (also called upload data) copies the data from the instrument to the computer for graphs, reports and export.

1. On the main menu, click **Retrieve Data**.
2. Fill in the new **Header** form. Meaningful header information helps you recognise and find the data later.
3. Click the blue **Continue** button. The screen flashes and shows the number of records uploaded.
4. Choose where to save the data file; always select the **Uploads** folder. A message confirms that the upload was saved.
5. You are asked whether to erase or keep the data in the instrument. Kept data are uploaded again with the next upload. In most cases, erase them: click **OK** to clear the instrument data.

> **Note**
> With a lot of data in the instrument, the upload can take several minutes. Wait until it is complete. Erasing the instrument data shortens later uploads.

Viewing uploaded data

1. Disconnect from the instrument if you are connected.
2. On the main page, click **Open Data File**.
3. The **Uploads** directory opens. Select the data file. The data open on the **Environmental Report** page, which shows the minimum, maximum and average values and from which you can create graphs.

> **Note**
> Unless configured otherwise, HAZCOMM-PRO saves uploaded data files in the **Uploads** folder. Always save data there so that you find your files easily.

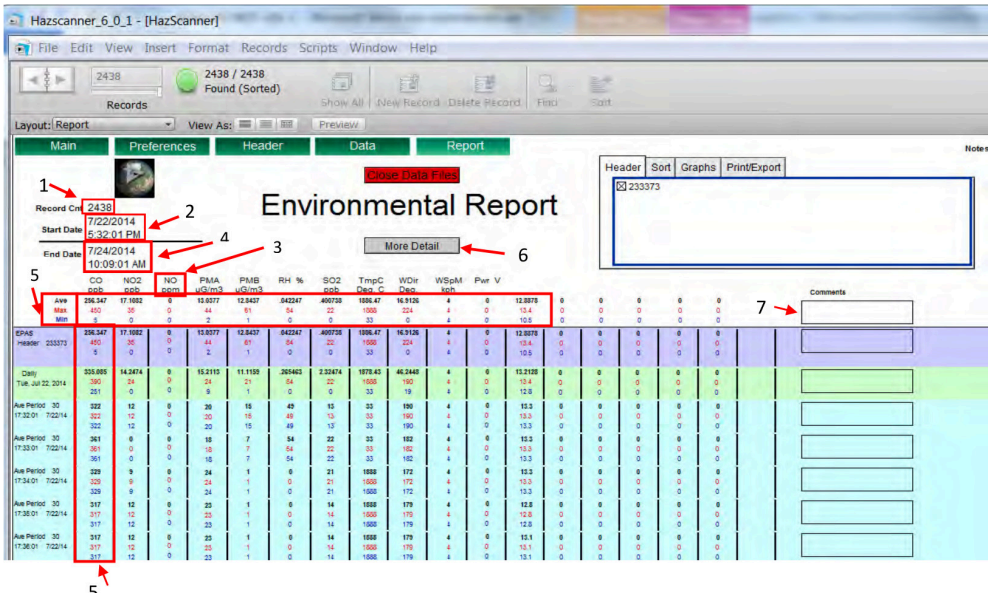


Figure 4-2. Environmental Report page. Numbers as in Table 4-1.

Table 4-1. Key features of the Environmental Report page.

No.	Feature
1	Number of records
2	Start date and time of the recorded data
3	Sensor and unit of measurement
4	End date and time of the recording
5	Average (black), maximum (red), minimum (blue)
6	**More Detail**: shows the minimum, maximum or average value of each data point
7	**Add Comments**: explain data points of interest

Note

More Detail shows all data points, with coloured lines for the average period totals. **Less Detail** hides the numbers and shows only the average data.

Graphing data

HAZCOMM-PRO plots stored data as line graphs, and you can then focus on particular data points. **Sensor Report** graphs all data, **Ave Report** only the average data. The instrument must be disconnected and the data opened as described under Viewing uploaded data (p. 37).

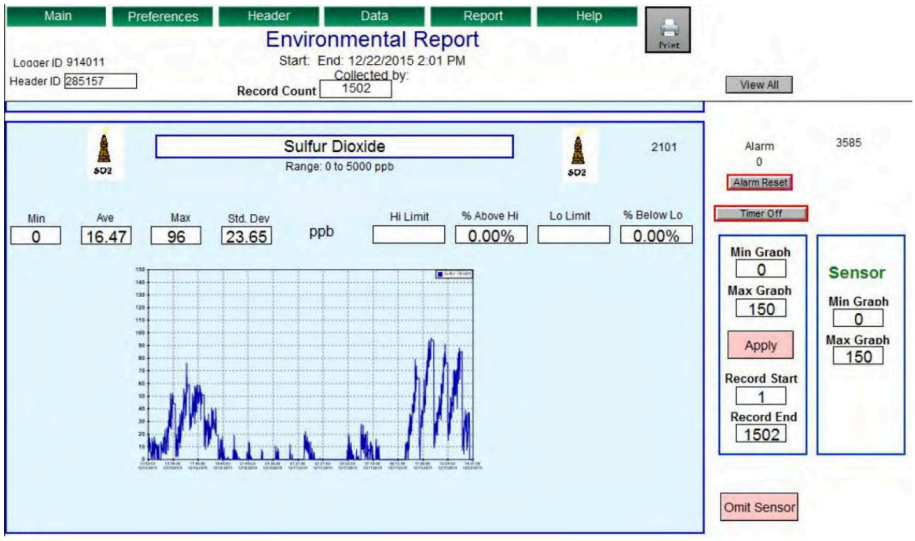


Figure 4-3. Sensor graph.

> **Note**
> The screen flashes several times while the software generates a report or a graph. This is normal.

The graph tools zoom in on the X axis, the Y axis or both, to show only the areas of interest. Change the **Min**–**Max** values (vertical axis) or the **Record Start**–**Record End** values (horizontal axis). This changes the axis ranges for better resolution; **Min**–**Max** gives a clear report when the data vary only slightly.

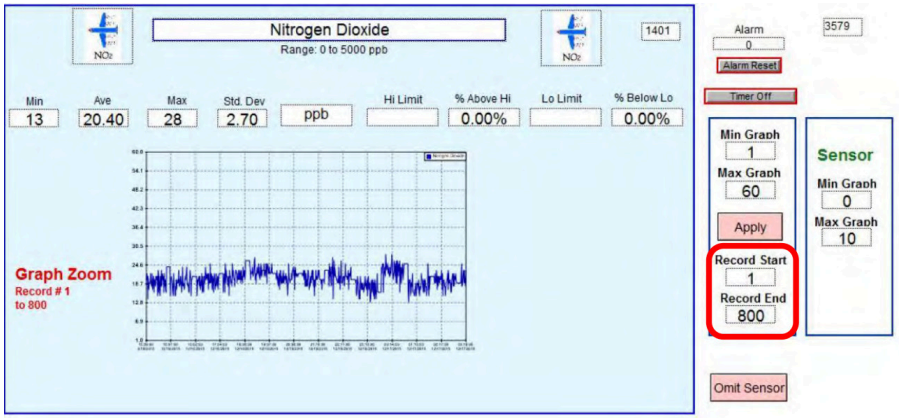


Figure 4-4. Graph with zoom applied.

Viewing current data

Click **View Current Data** on the main page. If logging is active, HAZCOMM-PRO retrieves the current sensor data from the connected instruments. If an instrument holds a lot of stored data, retrieve the data first.

The screen shows the current average and maximum values of each sensor. You can set and view limits in the **Hi Limit** and **Lo Limit** fields. A sensor pane turns red when it exceeds its high limit and stays red, even when the value falls below the limit, until you click **Alarm Reset**. Click a sensor to see a detailed summary and graph of that sensor. This page shows all data of the current header only.

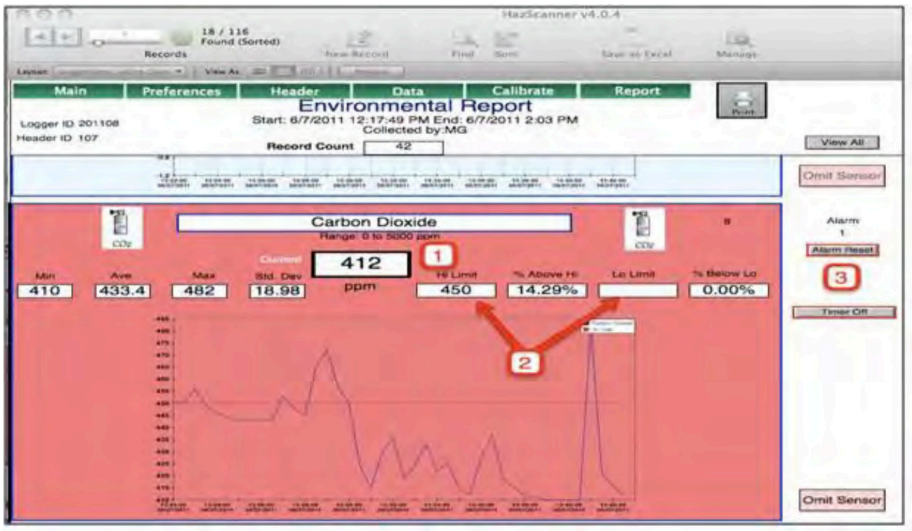


Figure 4-5. Sensor screen. (1) Current value. (2) Current limits: when you change them, the graph refreshes. (3) **Alarm Reset** turns the red background back to blue.

The **Print** button of this page is meant for the report function, but it also prints the current group (all sensors). **Omit Sensor** excludes a sensor from the found set and from printing. To print one sensor, go to **Logger Sensors View Print** in the **Layout** menu and choose **Current record**.

> **Note**
> In the **Print** dialog you can select and print a single page. The current record number tells you how the graphs are paginated.

Reports

1. Select **Report** in the menu bar.
2. On the **More Detail** report screen, select an average period in the **Report Ave** field.
3. In the **Sort** menu, click **Sort**, **Daily Report** or **Average Report**. **Less Detail** then shows the summary.

- **Export Data** works as in the data window.
- **Export Ave** exports the summary for the **Report Ave** period. For a daily average, select 24 hours.
- **Sensor Report** gives a graph of each sensor with minimum, maximum and other information, all based on the original sensor data; it does not change with the average period. With limits added, the report gives the percentage above the high limits and below the low limits.

Loading a report from a large data set can take up to two minutes, and the screen flashes while it is generated.

Alarms

There are two types of alarm, both based on the **Hi limit** and **Lo limit** fields of the sensor screens.

- **Software alarm.** When a limit is exceeded, the sensor background turns from blue to red and stays red until you click **Reset Alarm** for that sensor; this adds a line to the **Sensor Alarm** list at the top of the screen. Adding or changing a limit does not send it to the logger.
- **Logger alarm.** The limits are sent to the logger on the **Set Alarm** screen.

Buttons of the **Alarms** screen (open it with **Set Alarm** in the **Preferences** menu):

- Button 1 switches the master alarm on or off; off disables all logger alarms.
- Button 2, **Clear Logger Alarm**, switches off the current alarm in the logger. A new alarm still triggers.
- Button 3, **Set All Logger Alarms**, resets all limits in the logger.
- Button 4, **Clear all limits**: then enter the new limits and review them.
- Button 5, **Set Logger Alarm**, sets the limit of the selected sensor only.

Entering a value without sending it only creates a limit in the software.

NOTICE

New limits are lost when the instrument is switched off. Do not switch the station off after you set the limits and alarms.

To set sensor alarms:

1. Connect to the instrument in HAZCOMM-PRO.
2. On the **View Current Data** screen, click **Set Alarms**.
3. Enter high limits for each sensor that is to raise an alarm (1 in Figure 4-6).
4. Click **Turn Logger Alarms On** (2).
5. Click **Set All Logger Alarms** (3).

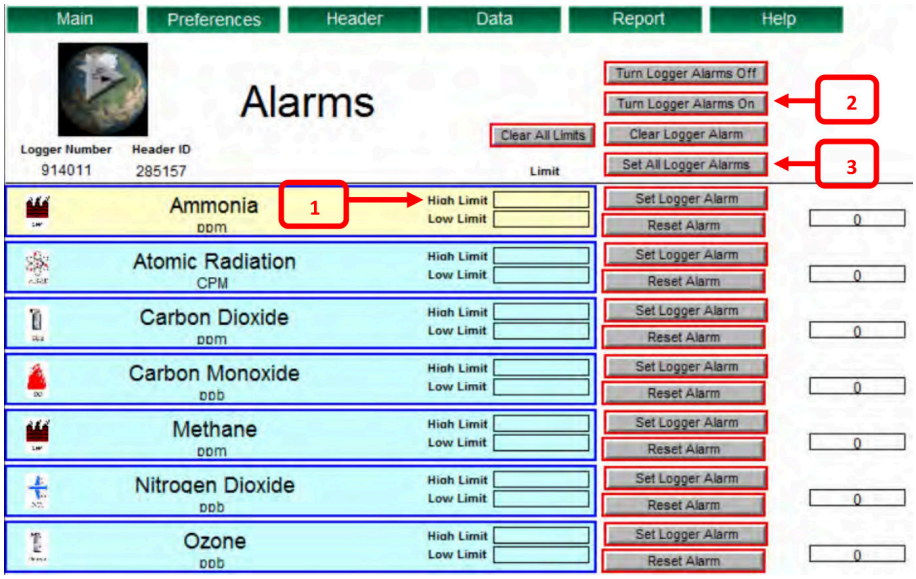


Figure 4-6. Alarm screen.

On the instrument. In the logger function of the front panel, **Alarm Reset** switches off active alarms; if the alarm condition remains, the alarm sounds again. **Alarm Status** 1 (on) or 0 (off) switches all logger alarms of the instrument on or off.



Figure 4-7. Alarm functions on the instrument.

> **Note**
> The logger alarm switches off after 30 minutes to save power. Use **Alarm Status** to reset an active alarm.

E-mail alerts. On the **Preferences** page, enter a valid e-mail address to receive new alarms by e-mail, select **Yes** in the **Send Alarm Email** box and make sure **Toggle Master Alarm** is set to 1.

> **Note**
> The computer running HAZCOMM-PRO must be connected to the internet to send alarm e-mails.

Uploading data to a USB thumb drive

Use a preformatted thumb drive, or format one first as described under Preparing a USB thumb drive (p. 32).

1. Insert the thumb drive into the USB port of the instrument. The display shows **Reading USB Device** and, when the drive is recognised, **USB Device Ready**.
2. Press **Function**, scroll to **Data to USB** and press **Enter**. The display shows arrows and **DATA to USB** for a second, then returns to the date and time. This does not mean that the transfer is complete: the disk light blinks rapidly until all data are transferred, then once every 6 seconds.
3. When the transfer is complete, press **Function** until **Remove USB** is shown and press **Enter**.
4. Remove the thumb drive; the display shows **USB removed**.

A fully equipped station sampling once a minute for 24 hours needs about 10 minutes to transfer its data.

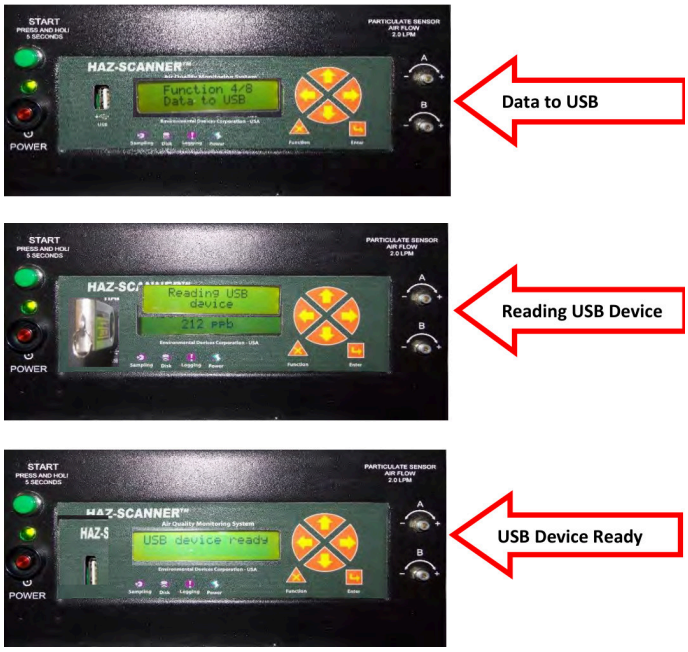


Figure 4-8. Front panel displays during the upload.

Troubleshooting

With help from technical support, you can use the HAZCOMM-PRO screens to troubleshoot the station: the software can send commands directly to the instrument to isolate a problem. The special

functions are in the **Layout** menu (**Terminal**) or in a drop-down list at the bottom of the **Preferences** screen.

If you have zeroed sensors or set new spans, reprogram the instrument (button 1 in Figure 4-9; button 2 opens the **Calibrate** screen). Reprogramming overwrites the factory settings and makes it possible to add new spans. If the spans in the **Span List** match those in the **Program List** of the **Logger** menu, the instrument is up to date. It is best not to use this function, to reset the zeros and spans before a new session, and to keep the factory settings as the default.

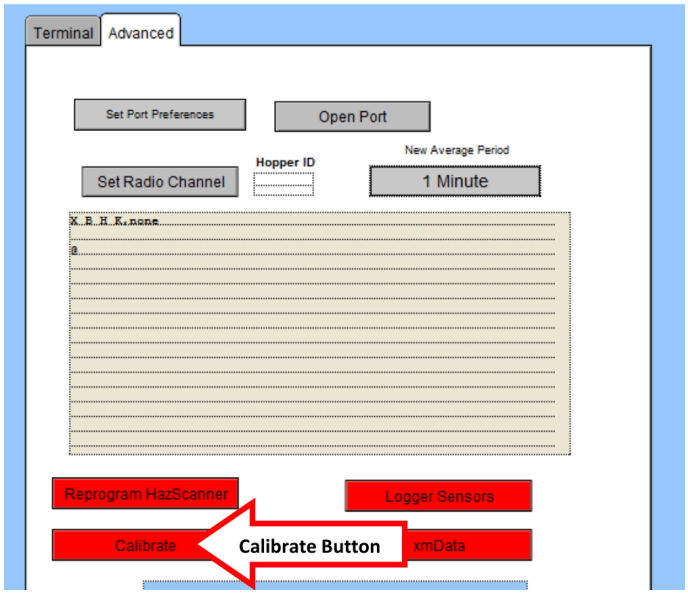


Figure 4-9. Terminal screen. (1) Reprogram. (2) Calibrate.

Table 4-2. Troubleshooting.

Problem	Check
Software does not connect	• Is the station switched on? • Is the serial cable firmly connected to the computer and the instrument? • With a serial-to-USB adapter on a Mac or PC: is the adapter driver installed? • Did you connect the adapter before you started HAZCOMM-PRO? • Have you tried restarting the instrument or the computer? • On the **Terminal** screen, send the character **D**: is the date returned?
No report can be created	• Make sure you are not connected to the instrument. • Check the header ID in the **Header List** of the **Layout** menu and that it has data, and that you see the correct data set. You can also use **Find** in the data window to search for it. • Check that you have sorted the data with the **Sort** menu.
Logging has stopped and the lights are off	The battery is probably drained. Set the power switch to **Off** and connect the charger. Wait 2 or 3 minutes before you reconnect to the instrument. Leave the charger connected.

CHAPTER 5

After use and sample handling

After a session, stop logging and retrieve the data. Keep the impactor clean, replace the gas treatment module when it is due and check the calibration of the sensors.

Ending a session

Stop logging before you move the station or disconnect a meter (see Logging from the front panel (p. 36)), then retrieve and erase the instrument data (see Retrieving data (p. 37)). Recharge the back-up battery when it is not in use. For the disposal of the instrument and its meters, see Disposal (p. 61).

Impactor care

The impactor sits inside the impactor sleeve IMS-105; impactors are available for 1.0, 2.5, 4.0 and 10 µm (**`HS-PM1.0um`**, **`HS-PM2.5um`**, **`HS-PM4.0um`**, **`HS-PM10um`**). Remove, clean and re-grease it from time to time. Dismantle, inspect and clean the impaction inlet at regular intervals, for example every 10th sample or after 250 hours of normal ambient use, and as often as needed.

Removing and refitting the impactor

To change the cut point, clean the impactor or grease the impactor cup, remove the impactor assembly: push it up from the bottom of the sleeve with the trim stick supplied with the instrument, or with a pencil or similar tool.

To refit it, insert the cup end of the impactor about one inch (25 mm) into the sleeve, then insert the sleeve into the particulate port of the instrument.



Figure 5-1. Removing the impactor from the sleeve.



Figure 5-2. Inserting the impactor into the sleeve.

Greasing the impactor plate

Use only a small amount of impactor grease IG-105 and remove any excess before you put the impactor into the sensor.

1. Remove the impactor assembly through the top of the sleeve.
2. Separate the impactor body from the impaction plate.

3. Squeeze a little grease onto a finger and wipe it evenly onto the impaction plate.
4. Reassemble the impaction plate and the impactor body.
5. Push the impactor at least 2 cm below the opening of the sleeve.

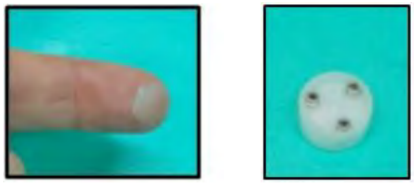


Figure 5-3. Applying grease to the impaction plate.

> **Note**
> Instead, you can apply the grease as a slurry with hexane or a suitable solvent, as follows.

1. Mix hexane and IG-105 grease in a dropper bottle: a 1-inch length of IG-105 to 100 mL of hexane.
2. Shake vigorously until you have an opaque, uniform suspension free of globs.
3. Put two or three drops of the cloudy solution on the impaction plate. The drops should saturate the plate and flow freely from edge to edge.
4. Let the plate dry: the hexane evaporates and leaves a thin film of grease.

Cleaning the impactor

1. Remove the impactor assembly from the sleeve and separate the impactor body from the impaction plate.
2. Inspect the O-rings of the impactor and replace them if necessary.
3. Remove loose particulate material from the sleeve without letting it fall onto the 47 mm gravimetric filter below, where it would cause wrong gravimetric results.
4. Rinse the impactor from top to bottom with hexane or a suitable solvent from a squeeze bottle, paying particular attention to the concentric grooved rings of the impaction plate. You can also clean the impactor with a foam-tip swab and warm soapy water.
5. Carefully reinsert the impactor assembly into the top of the sleeve and push it down at least 2 cm.

Gas treatment module GTM-6000

The gas treatment module contains activated carbon, Hopcalite and Purafil media that scrub toxic gases from the ambient air. When the internal solenoid system of the instrument switches over, the ambient air passes through the GTM-6000, which supplies zero air to re-establish the baseline. Replace the GTM-6000 after about 2000 hours of sampling.

1. Remove the front panel: take out the four screws, two on each side, and lift the top panel (Figure 5-4, left).
2. Remove the tubing on each side of the GTM-6000.
3. Unclip the old GTM-6000 and fit the new cartridge (Figure 5-4, right).

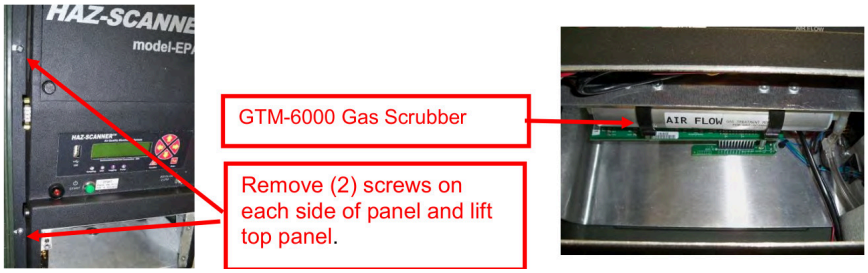


Figure 5-4. Replacing the GTM-6000.

Checking the particulate calibration

This procedure checks the calibration of the particulate sensors with the calibration span reference CS-105. The calibration itself needs a dust chamber and is normally done at the factory.

> **Note**
> Stop logging before you start. To re-zero the sensors at any time during the check, click **Purge**.

1. In the **Layout** menu, select **Terminal**.
2. On the **Advanced** tab, click **Calibrate** and enter the password **HAZSCAN321**.
3. In the pop-up, select **calibrate**, then **OK**; confirm the **Purge** message with **OK**.
4. Wait 8 minutes for the purge (auto zero) to finish.
5. On the instrument, press the down arrow until the display shows **Particulate Sensor** (A or B).
6. On the **Calibration** page of the software, click the box of that particulate sensor. It turns yellow.
7. Remove the impactor sleeve.
8. Align and insert the CS-105.
9. Wait 5 minutes for the readings to stabilise. The **K** value on the instrument display should match the value in the software within ±10 %.
10. If it does not, enter the displayed number in the **Test Value** window, enter the **K** value in the second place of the **Span** window (replacing 20000), click **High** under the **Test Value** window and click **Send Span**.
11. If the instrument has two particulate sensors, repeat steps 8 and 9 for the second sensor.

> **Note**
> Align the hole of the CS-105 exactly with the locating dot and check that the tool presses firmly against the locating hole. Insert the CS-105 a few times to check that the **K** value stays the same.



Figure 5-5. Alignment hole and locating dot.

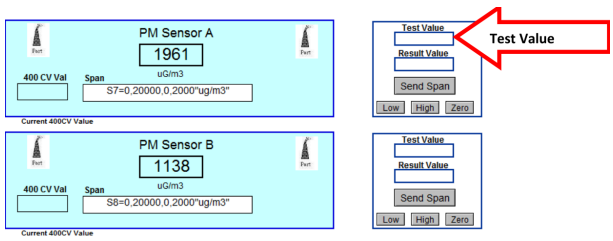


Figure 5-6. Calibration screen with the **Test Value** window.

When all particulate sensors are checked, remove the CS-105, refit the impactor sleeve and finish on the calibration page:

1. Click **Calibration Done**.
2. Select **Reprogram** and enter your login password when asked.
3. Select **Current** to program the instrument with the new spans and confirm with **yes**.
4. When programming is complete, scroll through the instrument display to check that it is programmed.
5. On the main page, disconnect from and reconnect to the instrument to check that the station works correctly.
6. In the **Layout** menu, select **Logger** and check the span list.

> **Note**
> The first line of the current span list must start with the number 38. If it does not, delete the line above the 38, select **Terminal** in the **Layout** menu, click **Reprogram** and select **Current Spans**. If the span list was correct, go on with the gas calibration.

Calibrating the gas sensors

You need a zero air bottle with a 0.5 L regulator, the calibration gas for each sensor and tubing.

NOTICE

New spans are lost when the instrument is switched off. If you do not reprogram the instrument, the new spans are lost at the next power-off. Reprogram after each calibration.

Preparing the instrument

1. Restart the instrument at least 24 hours before you start the gas calibration.
2. Remove the instrument cover and switch off the air sampling pump switch.
3. Remove the screw from the gas calibration inlet port.

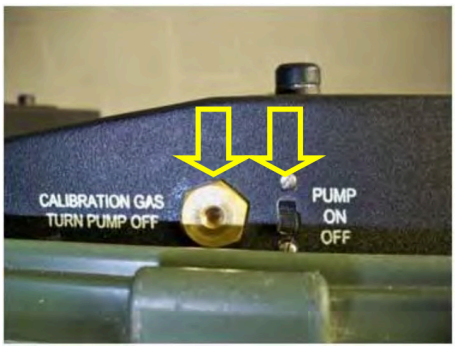


Figure 5-7. Air sampling pump switch and gas inlet port.

1. Connect the instrument to the computer running HAZCOMM-PRO.
2. In the **Layout** menu, select **Terminal**.
3. Click **Calibrate** and confirm.
4. Enter the password **HAZSCAN321** when asked.
5. Answer **No** to the question whether to purge.
6. Scroll to the gas sensor to be calibrated and click it. It is highlighted in yellow.

Zeroing the gas sensors

1. Attach the tubing from the zero air bottle with its 0.5 L regulator to the gas inlet port and open the valve.
2. Wait 5 minutes for the zero air to equalise in the sensor manifold.
3. In the software, click **Zero Sensor**, then **Send Span**.
4. Repeat step 3 for each gas sensor to be calibrated.



Figure 5-8. Zero air bottle with regulator on the gas inlet port.

Setting the span

1. Remove the zero air bottle from the inlet port, connect the calibration gas for the sensor and open the valve.
2. Wait until the displayed concentration no longer changes much.
3. Enter the displayed concentration in the **Test Value** field, click **High**, then **Send Span**.
4. If the concentration in the bottle differs from the concentration in the span, replace the span concentration with the actual concentration of the bottle.
5. Repeat steps 1 to 4 for each sensor.

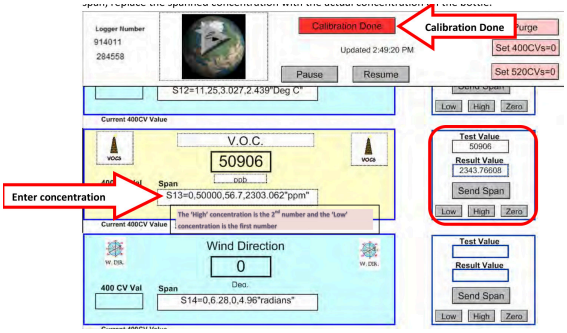


Figure 5-9. Setting the new high span: enter the concentration, then **Calibration Done**.

Finishing and reprogramming

1. Remove the calibration gas tubing and refit the screw in the gas calibration inlet port.
2. Switch the sampling pump on.
3. Click **Calibration Done**.
4. You are reminded to reprogram the instrument. Click **Cancel** in the pop-up.
5. In the **Terminal**, click the **Advanced** tab, then **Reprogram HAZ-SCANNER**.
6. Enter the password **HAZSCAN321** and select the **Current** span.

CHAPTER 6

Specifications

The data of the logger and of the sensors and meters that a station can carry. Values and units are those printed by the manufacturer.

Memory

Storage	100 000 000
Total records	454 545

Table 6-1. Logging time by sampling interval.

Sampling interval (min)	Samples per hour	Hours	Days
60	1	454 545	18 939.4
30	2	227 273	9469.7
15	4	113 636	4734.8
10	6	75 758	3156.6
1	60	7576	315.7

Power

Internal battery, run time	7–10 h on average, depending on concentrations, alarm conditions and configuration; about 5 h with radio equipment
Automatic switch-off	Internal battery below 10 V
Back-up battery BUBP-6000	12 V DC, 75 A, AGM; powers the station for about 3–5 days, depending on the configuration
Solar panel SP-6000	100 W, monocrystalline
Inlet heater HA-600 battery charger	110–240 V AC

Particulates (PM)

Operation	Four-key splash-proof membrane switch, menu-driven
Calibration	Gravimetric reference, NIST-traceable, SAE fine test dust (ISO 12103-1)
Accuracy	±10 % to filter gravimetric, SAE fine test dust
Sensing range	0.001–20.0 mg/m³, optional 0.01–200.0 mg/m³ or 0.1–2000.0 mg/m³
Particle size range	0.1–100 µm
Precision	±0.003 mg/m³ (3 µg/m³)
Sampling flow rate	2.0 L/min
Analogue output	0–2 V DC
Power	Rechargeable, interchangeable battery
Operating temperature	−10 °C to 50 °C
Storage temperature	−20 °C to 70 °C
Humidity	95 %, non-condensing

Carbon monoxide (CO)

Table 6-2. CO sensor.

Parameter	Condition, unit	Value
Performance		
Sensitivity	nA/ppm in 400 ppm CO	30–48
Response time	t_{90} (s) from zero to 400 ppm CO at 22 °C	<25
Zero current	ppm equivalent in zero air	<±3
Resolution	RMS (root mean square) noise (ppm equivalent)	<1.5
Range	ppm limit of performance warranty	1000
Linearity	ppm CO error at full scale, linear at zero and 400 ppm CO	±40
Overgas limit	maximum ppm for stable response to a gas pulse	2000
Lifetime		
Zero drift	ppm equivalent change/year in lab air	<0.5
Sensitivity drift	% change/year in lab air, monthly test	<6
Environmental		
Sensitivity at −20 °C	% (output at −20 °C/output at 20 °C) at 400 ppm CO	55–80
Sensitivity at 50 °C	% (output at 50 °C/output at 20 °C) at 400 ppm CO	105–115
Zero at −20 °C	ppm equivalent change from 20 °C	<±3
Zero at 50 °C	ppm equivalent change from 20 °C	<±4
Cross-sensitivity		
Filter capacity	ppm·h H_2S	20 000
H_2S	% measured gas at 20 ppm H_2S	<0.1
NO_2	% measured gas at 10 ppm NO_2	<0.1
Cl_2	% measured gas at 10 ppm Cl_2	<0.1
NO	% measured gas at 50 ppm NO	<50
SO_2	% measured gas at 20 ppm SO_2	<0.1
H_2	% measured gas at 400 ppm H_2	<70
C_2H_4	% measured gas at 400 ppm C_2H_4	<100
NH_3	% measured gas at 20 ppm NH_3	<0.1
Key specifications		
Temperature range	°C	−20 to 50
Pressure range	kPa	80–120
Humidity range	% RH	15–90
Storage period	months at 3–20 °C (stored in sealed pot)	6
Load resistor	Ω (recommended)	10–47
Weight	g	<2

Carbon dioxide (CO_2)

Operating voltage range	3.0–5.0 V DC
Operating current	Constant-current operation, 75–85 mA

Programmable output voltage ranges	Voltage output types: 0–2.8 V DC; bridge output types: 0 V to bridge supply voltage
Measuring ranges / resolution	• 0–500 ppm: 10 ppm from 0 to 250 ppm, then 20 ppm up to full scale • 0–1000 ppm: 20 ppm from 0 to 500 ppm, then 40 ppm • 0–2000 ppm: 50 ppm from 0 to 1000 ppm, then 100 ppm • 0–5000 ppm: 50 ppm from 0 to 2500 ppm, then 100 ppm • 0–10 000 ppm: 100 ppm from 0 to 5000 ppm, then 200 ppm
Warm-up time	To final zero ±0.2 % of range: 1 minute at 20 °C (68 °F) ambient
Response time t_{90}	<30 s at 20 °C (68 °F) ambient
Zero repeatability	±2 % of full scale at 20 °C (68 °F) ambient
Span repeatability	±2 % of full scale at 20 °C (68 °F) ambient
Long-term zero drift	±1 % of full scale/month at 20 °C (68 °F) ambient
Operating temperature range	−20 °C to +50 °C (−4 °F to 122 °F)
Temperature performance	±10 % of reading up to 50 % FSD (full-scale deflection) and ±15 % of reading from 50–100 % FSD over −20 °C to +50 °C (−4 °F to 122 °F)
Storage temperature range	−20 °C to +50 °C (−4 °F to 122 °F)
Humidity range	0–95 % RH, non-condensing
Digital signal format	8 data bits, 1 stop bit, no parity, 2.8 V logic level
Standard baud rates	34 400, 19 200, 9600
User-configurable parameters	Zero output voltage; FSD output voltage; positive- or negative-going output; sensor zero function; sensor span function

Nitric oxide (NO)

Table 6-3. NO sensor.

Parameter	Condition, unit	Value
Performance		
Sensitivity	nA/ppm in 40 ppm NO	500–750
Response time	t_{90} (s) from zero to 40 ppm NO	<10
Zero current	ppm equivalent in zero air	0–1
Resolution	RMS equivalent in zero air	<0.1
Range	ppm limit of performance warranty	100
Linearity	ppm error at full scale, linear at zero and 40 ppm NO	<±1.5
Overgas limit	maximum ppm for stable response to a gas pulse	200
Lifetime		
Zero drift	ppm equivalent change/year in lab air	<0.4
Sensitivity drift	% change/month in lab air, monthly test	<5
Environmental		
Sensitivity at −20 °C	% (output at −20 °C/output at 20 °C) at 40 ppm NO	65–85
Sensitivity at 50 °C	% (output at 50 °C/output at 20 °C) at 40 ppm NO	102–115
Zero at −20 °C	ppm equivalent change from 20 °C	<±0.5
Zero at 50 °C	ppm equivalent change from 20 °C	3–6
Cross-sensitivity		
H_2S	% measured gas at 20 ppm H_2S	<30
NO_2	% measured gas at 10 ppm NO_2	<5
Cl_2	% measured gas at 10 ppm Cl_2	<5
SO_2	% measured gas at 10 ppm SO_2	<3
CO	% measured gas at 400 ppm CO	<0.1
H_2	% measured gas at 400 ppm H_2	<0.1
C_2H_4	% measured gas at 1000 ppm C_2H_4	<0.1
NH_3	% measured gas at 20 ppm NH_3	<0.1
CO_2	% measured gas at 5 % CO_2	<0.1
Key specifications		
Temperature range	°C	−20 to 50
Pressure range	kPa	80–120
Humidity range	% RH	15–90
Storage period	months at 3–20 °C (stored in sealed pot)	6
Bias voltage	mV (working electrode above ground)	300
Load resistor	Ω (for optimum performance)	100–47
Weight	g	<2

Nitrogen dioxide (NO_2)

Table 6-4. NO_2 sensor. nd: not determined.

Parameter	Condition, unit	Value
Performance		
Sensitivity	nA/ppm in 10 ppm NO_2	−200 to −400
Response time	t_{90} (s) from zero to 10 ppm NO_2	<25
Zero current	ppm equivalent in zero air	±0.35
Resolution	RMS noise (ppm equivalent)	0.1
Range	ppm NO_2 limit of performance warranty	20
Linearity	ppm error at full scale, linear at zero and 10 ppm NO_2	–
Overgas limit	maximum ppm for stable response to a gas pulse	60
Lifetime		
Zero drift	ppm equivalent change/year in lab air	nd
Sensitivity drift	% change/month in lab air, twice-monthly test	nd
Environmental		
Sensitivity at −20 °C	% (output at −20 °C/output at 20 °C) at 10 ppm	80–95
Sensitivity at 50 °C	% (output at 50 °C/output at 20 °C) at 10 ppm	95–105
Zero at −20 °C	ppm equivalent change from 20 °C	<±0.6
Zero at 50 °C	ppm equivalent change from 20 °C	<±0.5
Cross-sensitivity		
H_2S	% measured gas at 20 ppm H_2S	<−20
Cl_2	% measured gas at 10 ppm Cl_2	<80
NO	% measured gas at 50 ppm NO	<0.5
SO_2	% measured gas at 20 ppm SO_2	<1
CO	% measured gas at 400 ppm CO	<0.1
H_2	% measured gas at 400 ppm H_2	<0.1
C_2H_4	% measured gas at 400 ppm C_2H_4	<0.1
NH_3	% measured gas at 20 ppm NH_3	<0.1
CO_2	% measured gas at 10 % CO_2	<0.1
Key specifications		
Temperature range	°C	−20 to 50
Pressure range	kPa	80–120
Humidity range	% RH	15–90
Storage period	months at 3–20 °C (stored in sealed pot)	6
Load resistor	Ω (for optimum performance)	33
Weight	g	<2

Ozone (O_3)

Power input	11–24 V DC
Power consumption	2.5–6 W max.

Outputs	0–5 V analogue, 8 bit; relay on board, 24 V DC/2 A, NO, NC, COM; RS-232, 2-wire proprietary protocol (not ASCII plain text); RS-485, 2-wire proprietary protocol (not networkable); I²C optional
LED indicators	Relay status: red = activated. Sensor status: green = normal; green slow flash (2 s) = warming up; green fast flash (0.3 s) = failure
Inputs	Relay set points: 4-way DIP (dual in-line package) switch; zero calibration: auto-calibration zero button; reset: microprocessor reset button; span calibration: factory use only; analogue inputs: 2 voltage (optional); digital input: 2 GPIO (optional, can be used for a digital temperature/RH sensor)
Diagnostics, on sensor failure	Status LED fast green flash; relay: AA version (energised) LED red, AB version (de-energised) LED off, C10 version (de-energised) LED off; 0–5 V analogue output 5 V
Board size	60 mm × 75 mm
Mounting	Screw or extrusion slot
Fan (if required)	On board, ball bearing, 50 000 hours
Sensor filter	On board
Options	Serial display (display connector); high-resolution 0–5 V analogue, 12 bit; temperature/RH sensor (GPIO, general-purpose input/output, option); I²C (inter-integrated circuit) output (display connector)
Operating temperature	0–50 °C (−20 °C to 50 °C if enclosed)
Operating humidity	5–95 % RH, non-condensing

Table 6-5. Ozone sensor ranges.

Parameter	Ozone 0–0.15 ppm	Ozone 0–0.5 ppm
Calibrated range (ppm)	0–0.150	0–0.500
0–5 V output scale	0–0.500	0–0.500
LDL (lower detection limit)	1 ppb	1 ppb
Accuracy of factory calibration	<±0.005 ppm	<±0.008 ppm (0–0.1 ppm)
Resolution (ppm)	0.001	0.001
Response time (T90)	<70 s	<60 s
Operating temperature	−5 °C to 40 °C	−5 °C to 40 °C
Relative humidity, non-condensing	5–95 %	5–95 %

Relative humidity

Table 6-6. Relative humidity sensor.

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Humidity measuring range	RH	0		100	% RH
Relative humidity accuracy (10–95 % RH)	RH		±3	±5	% RH
Supply voltage	Vs	4.75	5.00	5.25	V DC
Nominal output at 55 % RH (at 5 V DC)	Vout	2.42	2.48	2.54	V
Current consumption	Ic		2.8	4	mA
Temperature coefficient (10–50 °C)	Tcc		−0.05	−0.1	% RH/°C
Average sensitivity from 33–75 % RH	ΔVout/ΔRH		+26		mV/% RH
Sink current capability (R_L = 33 kΩ)	I			150	µA
Recovery time after 150 hours of condensation	Tr		10		s
Humidity hysteresis			±1		% RH
Humidity resolution			0.4		% RH
Long-term stability	T		±0.5		% RH/yr

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Time constant (at 63 % of signal, static), 33–75 % RH, at 2 m/s air flow	T		5	10	s
Output impedance	Z		70		Ω
Warm-up time	tw		200		ms

Temperature

Table 6-7. Temperature sensor, at T_a = 25 °C.

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Nominal resistance at 25 °C	R		10		kΩ
Beta value B25/100	β	3600	3730	3800	
Temperature measuring range	Ta	−30		80	°C
Nominal resistance tolerance at 25 °C	Rn		2	3	
Beta value tolerance	β		3		%
Response time	τ		10		s

Sulfur dioxide (SO_2)

Table 6-8. SO_2 sensor.

Parameter	Condition, unit	Value
Performance		
Sensitivity	nA/ppm in 10 ppm SO_2	180–350
Response time	t_{90} (s) from zero to 10 ppm SO_2	<12
Zero current	ppm equivalent in zero air	<±0.2
Range	ppm limit of performance warranty	20
Linearity	ppm error at full scale, linear at zero and 10 ppm	<5
Overgas limit	maximum ppm for stable response to a gas pulse	50
Lifetime		
Zero drift	ppm equivalent change/year in lab air	<0.2
Sensitivity drift	% change/year in lab air, monthly test	<6
Environmental		
Sensitivity at −20 °C	% (output at −20 °C/output at 20 °C) at 10 ppm	72–88
Sensitivity at 50 °C	% (output at 50 °C/output at 20 °C) at 10 ppm	74–90
Zero at −20 °C	ppm equivalent change from 20 °C	<±1
Zero at 50 °C	ppm equivalent change from 20 °C	<−0.5 to 1.5
Cross-sensitivity		
H_2S	% measured gas at 20 ppm H_2S	<−350
NO_2	% measured gas at 10 ppm NO_2	<−100
Cl_2	% measured gas at 10 ppm Cl_2	<−100
NO	% measured gas at 50 ppm NO	<1
CO	% measured gas at 400 ppm CO	<−0.2
H_2	% measured gas at 400 ppm H_2	<1
C_2H_4	% measured gas at 400 ppm C_2H_4	<3
NH_3	% measured gas at 20 ppm NH_3	<0.1
CO_2	% measured gas at 10 % CO_2	<0.1
Key specifications		
Temperature range	°C	−20 to 50
Pressure range	kPa	80–120
Humidity range	% RH	15–90
Storage period	months at 3–20 °C (stored in sealed pot)	6
Load resistor	Ω (for optimum performance)	22
Weight	g	<2

Wind direction

Sensor type	Continuous-rotation potentiometric wind direction vane
Applications	Wind resource assessment, meteorological studies, environmental monitoring
Sensor range	360° mechanical, continuous rotation
Signal type	Analogue DC voltage from a conductive plastic potentiometer, 10 kΩ

Transfer function	Ratiometric output voltage
Accuracy	Potentiometer linearity within 1 %
Dead band	8° maximum, 4° typical
Output signal range	0 V to excitation voltage (excluding dead band)
Threshold	1 m/s (2.2 mph)
Supply voltage	Regulated potentiometer excitation of 1–15 V DC
Mounting	Onto a 13 mm (0.5 in) diameter mast with cotter pin and set screw
Tools required	0.25 in nut driver, petroleum jelly, electrical tape
Operating temperature range	−55 °C to 60 °C (−67 °F to 140 °F)
Operating humidity range	0–100 % RH
Lifespan	50 million revolutions (2–6 years of normal operation)
Connections	4-40 brass hex nut/post terminals
Weight	0.14 kg (0.3 lb)
Dimensions	21 cm (8.3 in) long × 12 cm (4.3 in) high; 27 cm (10.5 in) swept diameter
Materials	Wing: black UV-stabilised injection-moulded plastic; body: black UV-stabilised static-dissipating plastic; shaft and bearing: stainless steel; boot: protective PVC sensor terminal boot included; terminals: brass

Wind speed

Sensor type	3-cup anemometer
Applications	Wind turbine control, wind speed measurement for programmable controllers, meteorological studies, environmental monitoring
Sensor range	1–96 m/s (2.2–215 mph) (highest recorded)
Instrument compatibility	Controllers or loggers requiring a square-wave signal
Signal type	Square-wave signal from an open-collector transistor; external pull-up resistor required; frequency proportional to wind speed
Transfer function	Consensus transfer function: scale factor (slope) 0.765 m/s/Hz (1.711 mph/Hz); offset 0.35 m/s (0.78 mph)
Recommended load resistance	Output sinks up to 20 mA; typical pull-up resistor 3300 Ω for 24 V, 1500 Ω for 24 V, 330 Ω for 5 V
Calibration	Calibrated version available
Output signal range	0–125 Hz
Uncertainty	Accuwind (Risø-R-1556) classification: class 2.4A, class 7.7B. IEC 61400-12-1 operational standard uncertainty: ±0.14 m/s at 10 m/s for class A, ±0.45 m/s at 10 m/s for class B. For the calibration uncertainty, see the calibration sheet
Distance constant (63 % recovery)	2.55 m (8.37 ft) at 5 m/s, 2.56 m (8.40 ft) at 10 m/s, per ASTM D 5096-02
Moment of inertia	1.01×10^{-4} kg·m² (74.5×10^{-6} slug·ft²)
Swept diameter of rotor	190 mm (7.5 in)
Supply voltage	5–26 V DC
Supply current	9 mA maximum
Mounting	Onto a 13 mm (0.5 in) diameter mast with cotter pin and set screw
Tools required	0.25 in nut driver, petroleum jelly, electrical tape

Wet bulb, rain gauge and ELF/EMF meter

Table 6-9. Wet bulb WS-WB-600.

Signal output	0–5 V DC
Range	0–100 °F
Display resolution	1 °F
Calibration	Tested and calibrated against NIST (National Institute of Standards and Technology)

Table 6-10. Rain gauge RS-6000.

Resolution	0.01"/tip (0.254 mm)
Accuracy	±4 % up to 3"/hour
Maximum rate	Unlimited

Table 6-11. ELF/EMF meter HS-ELF-6000.

Display resolution	0.01 G
Sensor minimum resolution	0.1 G
Sensor accuracy	±2 % of full scale
Measurement range	0.01–200 G

Wireless radio RM-105EXT

Transmitter power	1 W, digitally modulated
Frequency band	900 MHz ISM (industrial, scientific and medical) band
Range	Up to 5 miles, line of sight
Interface	Integrated RS-232 serial modem
Serial cable, computer to base radio	30 ft maximum

CHAPTER 7

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. Sensors are added to a station at the factory only.

Station

Description	Order code	Mfr code
HAZ-SCANNER EPAS Air Monitoring Station, built to your sensor specification	Ask Analyt-MTC	–

Particulate inlet, calibration and gas treatment

Description	Order code	Mfr code
Impactor, 1.0 µm	Ask Analyt-MTC	**HS-PM1.0um**
Impactor, 2.5 µm	Ask Analyt-MTC	**HS-PM2.5um**
Impactor, 4.0 µm	Ask Analyt-MTC	**HS-PM4.0um**
Impactor, 10 µm	Ask Analyt-MTC	**HS-PM10um**
Impactor sleeve	Ask Analyt-MTC	IMS-105
Impactor grease	Ask Analyt-MTC	IG-105
Calibration span reference, for checking the particulate calibration	Ask Analyt-MTC	CS-105
Precipitation cap	Ask Analyt-MTC	PC-106
Rain and moisture trap	Ask Analyt-MTC	RT-600
Inlet heater	Ask Analyt-MTC	HA-600
Flow meter	Ask Analyt-MTC	FM-105
Gas treatment module (scrubber cartridge)	Ask Analyt-MTC	GTM-6000

Tripod and power

Description	Order code	Mfr code
Tripod	Ask Analyt-MTC	TP-600
External power connector	Ask Analyt-MTC	EPC-600
Universal battery charger	Ask Analyt-MTC	BC-6000
Back-up battery, 12 V DC, 75 A, AGM	Ask Analyt-MTC	BUBP-6000
Power connection for the back-up battery	Ask Analyt-MTC	EPC-BUBP-600
External charger for the back-up battery	Ask Analyt-MTC	BC-BUBP-6000
Solar panel, 100 W	Ask Analyt-MTC	SP-6000

Meters and sensors

Description	Order code	Mfr code
Wind speed and direction meter	Ask Analyt-MTC	HS-WS&D-6000
ELF/EMF meter	Ask Analyt-MTC	HS-ELF-6000
Sound meter, with tripod bracket	Ask Analyt-MTC	HS-SM-6000
Quest-compatible sound level meter	Ask Analyt-MTC	ASLM-6000
Rain gauge, tipping bucket	Ask Analyt-MTC	RS-6000
Atomic/nuclear radiation meter	Ask Analyt-MTC	HS-AR-6000
Alarm unit	Ask Analyt-MTC	AL-6000
Wet bulb	Ask Analyt-MTC	WS-WB-600
Barometric pressure sensor	Ask Analyt-MTC	HS-BP-6000
Dew point sensor	Ask Analyt-MTC	HS-DP-6000
Solar radiance intensity meter	Ask Analyt-MTC	HS-SR-6000

Wireless

Description	Order code	Mfr code
Extended-range wireless radio kit	Ask Analyt-MTC	RM-105EXT
Wireless network software option, for point-to-multipoint operation	Ask Analyt-MTC	WNS-600
Weatherproof radio enclosure, for the tripod	Ask Analyt-MTC	RM-105-WE

CHAPTER 8

Service and contacts

Analyt-MTC is your contact for everything concerning your SKC HAZ-SCANNER EPAS: technical questions and troubleshooting, the annual factory service and calibration, new sensors, spare parts and accessories, and advice on wireless installations.

Contact

ANALYT-MTC Messtechnik GmbH

German Headquarters

Klosterrunsstraße 18, 79379 Müllheim
Germany

+49 7631 5545

info@analyt-mtc.de

French Subsidiary

175 Avenue d'Alsace, 68000 Colmar
France

+33 3 89 41 47 78

info@analyt-mtc.fr

www.analyt-mtc.com

Before you contact Analyt-MTC

Send the registration form from the **Help/Registration** menu of HAZCOMM-PRO first (see Help and registration (p. 33)), and have the serial number (logger ID) of the instrument at hand.

Annual factory service

Have the instrument serviced and calibrated at the factory once a year. The particulate calibration needs a dust chamber and is done at the factory; new sensors are also added there. Ask Analyt-MTC to arrange it.

Disposal

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

ANALYT-MTC Messtechnik GmbH

Sales, service and calibration

German Headquarters
Klosterrunsstraße 18, 79379 Müllheim
Germany
+49 7631 5545
info@analyt-mtc.de

French Subsidiary
175 Avenue d'Alsace, 68000 Colmar
France
+33 3 89 41 47 78
info@analyt-mtc.fr

www.analyt-mtc.com

AMTC-IN-0074 · Rev. 1 · 2026-10

© 2026 ANALYT-MTC Messtechnik GmbH. All rights reserved. Subject to technical changes without notice.