ANALYT MESSTECHNIK



OPERATING MANUAL

SKC Universal MTX Sample Pumps

Intrinsic safety, charging, flow rate setting, timed, intermittent and low flow sampling with the ATEX and UKEX certified Universal MTX pumps — Standard, Intermediate and Deluxe — 5 to 4000 mL/min, with maintenance, troubleshooting and ordering information.

AMTC-MN-0045

Rev. 2 · October 2026

About this manual

The SKC Universal MTX pumps are air sampling pumps for 1000 to 4000 mL/min at constant flow, and for 5 to 500 mL/min with a low flow adapter, certified intrinsically safe under ATEX and UKEX. This manual covers charging, flow setting, sample hold and timer, high and low flow sampling, maintenance, troubleshooting, technical data and order numbers. Analyt-MTC supplies, services and supports the pumps (see Service, warranty and contacts (p. 25)). For sampling methods, refer to the SKC Step-by-Step Guide to Air Sampling (Cat. No. 224-G1).

Read Safety (p. 5) before you use the pump for the first time: the certification holds only under the conditions set out there. To start sampling quickly, follow Commissioning (p. 11), Setting the flow (p. 12) and Sampling (p. 14).

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

Conventions in this manual:

- Keys, buttons and menu entries are printed like this: **START/HOLD**.

Abbreviations

Abbreviation	Meaning
IOM	Institute of Occupational Medicine; here the IOM inhalable sampler
LED	Light-emitting diode
NiMH	Nickel-metal hydride
RH	Relative humidity

How this manual marks information

⚠ WARNING

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

NOTICE

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

Note
Information that helps understanding; never a hazard.

Display texts

Legends on the liquid crystal display (LCD) are printed as displayed: **HOLD**. Numbers in brackets, such as (8), refer to Figure 1 (p. 8).

Document information

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

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CHAPTER 1

Safety

Read this chapter before you use the pump for the first time. A Universal MTX pump is intrinsically safe as long as it is undamaged, runs on its own NiMH battery pack and contains only approved parts. The rules in this chapter keep it that way, and protect the pump and your samples.

Use in hazardous locations

All three models are certified for potentially explosive atmospheres under the EU ATEX Directive 2014/34/EU and the UK regulations (UKEX), with the marking II 1G Ex ia IIC T4 Ga. They may be used in zones 0, 1 and 2 with flammable gases and vapours of groups IIA, IIB and IIC and temperature classes T1 to T4. The certificates and standards are listed under Certification (p. 21).

⚠ WARNING

Check the rating before use. A pump whose rating does not meet the requirements of the hazardous location is not protected for that location. It can ignite an explosive atmosphere there. Before the pump enters a hazardous location, have your site manager or the person responsible for the site confirm that its rating meets the site's requirements. Neither the manufacturer nor Analyt-MTC can decide which rating your site needs.

⚠ WARNING

Charging, a wrong battery pack or charger, a damaged pump or the battery eliminator can defeat the intrinsic safety of the pump. In a hazardous location the pump can then ignite an explosive atmosphere.

- Never charge the battery pack in a hazardous location.
- Use the pump only at ambient temperatures from −20 to +40 °C. The certification does not cover use outside this range.
- Use the pump only with its own replaceable battery pack, P22419MTX, and charge the pack only with a charger approved for the Universal MTX (see Approved battery, chargers and parts (p. 5)).
- Do not use a damaged pump. Cracks in the battery-pack enclosure or in the potting inside, which expose internal components or cells, can invalidate the intrinsic safety. Checking that the pump is fit for a hazardous location is the user's responsibility.
- Do not use the battery eliminator (see Mains operation (p. 6)).

Note
The pump has not been assessed as a safety-related device in the sense of Directive 2014/34/EU, Annex II, clause 1.5, and the UK Regulations 2016 No. 1107, Schedule 1, clause 22.

Approved battery, chargers and parts

Power the pump only from its NiMH battery pack, P22419MTX (4.8 V, 2.0 Ah), and charge it only with one of the two chargers designated for the Universal MTX: the single charger 223-203A or the five-station charger 223-113A. Replace parts only with the original parts listed in Ordering information (p. 22).

⚠ WARNING

Components other than the original parts can impair the intrinsic safety of the pump. In a hazardous location the pump can then ignite an explosive atmosphere. Use only the battery pack, the chargers and the original parts named in this section.

NOTICE

A charger that is not approved for this battery pack can impair the battery's performance or damage it beyond repair. It can also affect the battery-pack warranty (see Analyt-MTC's terms and conditions). Charge the pack only with the single charger 223-203A or the five-station charger 223-113A.

Mains operation (battery eliminator)

In safe areas the pump can run from the mains through a battery eliminator (223-305B with EU 2-pin plug, 223-305C with UK 3-pin plug). It consists of a mains adapter and a dummy battery pack that takes the place of the normal battery pack.

⚠ WARNING

With the battery eliminator fitted, the ATEX and UKEX certifications do not apply. The pump can then ignite an explosive atmosphere in a hazardous location. Never take a pump fitted with a battery eliminator into a hazardous location.

Pump variants

The Universal pumps are also made in a variant range that is UL certified for intrinsic safety. UL variants are not suitable for potentially explosive atmospheres in the EU, where ATEX approval is mandatory, or in the UK, where UKEX certification is mandatory. This manual covers the ATEX and UKEX certified Universal MTX pumps.

⚠ WARNING

The UL certified and the ATEX and UKEX certified variants use different components. UL variants are not suitable for potentially explosive atmospheres in the EU and the UK, and their parts are not covered by the ATEX and UKEX certification. Parts from the other variant can impair the intrinsic safety of the pump. In a hazardous location the pump can then ignite an explosive atmosphere. Never exchange parts between a UL certified pump and an ATEX and UKEX certified pump. If in doubt, contact Analyt-MTC.

Protecting the pump

NOTICE

Water, aggressive fumes or impinger liquid that reach the pump mechanism can damage the pump.

- **Water.** The case is rated IP20: it is neither waterproof nor splash-proof. Never use the pump where water could get into the case.
- **Sample media.** Do not run the pump for long periods without a sorbent tube or filter in line.
- **Long-term colour-change tubes.** Always use a tandem tube holder with a trap tube, so that the aggressive fumes these tubes give off cannot reach the pump mechanism.
- **Impingers.** Always fit a trap between the impinger and the pump inlet, so that impinger liquid cannot reach the pump mechanism. Set the flow below 1 L/min before you connect the trap and the impinger. Fix the impinger bracket to the front of the pump with the accessory mounting screws (11) to keep it steady.
- **Particulate filter.** Replace the inlet filter regularly (see The inlet filter (p. 17)).

Damage caused by ignoring these precautions can affect your warranty claim (see Analyt-MTC's terms and conditions).

CHAPTER 2

Product description

Models covered

Each pump comes with a NiMH battery pack and a toolkit with a large and a small bladed screwdriver attachment.

Order code	Model	Controls
224-44MTX	Standard	On/off switch only
224-PCMTX4	Intermediate	On/off switch, sample hold, display of the elapsed run time
224-PCMTX8	Deluxe	As the Intermediate, plus timer: timed run, delayed start, intermittent sampling

Parts of the pump

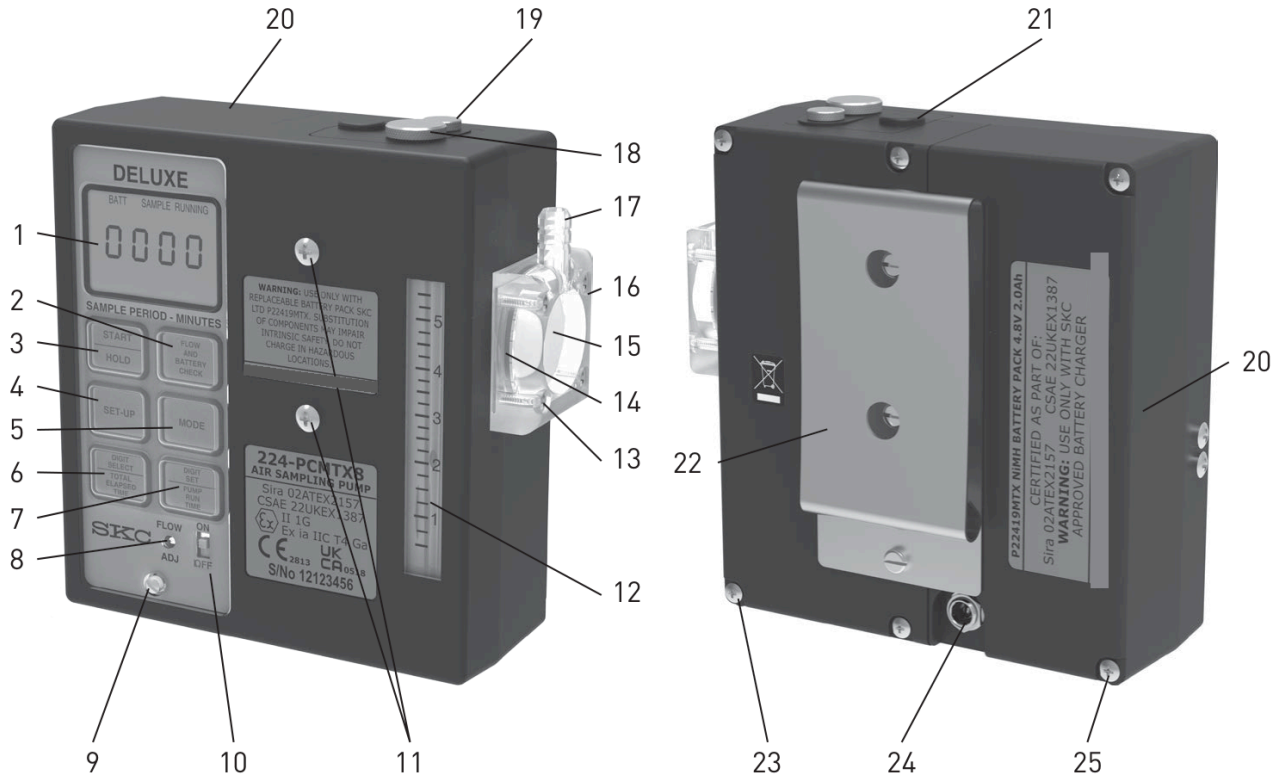


Figure 1. Pump parts, shown on a Deluxe pump (224-PCMTX8). Left: front; right: back.
1 LCD screen · **2 FLOW AND BATTERY CHECK** key · **3 START/HOLD** key · **4 SET-UP** key · **5 MODE** key · **6 DIGIT SELECT** key · **7 DIGIT SET** key · **8** Flow adjust screw · **9** Retaining screw of the anti-tamper cover · **10** On/off switch · **11** Accessory mounting screws · **12** Flow indicator · **13** Filter housing screws (4) · **14** Filter O-ring seal · **15** Inlet protection filter · **16** Inlet protection filter housing · **17** Air inlet · **18** Exhaust port cover · **19** Low flow mode screw cover · **20** Battery pack · **21** Low flow mode regulator cover · **22** Belt clip · **23** Main case screws (4) · **24** Charging jack socket of the battery pack · **25** Battery pack screws (2)

Control panels

The controls sit under a clear anti-tamper cover, which can only be removed with a tool, so that nobody changes the settings during a sample run (see Reaching the controls (p. 12)). The three models differ only in their control panels.

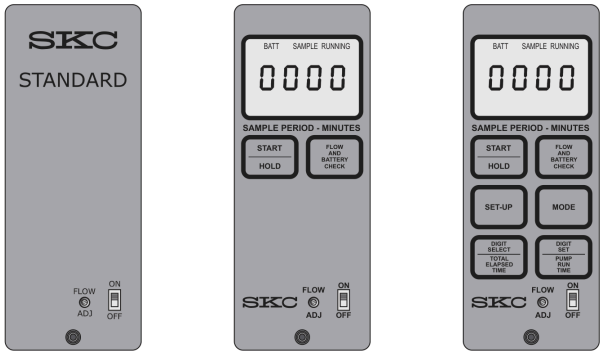


Figure 2. Control panels. Left: Standard, 224-44MTX; centre: Intermediate, 224-PCMTX4; right: Deluxe, 224-PCMTX8.

Key or control	Models	What it does
ON/OFF switch (10)	All	Switches the pump on (it starts to run) and off.
FLOW ADJ screw (8)	All	Sets the flow rate (see Setting the flow (p. 12)).
START/HOLD (3)	Intermediate, Deluxe	Switches between running and hold (see Sample hold (p. 12)); starts a programmed run.
FLOW AND BATTERY CHECK (2)	Intermediate, Deluxe	Runs the pump from hold without counting the time, and shows the battery state (see Flow and battery check (p. 12)).
SET-UP (4)	Deluxe	Opens the timer settings from hold.
MODE (5)	Deluxe	Steps through the timer settings **DELAYED START**, **SAMPLE PERIOD** and **PUMP PERIOD**.
DIGIT SELECT (6), also labelled TOTAL ELAPSED TIME	Deluxe	Selects one of the four digits of a timer setting; the selected digit flashes.
DIGIT SET (7), also labelled PUMP RUN TIME	Deluxe	Raises the selected digit from 0 to 9 and back to 0. During an intermittent run, press and hold it to see the pump running time.

Switching on and the display

Set the on/off switch (10) to ON: the pump starts to run. On the Intermediate and Deluxe models the LCD comes on and shows **BATT**, **SAMPLE RUNNING** and **0000**. The display counts the elapsed sample time in minutes, in steps of one minute, up to 9999 minutes (about one week); it then returns to 0000 and keeps counting. The display also shows the operating mode, the battery condition and flow faults. After a shutdown on low battery or a flow fault, the elapsed sample time stays on the display.

Flow indicator

The built-in flow indicator (12) is a rotameter with a scale from 0.5 to 5.5 L/min. It shows during a sample whether the flow changes, for example because the filter is loading or the tubing is pinched. **Do not use it to set or calibrate the sample flow rate** — use a calibrated flowmeter (see Setting the flow (p. 12)).

Built-in protection

Low battery	All models switch off automatically when the battery is low, before the pack is damaged by over-discharge.
Flow fault	Intermediate and Deluxe models detect a flow fault caused by blocked tubing or an overloaded filter. If the fault lasts longer than 15 seconds, the pump stops; it tries to restart automatically four times before it shuts down for good. The timer stops with it. For causes, see Troubleshooting (p. 19).
Particulate trap	A replaceable filter behind the air inlet keeps particles out of the pump mechanism (see The inlet filter (p. 17)).

CHAPTER 3

Commissioning

Charge the battery pack fully before you use the pump for the first time — ideally overnight — and before every sample run. The chargers charge at a constant current for 16 hours, then switch to a trickle charge that prevents overcharging.

⚠ WARNING

Charging the battery pack in a hazardous location can ignite an explosive atmosphere. Never charge the battery pack in a hazardous location. Use only the single charger 223-203A or the five-station charger 223-113A.

Charging

1. The charger comes with mains plugs for the UK, Europe, the USA and Australia / New Zealand. Fit the plug for your country. The charger works on 100–240 V AC, 50/60 Hz.
2. Plug the charger's output jack into the charging socket at the rear of the battery pack (24).
3. Plug the charger into the mains and switch on. The LED on the charger lights steadily: the pack is charging at the full rate.
4. After 16 hours the charger switches to trickle charge by itself; its LED now flashes on and off.
5. When the pack is fully charged, unplug the jack from the battery pack. Do not leave the pack on the charger for more than 24 hours.

The battery performs best when it is charged between 0 and +40 °C. A new pack reaches its full capacity after 2 to 3 full charge and discharge cycles. For long-term care, see Battery care (p. 17).

CHAPTER 4

Operation

Operation runs from setting the flow rate to the finished sample: set the flow against a calibrated flowmeter; on the Deluxe, program the timer if your sampling method needs it; then take the sample, at 1000 to 4000 mL/min or in low flow mode at 5 to 500 mL/min.

All models set their flow with a screw under the anti-tamper cover, from 1000 to 4000 mL/min. The pump then holds the flow within ±5 % of the set point. Set it against a calibrated flowmeter, such as a chek-mate flowmeter or a rotameter — never against the built-in flow indicator.

Reaching the controls

1. Undo the retaining screw of the anti-tamper cover (9) with the large bladed screwdriver attachment of the toolkit.
2. Lift off the cover. Refit it after setting up, so that the settings cannot be changed during the sample.

Setting the flow

> **Note**
> Do not force the flow adjust screw. Make sure the screwdriver blade sits firmly in the screw's slot before you turn it.

1. Connect a calibrated flowmeter to the pump as your sampling method requires (flowmeters: see Charging and flow measurement accessories (p. 23)).
2. Switch the pump on with the on/off switch (10).
3. Turn the flow adjust screw (8) with the small bladed screwdriver attachment of the toolkit: clockwise to increase the flow, anticlockwise to decrease it. The screw covers its whole range in 12 turns.
4. Stop when the flowmeter reads the flow rate you need.

Sample hold (Intermediate and Deluxe)

Once the pump is switched on, press **START/HOLD** to put it on hold: the pump stops, the timer freezes and **HOLD** appears at the bottom left of the display. Press **START/HOLD** again: the pump restarts, the timer carries on from where it stopped and **SAMPLE RUNNING** appears at the top right. Each further press switches between running and hold.

Flow and battery check (Intermediate and Deluxe)

The flow and battery check lets you run the pump to check or set the flow without adding the time to the sample time.

1. Put the pump on hold with **START/HOLD**.
2. Press **FLOW AND BATTERY CHECK**. The pump runs, but the timer stays frozen; **HOLD** flashes at the bottom left.

3. Read the battery state — **BATT OK**: fully charged; **LO BATT**: flat — and check or set the flow with your flowmeter.
4. Press **FLOW AND BATTERY CHECK** again to return to hold.

Programming the timer (Deluxe)

The Deluxe pump, 224-PCMTX8, can stop by itself after a set time, start after a delay, and spread a shorter pumping time over a longer sampling period. All times are set in minutes, up to 9999 minutes (about one week).

The three timer settings

DELAYED START	The minutes that pass before the pump starts to run. 0000 switches the delayed start off.
SAMPLE PERIOD	The period over which the sample is taken. 0000 switches the timed run off: the pump then runs until you stop it with **START/HOLD**.
PUMP PERIOD	The minutes the pump actually runs within the sample period. If it is equal to or longer than the sample period — or left at 0000 — the pump runs throughout the sample period. If it is shorter, the pump works out on and off periods itself, so that the pumping time is spread over the whole sample period.

Entering a setting

1. Switch the pump on and press **START/HOLD** to put it on hold.
2. Press **SET-UP**. The display shows **SET UP DELAYED START**, and the right-hand digit flashes.
3. Press **MODE** to step from **DELAYED START** to **SAMPLE PERIOD** and **PUMP PERIOD**. The display shows the name of the setting.
4. Press **DIGIT SELECT** to move along the four digits; the selected digit flashes.
5. Press **DIGIT SET** to raise the selected digit from 0 to 9 and back to 0.

Work out the time in minutes first, then enter it from the right: for 8 hours, 480 minutes, leave the right-hand digit at 0, set the second digit from the right to 8 and the third to 4, so that the display reads 0480.

Timed run

Example: an 8-hour run with no delayed start.

1. Switch the pump on, press **START/HOLD** to put it on hold, and press **SET-UP**.
2. Press **MODE** until **SAMPLE PERIOD** is shown, and enter 0480. Leave **PUMP PERIOD** at 0000: the pump then runs throughout the sample period.
3. Press **START/HOLD**. The pump starts, and **SAMPLE PERIOD** flashes at the top right of the display.
4. After 480 minutes the pump stops by itself. The display shows **HOLD**, **SAMPLE OVER** and the elapsed run time. If the pump stopped early, for example on low battery, the display shows the time it actually ran.

Timed run with delayed start

Example: an 8-hour run that starts after 2 hours.

1. Switch the pump on, press **START/HOLD** to put it on hold, and press **SET-UP**. **DELAYED START** is shown with its right-hand digit flashing.
2. Enter 2 hours as 0120: leave the right-hand digit at 0, set the second digit to 2 and the third to 1.
3. Press **MODE** until **SAMPLE PERIOD** is shown, and enter 0480. Leave **PUMP PERIOD** at 0000.
4. Press **START/HOLD**. **DELAYED START** flashes at the bottom left, and the display counts down from 120 minutes.
5. When the delay has run out, the pump starts by itself and **SAMPLE PERIOD** flashes at the top right.
6. After 480 minutes the pump stops. The display shows **HOLD**, **SAMPLE OVER** and the elapsed run time — or the time it actually ran, if it stopped early.

Intermittent sampling

Intermittent sampling takes one sample over a long period — up to 9999 minutes, about one week — while the pump runs only for as long as the battery allows, for example 8 hours spread over 7 days. The result is an average over the whole period, which is useful for environmental or ambient monitoring.

Example: 8 hours of pumping spread over 24 hours.

1. Switch the pump on, put it on hold and press **SET-UP**. Enter a delayed start if you need one.
2. Press **MODE** until **SAMPLE PERIOD** is shown, and enter 1440 (24 hours).
3. Press **MODE** until **PUMP PERIOD** is shown, and enter 0480 (8 hours).
4. Press **START/HOLD**. The pump calculates its on and off times and starts. **SAMPLE RUNNING** is shown at the top right and **PUMP PERIOD** flashes at the bottom right. The display counts the total elapsed time; press and hold **DIGIT SET** (PUMP RUN TIME) to see how long the pump has actually run. Release the key to return to the total time.
5. At the end of the run the display shows **HOLD**, **SAMPLE OVER** and the total elapsed time. Press and hold **DIGIT SET** (PUMP RUN TIME) to read the pump running time.

Repeating or clearing a program

The pump keeps its program as long as it stays switched on. To run the same program again later, leave the pump on with the display active, then press **SET-UP** and **START/HOLD**: the run starts again from the beginning. To clear the program, switch the pump off and on again with the on/off switch.

> **Note**
> You can charge the battery pack while the pump is switched on, so that it keeps its program — outside hazardous locations only (see Commissioning (p. 11)).

Sampling

The Universal MTX samples at constant flow from 1000 to 4000 mL/min with the sampling medium connected to the air inlet. For 5 to 500 mL/min it works in low flow mode with a low flow adapter. The sampling method you follow decides the medium, the flow rate and the sampling time.

Before you sample

NOTICE

Water, aggressive fumes or impinger liquid that reach the pump mechanism can damage the pump, and a wrong filter set-up makes it fault on flow.

- Do not run the pump for long periods without a sorbent tube or filter in line.
- For long-term colour-change tubes, always use a tandem tube holder with a trap tube.
- For impingers, always fit a trap between the impinger and the pump inlet, and set the flow below 1 L/min before you connect the trap and the impinger.
- Keep the pump away from water: the IP20 case is not splash-proof.
- Fit only one filter in the sampling head, and no backing paper with or instead of it — either makes the pump fault on flow.

Taking a sample, 1000 to 4000 mL/min

1. Charge the battery fully (see Commissioning (p. 11)). A battery that was not fully charged is a common reason for a pump stopping before the end of the sample.
2. Check that low flow mode is off (see Switching low flow mode on and off (p. 15)).
3. Set the flow rate with a calibrated flowmeter (see Setting the flow (p. 12)). On the Intermediate and Deluxe, use the flow and battery check (p. 12), so that the time does not count towards the sample, and confirm **BATT OK**.
4. On the Deluxe, program a timed run, a delayed start or an intermittent run if the method needs one (see Programming the timer (Deluxe) (p. 13)).
5. Refit the anti-tamper cover and connect the sampling medium.
6. Start the sample: on the Standard, with the on/off switch; on the Intermediate and Deluxe, with **START/HOLD** from hold. Use **START/HOLD** to pause and continue the sample.
7. During the sample, the flow indicator (12) shows whether the flow changes as the filter loads or the tubing kinks.
8. At the end, stop the pump — or let the timer stop it — and read the elapsed run time on the display (Intermediate and Deluxe).

Back pressure rises with the sampling medium and the flow rate. Typical values: an IOM sampler with a glass fibre (GFA) filter at 4 L/min about 10 in. H_2O, an IOM sampler with a 0.8 µm mixed cellulose ester (MCE) filter at 2 L/min about 15 in. H_2O. The back pressure the pump can compensate at each flow rate is given under Flow (p. 20).

Low flow sampling, 5 to 500 mL/min

The standard flow range is 1000 to 4000 mL/min. To sample at 5 to 500 mL/min you need an adjustable low flow adapter (tube holder) for one, two, three or four sample tubes. Each tube position has a throttle valve with which you set its flow. In low flow mode, a constant pressure controller built into the pump keeps a constant suction at the outlet of the adapter, so that the flow through the tubes stays stable once it is set. Order numbers are in Gas and vapour sampling accessories (p. 24).

Switching low flow mode on and off

The low flow mode control sits under the smaller of the two knurled metal cap screws on top of the pump (19 in Figure 1 (p. 8)).

1. Unscrew and remove the cap screw.

2. **On:** with the large bladed screwdriver attachment, turn the low flow mode control three turns anticlockwise.
3. **Off:** turn the control clockwise as far as it goes.
4. Refit the cap screw.

Setting up for low flow

1. Check that low flow mode is off, and that the low flow adapter is not yet connected to the pump's inlet hose nipple.
2. Stand the pump upright on a level surface and switch it on. Set the flow to about 1.5 L/min. Only an approximate flow is needed, so you can read it on the built-in flow indicator.
3. Switch the pump off and switch low flow mode on. Do not adjust the pump's flow any further.
4. Connect the low flow adapter to the pump's inlet hose nipple (Figure 3) and fit the sample tube(s).
5. Switch the pump on. With a calibrated flowmeter, such as a chek-mate or a rotameter, set the low flow with the adapter's throttle valve.

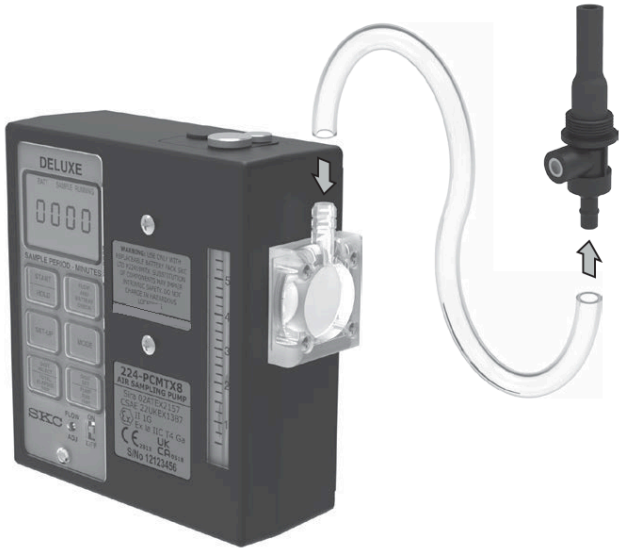


Figure 3. Low flow adapter connected to the pump's inlet hose nipple. Arrows: direction of flow.

NOTICE

In low flow mode the pump cannot reach its normal flow, so a sample at 1000 mL/min or more would not get the flow you set. After low flow sampling, check that low flow mode is off before you use the same pump for sampling at 1000 mL/min or more.

CHAPTER 5

Maintenance

You can replace the inlet filter and the battery pack yourself, and keep the battery in good condition. Have the pump serviced at least once a year. Before each use in a hazardous location, check the case and the battery pack for damage (see Use in hazardous locations (p. 5)).

Service interval

The manufacturer recommends a service at least once a year: the first one year after purchase, then every year on that date. How often your pump actually needs servicing is for you to decide in your own risk assessment. The service record in Service record (p. 25) helps you keep track; Analyt-MTC carries out the service.

The inlet filter

A particulate filter behind the air inlet keeps dust out of the pump mechanism. It sits in the inlet protection filter housing (16), sealed with an O-ring (14), and the housing is held by four screws (13). For general maintenance, replace the filter every 2 to 3 months, or sooner if it looks dirty: new filters are white, a blocked filter looks black.

Replacement filters come in packs of 10 (P2240901) or as a kit of 3 filters and 3 O-rings (P22409); a complete filter housing with one filter and one O-ring is P22417D (see Spare parts (p. 22)).

Battery care

First use	Charge the pack fully. It reaches its full capacity after 2 to 3 full charge and discharge cycles.
Charging	Charge only with an approved charger (223-203A or 223-113A), at 0 to +40 °C. Disconnect the pack from the charger after no more than 24 hours.
Discharging	The battery performs best between −10 and +45 °C. In hazardous locations the pump may be used only from −20 to +40 °C (see Use in hazardous locations (p. 5)).
Regular use	If the battery is only partly discharged each time, its usable capacity can drop. Cycle it once a month: run the pump until it shuts down on low battery, then charge it fully.
Storage and occasional use	1. Charge the pack fully before storage. 2. Store it in a cool, dry place at 0 to 30 °C. 3. Recharge it at least once a year, more often if it is stored above 30 °C. 4. After storage, cycle it 2 to 3 times to restore its capacity.

Testing the battery pack

1. Connect an approved charger to the battery pack. If the charger's LED lights, the pack's charging input is in order. If it does not light, the pack's input fuse has blown: replace the battery pack.
2. Leave the pack on the charger until it is fully charged.
3. If the pump does not work at all with the fully charged pack, the pack's output fuse has blown or its cells have failed or reached the end of their life: replace the battery pack.
4. If the pump works but shuts down on low battery after a much shorter run time than before, the cells are failing or at the end of their life: replace the battery pack.

Replacing the battery pack

1. Undo and remove the two battery pack screws (25).
2. Slide the battery pack carefully sideways out from under the metal belt clip (22), and lift it off.
3. Slide the new battery pack (P22419MTX) in under the belt clip. Make sure the pins of the pump's power connector engage the holes of the socket on the battery pack.
4. Fasten the pack with the two screws. Do not overtighten them.
5. Charge the new battery pack fully before use.

CHAPTER 6

Troubleshooting

⚠ WARNING

Taking the pump apart to replace internal parts can damage components or leave them assembled wrongly. Either can affect the pump's performance or invalidate its ATEX and UKEX certification. A pump without valid certification can ignite an explosive atmosphere in a hazardous location. Make sure no component is damaged or assembled wrongly, and do not overtighten the screws.

Problem	Possible cause and remedy
The battery pack does not charge.	• Try the charger with another battery pack. If that pack does not charge either, replace the charger. • Try the battery pack on a charger that is known to work. If it still does not charge, replace the battery pack (see also Testing the battery pack (p. 17)).
The pump does not run.	Try a battery pack that is known to be good. If the pump then runs, replace the battery pack.
The pump keeps going into flow fault (Intermediate and Deluxe).	• The back pressure of the sampling medium is too high: use a lower flow rate or a less restrictive medium, if your sampling method allows it. • More than one filter is fitted in the sampling head: fit only one. • A filter backing paper is fitted with or instead of the filter: fit only the filter. • The pump's particulate filter is blocked (it looks black): replace it (see The inlet filter (p. 17)). • The tubing is blocked or pinched: replace it.
The pump does not reach the flow rate you need.	• The battery voltage is low: charge the battery pack fully. • The back pressure of the sampling medium is too high: use a lower flow rate or a less restrictive medium, if your sampling method allows it. • The pump is in low flow mode: switch it off (see Switching low flow mode on and off (p. 15)). • The pump valves leak: have the valve plate assemblies replaced — contact Analyt-MTC.
The pump stops on low battery before the end of the sample.	• The battery pack was not fully charged: always charge it fully before a sample run. • The battery pack is near the end of its life and has lost capacity: replace it. • The back pressure of the sampling medium is too high: use a lower flow rate or a less restrictive medium, if your sampling method allows it.

If none of these remedies helps, contact Analyt-MTC (see Service, warranty and contacts (p. 25)).

CHAPTER 7

Specifications

Flow

Flow range	1000–4000 mL/min, constant flow 5–500 mL/min with a low flow adapter, constant pressure
Flow control	±5 % of the set point, constant flow
Flow indicator	Built-in rotameter, scale 0.5–5.5 L/min (indication only)
Flow fault (Intermediate, Deluxe)	Pump stops after 15 s of blocked or restricted flow; four automatic restart attempts
Particulate trap	Built-in, replaceable inlet filter

Compensation range

Flow rate, L/min	Back pressure, in. H_2O
1	5–30
2	0–25
3	0–20
4	0–10

Typical back pressure of sampling media: IOM sampler with GFA filter at 4 L/min about 10 in. H_2O; IOM sampler with 0.8 µm MCE filter at 2 L/min about 15 in. H_2O.

Power

Battery	Rechargeable NiMH battery pack, 4.8 V, 2.0 Ah (P22419MTX)
Typical run time	At least 8 hours at 3000 mL/min against 20 in. H_2O back pressure
Charging	16 hours at constant current, then trickle charge; single charger 223-203A or five-station charger 223-113A, 100–240 V AC, 50/60 Hz
Low battery	Automatic shutdown before the battery is over-discharged
Mains operation	With battery eliminator 223-305B or 223-305C; not certified for hazardous locations

Display and timer

Function	Models
Controls	Standard 224-44MTX: on/off switch and flow adjust screw only
LCD	Intermediate and Deluxe: elapsed run time 0–9999 minutes; operating mode, battery condition, flow fault
Sample hold	Intermediate and Deluxe: pauses pump and timer
Fault shutdown	Intermediate and Deluxe: on low battery and on high back pressure, with the timer frozen
Timer	Deluxe: timed shutdown; delayed start up to 9999 minutes; intermittent sampling
Anti-tamper cover	All models: clear cover over the controls, removed with a tool

Operating conditions

Operating and storage temperature	−20 to +40 °C
Operating humidity	0–95 % RH

Mechanical

Dimensions (H × W × D)	133 × 131 × 57 mm
Weight	915 g
Case	Accessory mounting screws on the front; belt clip
Ingress protection	IP20: not water- or splash-proof

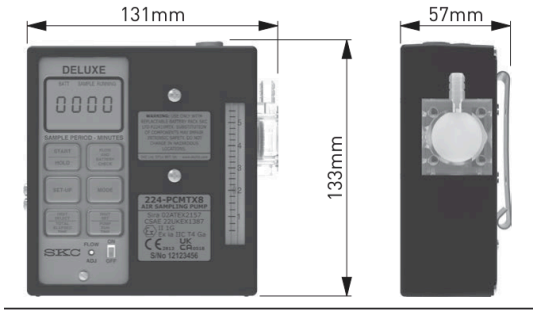


Figure 4. Dimensions: front view (left) and side view (right).

Certification

Marking	II 1G Ex ia IIC T4 Ga · CE · UKCA
ATEX	Certificate SIRA 02ATEX2157; Directive 2014/34/EU; standards EN IEC 60079-0:2018, EN 60079-11:2012
UKEX	Certificate CSAE 22UKEX1387; UK Regulations 2016 No. 1107; standards EN IEC 60079-0:2018, EN 60079-11:2012
Use	Zones 0, 1 and 2; flammable gases and vapours; groups IIA, IIB and IIC; temperature classes T1 to T4
Ambient temperature	−20 to +40 °C

The certification applies only under the conditions in Safety (p. 5). A variant range certified to UL is not covered (see Pump variants (p. 6)).

CHAPTER 8

Ordering information

Order from Analyt-MTC with the order codes. Use only original parts: other components may impair the intrinsic safety (see Approved battery, chargers and parts (p. 5)).

Pump components

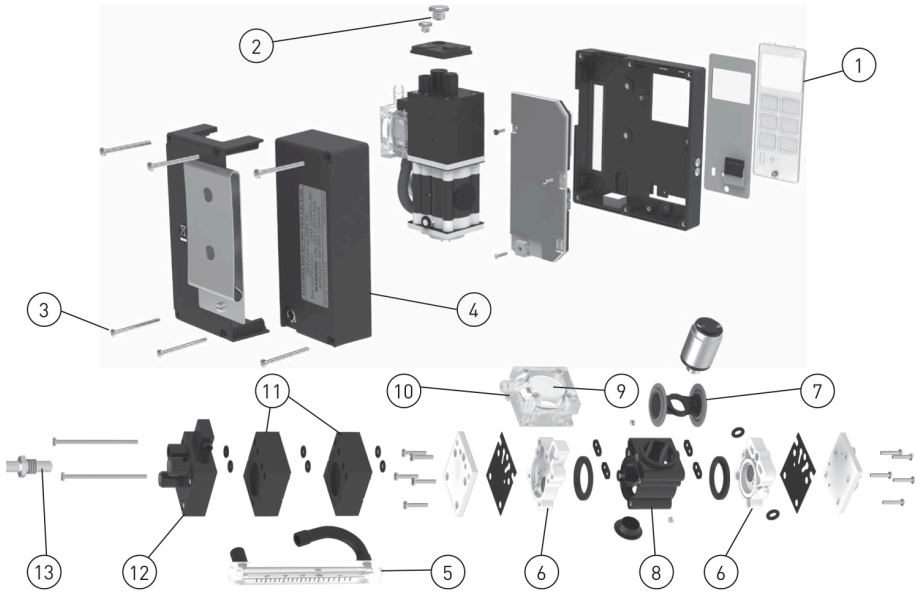


Figure 5. Pump components. Numbers as in the spare parts table.

Spare parts

Item	Order code	Description
1	P22433C	Keypad cover plate
2	P22433RGY	Cap screws, set of 2
3	P22433ES	External screw pack
4	P22419MTX	Battery pack, NiMH, 4.8 V, 2.0 Ah
5	P22433L	Flow meter assembly
6	P22417F	Valve plate assembly, set of 2
7	P22417H	Yoke and diaphragm assembly
8	P22417G	Pump body
9	P22409	Inlet filter and O-ring kit, 3 filters and 3 O-rings
9	P2240901	Inlet filter, pack of 10
10	P22417D	Filter housing assembly, with 1 inlet filter and 1 O-ring
11	P22417K	Pulsation dampener, set of 2
12	P22417J	Regulator assembly
13	P22417C	Pressure (exhaust) port fitting

The manufacturer recommends having the pump serviced regularly by an authorised service centre. Because an incorrect repair can compromise the certification for explosive atmospheres, the

complete range of internal parts is supplied only to authorised service centres trained on these pumps. For a part not listed here, or for a repair, contact Analyt-MTC.

Charging and flow measurement accessories

Order code	Description
223-203A	Single battery charger, 100–240 V AC, 50/60 Hz, with UK, EU, US and AUS mains plugs
223-113A	Five-station battery charger, 100–240 V AC, 50/60 Hz, with UK, EU, US and AUS mains plugs
223-305B	Battery eliminator, 230 V AC, 50 Hz, EU 2-pin mains plug — not for hazardous locations
223-305C	Battery eliminator, 230 V AC, 50 Hz, UK 3-pin mains plug — not for hazardous locations
375-00205	chek-mate flowmeter, 20–500 mL/min, accuracy ±1 % of reading (±2.5 % at 20–50 mL/min)
375-0550	chek-mate flowmeter, 0.5–5.0 L/min, accuracy ±1 % of reading (±2.5 % at 0.5–0.75 L/min)
393-002025	Rotameter, 20–250 mL/min, accuracy ±2.5 % of full scale
393-0334	Rotameter, 0.3–3.4 L/min, accuracy ±2.5 % to VDI/VDE 3513-2:2008

Dust sampling accessories

Order code	Description
225-70A	IOM sampler, plastic, with two-part plastic filter cassette and clip
225-76A	IOM sampler, stainless steel, with two-part stainless steel filter cassette and clip
225-79A	IOM sampler, plastic, with two-part stainless steel filter cassette and clip
225-71A	IOM two-part plastic filter cassette with cap and clip
225-75A	IOM two-part stainless steel filter cassette with cap and clip
391-01	Calidaptor flow calibration adapter for the IOM sampler
225-772	IOM foam plug for respirable and multi-dust sampling, pack of 10
225-69	Cyclone sampler, plastic, with plastic cassette for 25 mm filters
225-69-37	Cyclone sampler, plastic, with plastic cassette for 37 mm filters
225-62	Cyclone plastic cassette for 25 mm filters, with clip
225-62-37	Cyclone plastic cassette for 37 mm filters, with clip
225-67-10	Filter transport cassette for 25 mm filters, pack of 10

Gas and vapour sampling accessories

Order code	Description
224-26-01	Adjustable low flow adapter / tube holder, single
224-26-02	Adjustable low flow adapter / tube holder, double
224-26-03	Adjustable low flow adapter / tube holder, triple
224-26-04	Adjustable low flow adapter / tube holder, quadruple
224-29A	Protective cover type A, 6 mm diameter × 70 mm
224-29B	Protective cover type B, 8 mm diameter × 110 mm
224-29C	Protective cover type C, 10 mm diameter × 150 mm
224-29D	Protective cover type D, 10 mm diameter × 220 mm
224-29P	Protective cover for low-volume polyurethane foam (PUF) tubes
224-29V	Tube holder for OSHA versatile sampler (OVS) tubes
Ask Analyt-MTC	Tube tip breaker

For filters, sorbent tubes, impingers and other sampling media, ask Analyt-MTC.

Pump kits

Each model is also supplied in kits. The kit number is the pump's part number with a suffix. Every pump in a kit comes with its NiMH battery pack, a tool kit and the operating manual.

Suffix	Kit	Contents besides the pump(s)
K	Single pump, basic	Single charger, Tygon tubing, Step by Step Guide, carry case
K5	Five pumps, basic	Five station charger, Tygon tubing for each pump, 3 Step by Step Guides, carry case
KP / K5P	Dust sampling, one or five pumps	As K / K5, plus per pump an IOM Multidust sampler; 5 IOM Multidust cassettes (15 for five pumps), IOM foams and a Calidaptor
KV / K5V	Vapour sampling, one or five pumps	As K / K5, plus per pump a single adjustable tube holder and a protective tube cover; a tube breaker
KC / K5C	Combined dust and vapour, one or five pumps	Contents of the dust and the vapour kit together

Kit	Standard, order code	Intermediate, order code	Deluxe, order code
Basic kit, 1 pump	224-44MTXK	224-PCMTX4K	224-PCMTX8K
Basic kit, 5 pumps	224-44MTXK5	224-PCMTX4K5	224-PCMTX8K5
Dust kit, 1 pump	224-44MTXKP	224-PCMTX4KP	224-PCMTX8KP
Dust kit, 5 pumps	224-44MTXK5P	224-PCMTX4K5P	224-PCMTX8K5P
Vapour kit, 1 pump	224-44MTXKV	224-PCMTX4KV	224-PCMTX8KV
Vapour kit, 5 pumps	224-44MTXK5V	224-PCMTX4K5V	224-PCMTX8K5V
Combined kit, 1 pump	224-44MTXKC	224-PCMTX4KC	224-PCMTX8KC
Combined kit, 5 pumps	224-44MTXK5C	224-PCMTX4K5C	224-PCMTX8K5C

CHAPTER 9

Service, warranty and contacts

Analyt-MTC is your contact for everything concerning the Universal MTX pumps: technical questions, the annual service, repairs, spare parts, accessories, sampling media and warranty claims.

Contact

ANALYT-MTC Messtechnik GmbH

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Klosterrunsstraße 18, 79379 Müllheim
Germany

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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

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

- the model (224-44MTX, 224-PCMTX4 or 224-PCMTX8) and the serial number from the rating label on the front of the pump;
- the sampling medium and flow rate you used;
- what happened, and what the display showed (see Troubleshooting (p. 19)).

Service record

The manufacturer recommends a service at least once a year, starting one year after the date of purchase (see Service interval (p. 17)). Record the pump's details and each service here.

Model	
Serial number	
Date of purchase	

Service	Date	Service	Date	Service	Date
1		5		9	
2		6		10	
3		7		11	
4		8		12	

Warranty

Make warranty claims to Analyt-MTC; the warranty is governed by Analyt-MTC's terms and conditions. Damage caused by ignoring the precautions in Protecting the pump (p. 7), or by charging the battery pack with a charger that is not approved for it, can affect your warranty claim.

Disposal

The pump carries the crossed-out wheeled bin symbol: at the end of its life it must not go into household waste, but must be disposed of as electrical and electronic equipment under the WEEE rules that apply in your country. Remove the battery pack first. The NiMH battery pack, and any spare packs, must be collected separately and recycled or disposed of under the battery rules that apply in your country. For details on how to comply, contact Analyt-MTC.

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Sales, service and calibration

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