44XR Universal Sample Pump
Cat. No. 224-44XR
Operating Instructions

863 Valley View Road, Eighty Four, PA 15330 • 724-941-9701 • skcinc.com

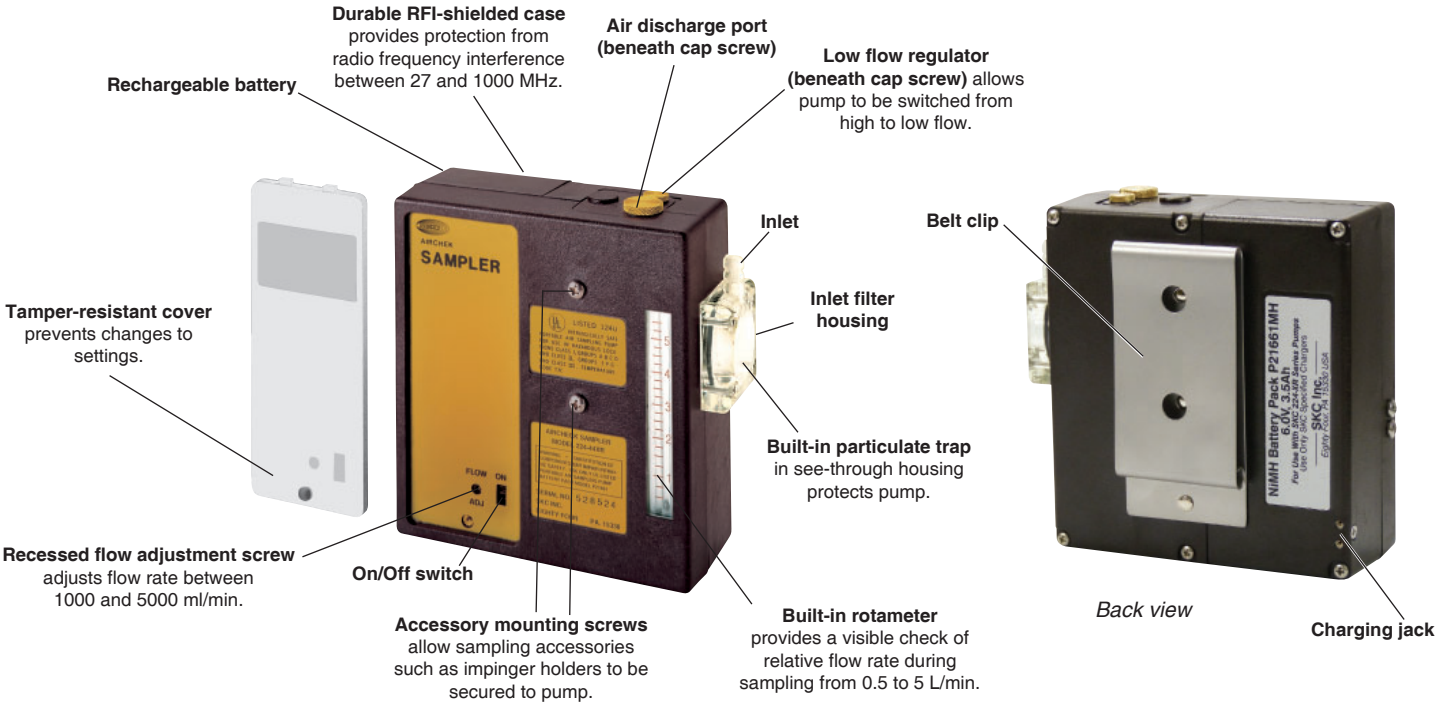


Figure 1. *Front and back views of 44XR Universal Sample Pump*

Introduction

Description

The 44XR Universal Sample Pump (*Figure 1*) is a constant flow (from 5 to 5000 ml/min) air sampler suitable for a broad range of applications. It is ideal for industrial hygiene studies as well as environmental testing.

Checking Pump/Kit Contents

Use the table below to verify that you received all items associated with the Cat. No. ordered. If you are missing items, contact SKC at 800-752-8472 (U.S. only) or 724-941-9701.

If You Ordered Cat. No.	Your Package Should Contain
224-44XR	Universal 44XR Sample Pump with NiMH battery pack and screwdriver set
224-44XRKD	Single Universal 44XR Pump Kit with pump, NiMH battery, screwdriver set, 100-240 V single charger, filter cassette holder, adjustable tube holder with Type A protective tube cover, exhaust port fitting, and nylon carry case
224-44XRKDH	Single Universal 44XR Pump Kit with pump, NiMH battery, screwdriver set, 100-240 V single charger, filter cassette holder, adjustable tube holder with Type A protective tube cover, exhaust port fitting, and hard-sided carry case

Required Equipment/Media

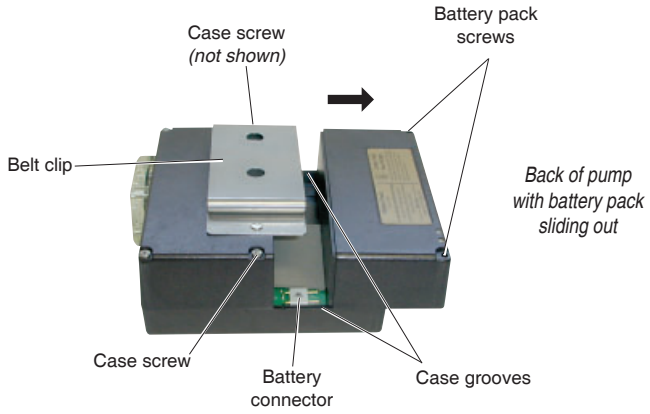
- ☑ **1/4-inch ID (3/8-inch OD) Tygon® tubing**
- ☑ **PowerFlex® Charger**
- ☑ **Low flow accessories** if sampling at 5 to 500 ml/min. *See Accessories.*

Getting Started

Install the Battery Pack

To enhance battery life, SKC ships battery packs separately from the pump. Once installed, completely charge the battery pack before operating the pump.

1. Remove the two screws that secure the battery pack and loosen the two case screws above and below the belt clip.
2. Carefully slide the battery pack out from under the belt clip. Ensure that the battery is kept level.
3. Slip the front edge of the new battery pack under the belt clip and position the battery pack to engage the grooves in the case.
4. Slide the battery pack toward the pump until it is flush with the pump case on all sides.
5. Reinstall two battery screws and tighten the case screws loosened in Step 1.
6. Charge the battery completely. *See Charge the Battery Pack.*
   Note: *For optimum charge, ensure the pump is not running during charging.*

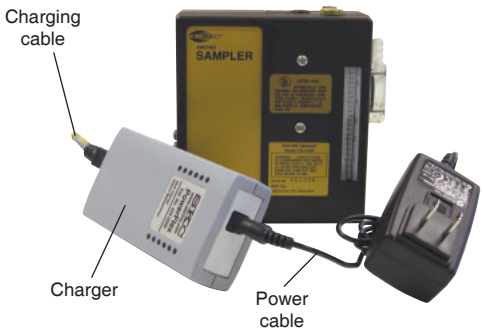


Charge the Battery Pack

1. Activate the charger. *Follow PowerFlex Operating Instructions 37783.*

For optimum charge, ensure that the pump is not running.

2. Insert the charging cable connector into the charging port on the charger.
3. Insert the charging plug end of the cable into the jack on the back of the pump's battery pack *(Figure 1).*
4. Charge the battery completely (the LED at the port connected to the pump is a steady green) before using the pump.
5. Disconnect the charging cable from the back of the pump's battery pack.



Charging Train with single PowerFlex charger

Notes and Cautions

- To comply with intrinsic safety regulations, do not charge or operate the pump from the charger in hazardous locations.
- Using a non-approved charger voids any warranty.
- Using a repaired or rebuilt battery pack voids any warranty and the UL Listing for intrinsic safety.
- Using any device other than the approved battery pack to power the pump voids the UL Listing for intrinsic safety and any warranty.
- Ensure proper orientation of charging cable before plugging it into the charging jack. Improper orientation/contact will short-circuit the battery and voids any warranty.
- Short-circuiting the battery pack will render it immediately inoperative.
- Failure to follow warnings and cautions voids any warranty.
- The battery pack may be kept on the SKC-approved charger for an indefinite time.

For more information on SKC pump battery packs, visit the Knowledge Center at www.skcinc.com.

Turn Pump Power On/Off *(Figure 1)*

Turn on: Remove the tamper-resistant cover. Move the on/off switch to ON.

Turn off: Move the on/off switch to OFF.

Use the Pump with AC Power (Power option in non-hazardous locations)

Do not use the pump with the Battery Eliminator in hazardous locations. UL Listing for intrinsic safety is not in effect during pump operation with Battery Eliminator.

The Battery Eliminator is an accessory that converts alternating current (AC) to direct current (DC) from which the pump can be operated for extended runs. **The Battery Eliminator should be used in non-hazardous locations only.** *See Accessories.*

1. Remove the battery pack from the pump *(see Replace the Battery Pack)*. The Battery Eliminator comprises two pieces, a wall cube and a power adapter.

2. Plug the wall cube into a standard wall outlet and insert its plug end into the power adapter.

3. Fit the power adapter on the pump in place of the battery pack.

Operation

High Flow Applications (1000 to 5000 ml/min)

Deactivate the Regulator for High Flow

1. To ensure the pump is set for high flow, remove the cap screw *(Figure 1)* covering the regulator valve and turn the exposed screw **clockwise** until it stops. Do not overtighten. *See right.*

2. Replace the cap screw. The pump is now set for high flow.

For high flow, turn regulator valve screw clockwise.

Set/Verify Flow Rate

- *Allow pump to equilibrate after moving it from one temperature extreme to another.*
- *Charge pump battery completely before flow rate verification and sampling.*
- *Verify flow rate through sampling train using procedure below before and after each sampling operation.*

1. Ensure that the battery is fully charged and that the pump has run for five minutes before verifying flow rate. Leave the pump running.
2. Prepare the flowmeter *(see flowmeter instructions)*.
3. Set up a flow rate verification train (*Figure 2*): Using flexible tubing, connect the flowmeter outlet (suction port) to the representative sampling medium inlet. Using 1/4-inch Tygon tubing, connect the representative sampling medium outlet to the pump inlet.
4. Set the flow rate using the flow adjustment screw *(Figure 1)* until the flowmeter indicates the method-specified flow rate. Take a minimum of three readings and record the average flow rate, as per OSHA/NIOSH instructions.
5. When flow rate verification is complete, turn off the pump and disconnect the flowmeter.

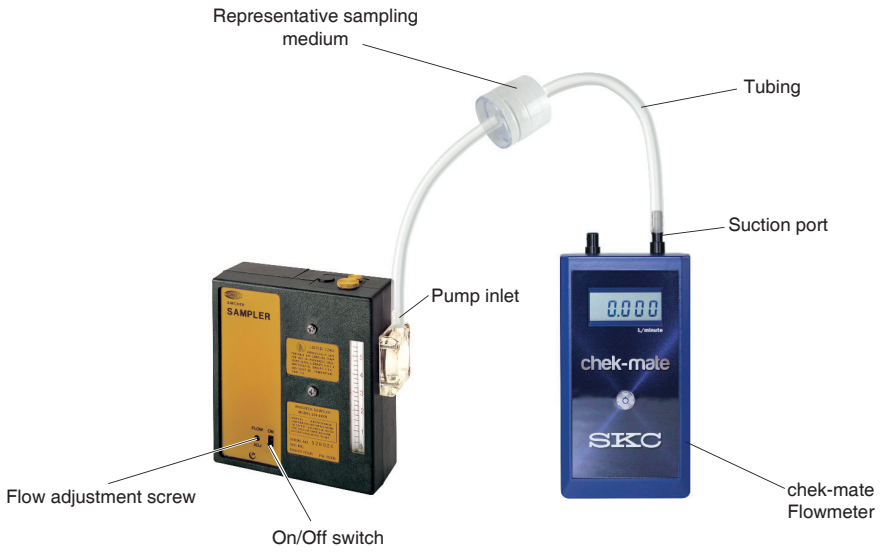


Figure 2. *Flow Rate Verification Train with Filter Cassette*

Set Up/Sample

- *Allow pump to equilibrate after moving it from one temperature extreme to another.*
- *Protect sample pump from weather when in use outdoors.*
- *Powering the pump with any device other than the approved battery pack voids the UL Listing for intrinsic safety.*
- *Do not use the pump with the Battery Eliminator in hazardous locations. UL Listing for intrinsic safety is not in effect during pump operation with Battery Eliminator.*
- *Use of any device other than the approved battery pack or Battery Eliminator to power the pump voids any warranty.*
- *Charge pump battery completely before flow rate verification and sampling.*
- *Verify flow rate through sampling train (see Set/Verify Flow Rate) before and after each sampling operation.*

Clip sampling medium to worker and pump to belt.

1. Replace the representative sampling medium used for flow rate verification with an unexposed medium for sample collection.

2. Place the sampling medium where appropriate for sampling.
   a. For personal sampling, clip the sampling medium to the worker in the breathing zone. *See above right.*
   b. **When using impingers, an in-line trap (SKC Cat. No. 225-22 or 225-22-01) is required to prevent fumes from accidentally being drawn into the sampler.** Place the in-line trap between the pump and the impinger. Mount the impinger and trap to the face of the sampler using the accessory mounting screws *(Figure 1)* or place them in a holster at the worker's waist.

Impinger holder on pump with impinger and trap

Failure to use an appropriate in-line trap during impinger sampling voids any warranty.

   c. When using the pump for pressure applications, such as bag sampling, thread the exhaust port fitting supplied with the pump into the air discharge port on top of the pump; hand-tighten only. Using PTFE tubing, connect the inlet of the sample medium (e.g., sample bag) to the exhaust port fitting on the pump. Turn on the pump to collect the appropriate volume of air. Shut off the pump and close inlet on sample medium to stop sampling.

Thread exhaust port fitting into air discharge port on pump.

3. Start sampling by turning on the pump using the on/off switch *(Figure 1)*. Record the start time.

4. At the end of the sampling period, turn off the pump and record the stop time.

5. Seal the sample and send it with blanks and pertinent sampling information to a laboratory for analysis.

6. Verify the flow.
   a. Turn on the pump and reinstate the flow rate verification train (*Figure 2*).
   b. Take three readings and record the average value as the post-sample flow rate. **Do not adjust the pump flow rate during this step.**
   c. Compare the pre and post-sample flow rates. Note in sampling documentation if the values differ by more than ± 5%.

Low Flow Applications (5 to 500 ml/min)

Using Single Adjustable Tube Holder (Figure 3)

Activate the Regulator for Low Flow

1. Start the pump using the on/off switch *(Figure 2)*, and adjust the flow rate by turning the flow adjustment screw *(Figure 2)* until the built-in rotameter reads approximately 1.5 L/min.

2. Remove the cap screw covering the regulator valve *(Figure 2)* and turn the exposed screw four to five turns **counterclockwise.**

3. Replace the cap screw. The pump is now set for low flow.

For low flow, turn regulator valve screw counterclockwise.

Set/Verify Flow Rate for Single Tube

- *Allow pump to equilibrate after moving it from one temperature extreme to another.*
- *Charge pump battery completely before flow rate verification and sampling.*
- *Verify flow rate through sampling train using procedure below before and after each sampling operation.*

1. Ensure that the battery is fully charged and that the pump has run for five minutes before verifying flow rate. Leave the pump running.

2. Ensure that the regulator has been activated for low flow and the pump flow rate is set at 1.5 L/min.

3. Prepare the flowmeter per flowmeter instructions.

4. Set up a flow rate verification train *(see below)*:
   a. Connect the single adjustable tube holder to the pump inlet.
   b. Insert an opened representative sorbent tube into the rubber sleeve *(Figure 3)* of the low flow tube holder **with the arrow on the tube pointing toward the tube holder.**
   c. Using flexible tubing, connect the exposed end of the sorbent tube to the flowmeter outlet (suction port).

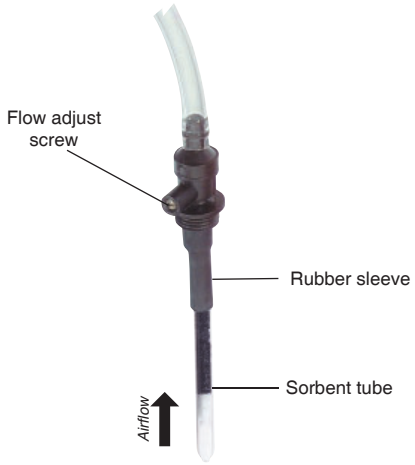


Figure 3. *Single Adjustable Tube Holder with Sample Tube*

5. Loosen the brass flow adjust screw *(Figure 3)* on the tube holder. Adjust the flow rate by turning the flow adjust screw (**counterclockwise to increase, clockwise to decrease**) until the flowmeter indicates the desired flow. Take a minimum of three readings and record the average flow rate, as per OSHA/NIOSH instructions.

Do not adjust the flow on the pump. Adjust the flow only by using the flow adjust screw on the tube holder. Observe the flow rate on the flowmeter.

6. When flow rate verification is complete, turn off the pump and disconnect the tubing from the sorbent tube.

Turn screw to adjust flow.

Flow rate verification train with tube in adjustable tube holder

Set Up/Sample

- *Allow pump to equilibrate after moving it from one temperature extreme to another.*
- *Protect sample pump from weather when in use outdoors.*
- *Powering the pump with any device other than the approved battery pack voids the UL Listing for intrinsic safety.*
- *Do not use the pump with the Battery Eliminator in hazardous locations. UL Listing for intrinsic safety is not in effect during pump operation with Battery Eliminator.*
- *Use of any device other than the approved battery pack or Battery Eliminator to power the pump voids any warranty.*
- *Charge pump battery completely before flow rate verification and sampling.*
- *Verify flow rate through sampling train (see Set/Verify Flow Rate for Single Tube) before and after each sampling operation.*

Clip holder to worker and pump to belt.

1. Replace the representative sorbent tube used to set the flow with a new unexposed sorbent tube for sample collection.

2. Place the appropriate size protective tube cover over the tube, and screw it into place on the tube holder. **For personal sampling,** clip the tube holder to the worker in the breathing zone. *See above right*.

3. Start sampling by turning on the pump using the on/off switch *(Figure 2)*, and record the start time.

4. At the end of the sampling period, turn off the pump and record the stop time.

5. Seal the sample and send it with blanks and pertinent sampling information to a laboratory for analysis.

6. Verify the flow.
   a. Turn on the pump and reinstate the flow rate verification train (*see Set/Verify Flow Rate for Single Tube*).
   b. Take three readings and record the average value as the post-sample flow rate. **Do not adjust the pump flow rate during this step.**
   c. Compare the pre and post-sample flow rates. Note in sampling documentation if the values differ by more than ± 5%.

7. To return to high flow, remove the tube holder and deactivate the regulator. *See Deactivate the Regulator for High Flow.*

Low Flow Applications (5 to 500 ml/min)

Using Multiple-tube Adjustable Tube Holder (Figure 4)

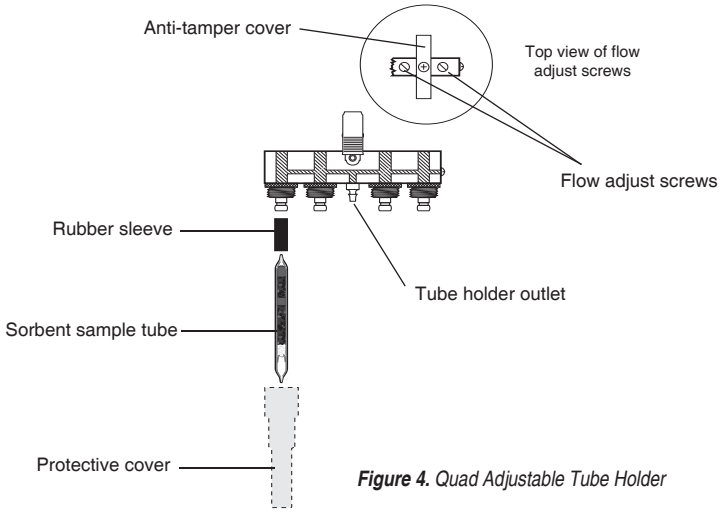


Figure 4. *Quad Adjustable Tube Holder*

Activate the Regulator for Low Flow

1. Start the pump using the on/off switch *(Figure 1)*, and adjust the flow rate by turning the flow adjustment screw *(Figure 1)* until the built-in rotameter reads approximately 1.5 L/min.
2. Remove the cap screw covering the regulator valve *(Figure 1)* and turn the exposed screw four to five turns counterclockwise.
3. Replace the cap screw. The pump is now set for low flow.

For low flow, turn regulator valve screw counterclockwise.

Set/Verify Flow Rate for Multiple Tubes

- *Allow pump to equilibrate after moving it from one temperature extreme to another.*
- *Charge pump battery completely before flow rate verification and sampling.*
- *Verify flow rate through sampling train using procedure below before and after each sampling operation.*

Follow these important steps before proceeding:

1. Ensure that the battery is fully charged and that the pump has run for five minutes before verifying flow rate. Leave pump running.
2. Ensure that the regulator has been activated for low flow and the pump flow rate is set at 1.5 L/min.
3. Calculate the sum of all tube flow rates. The maximum flow rate through any one tube is 500 ml/min.*
   a. If the sum is ≤ 1000 ml/min, set the pump flow rate to 1.5 L/min.
   b. If the sum is > 1000 ml/min, multiply that number by 0.15 and total the two numbers. Set the pump flow rate for the resulting new sum. (**Example:** Sampling with three sorbent tubes, each with a flow rate of 500 ml/min.* The sum of the tube flow rates is calculated as 3 x 500 = 1500. Determining a 15% higher flow rate is calculated as 1500 x 0.15 = 225. Calculating the final pump flow setting would be 1500 + 225 = 1725 ml/min.)

** Back pressure across some sample tubes can be higher than average. In these instances, the maximum flow rate of 500 ml/min may not be achieved.*

4. Prepare the flowmeter. *See flowmeter instructions*.
5. Set up the flow rate verification train (*see right*):
   a. Connect the adjustable tube holder *(Figure 4)* to the pump inlet *(Figure 1)* using the attached 1/4-inch Tygon tubing.
   b. Insert an opened representative sorbent tube into each rubber sleeve of the tube holder *(Figure 4)*. **Ensure that the arrow on each tube points toward the tube holder.**

If sampling with fewer tubes than number of ports, insert unopened sorbent tubes in the empty ports to seal them.

Connect tube holder to pump inlet and tube inlet to flowmeter.

Low Flow Applications, Multiple Tubes (Cont)

c. Using flexible tubing, connect the exposed end of the first sorbent tube to the flowmeter outlet (suction port).

6. Loosen and turn the brass flow adjust screw *(Figure 4)* on the port of the appropriate tube holder (**counterclockwise to increase, clockwise to decrease**) until the desired flow rate is achieved. ***Note:*** *For tri and quad models, first rotate each anti-tamper cover (Figures 4 and 5) to expose the flow adjust screws, then adjust the appropriate one until the flowmeter indicates the desired flow.*

Do not adjust the flow on the pump. Adjust the flow only by using the flow adjust screw on the tube holder.

Do not exceed 500 ml/min flow rate per tube.

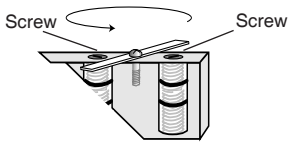


Figure 5.
Cut-away of Tri/Quad Adjustable Tube Holder

7. Disconnect the flowmeter from the tube and connect it to the next sorbent tube. Repeat the flow adjustment process until all tubes are flow-verified. Changing the flow on one tube will not affect the flow rate through the remaining tubes.

8. When the flow rate is set for each tube, turn off the pump and disconnect the flowmeter.

Set Up/Sample

- *Allow pump to equilibrate after moving it from one temperature extreme to another.*
- *Protect sample pump from weather when in use outdoors.*
- *Powering the pump with any device other than the approved battery pack voids the UL Listing for intrinsic safety.*
- *Do not use the pump with the Battery Eliminator in hazardous locations. UL Listing for intrinsic safety is not in effect during pump operation with Battery Eliminator.*
- *Use of any device other than the approved battery pack or Battery Eliminator to power the pump voids any warranty.*
- *Charge pump battery completely before flow rate verification and sampling.*
- *Verify flow rate through sampling train (see Set/Verify Flow Rate for Multiple Tubes) before and after each sampling operation.*

Clip holder to worker and pump to belt.

1. Replace the representative sampling media used for flow rate verification with unexposed media for sample collection. Use protective tube covers to prevent tube breakage.

2. Place the sampling media where appropriate for sampling. For personal sampling, clip the tube holder to the worker in the breathing zone.

3. Start the sampling by turning on the pump using the on/off switch *(Figure 1)*. Record the start time.

4. At the end of the sampling period, turn off the pump and record the stop time.

5. Seal the sample(s) and send with blanks and pertinent sampling information to a laboratory for analysis.

6. Verify the flow.
   a. Turn on the pump and reinstate the flow rate verification train (*see Set/Verify Flow Rate for Multiple Tubes*).

   b. Take three readings and record the average value as the post-sample flow rate. **Do not adjust the pump flow rate during this step.**

   c. Compare the pre and post-sample flow rates. Note in sampling documentation if the values differ by more than ± 5%.

7. To return to high flow, remove the tube holder and deactivate the regulator. *See Deactivate the Regulator for High Flow.*

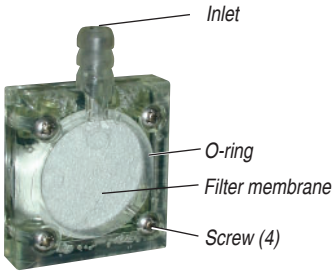
Maintenance

Clean the Pump Inlet Filter

The 44XR Universal Sample Pump is fitted with a filter/trap inside a clear plastic intake port housing. This prevents particles from being drawn into the pump mechanism. Visually check the filter to ensure that it does not become clogged. If maintenance is necessary, follow this procedure:

1. Clean dust and debris from around the filter housing.
2. Remove the four screws and the front filter housing.
3. Remove the O-ring.
4. Remove and discard the filter membrane.
5. Clean the filter housing.
6. Insert a new filter membrane and the O-ring.* *See Replacement Parts.*
7. Reattach the front filter housing and cross-tighten the four screws.

* *Replace with new O-ring only as needed.*



Close-up of inlet filter housing

Maintain the Battery Pack

For proper maintenance of battery packs, SKC offers chargers (*see Accessories*) that condition the battery for optimum performance in 6 to 8.5 hours. For optimum charge, ensure pump is not running during charging. Follow charger instructions.

Fully charge packs before use. *See Charge the Battery Pack. For more information on SKC pump batteries, visit the Knowledge Center at www.skcinc.com.*

To comply with intrinsic safety regulations, battery packs should not be charged in hazardous locations.

Ensure proper orientation of charging cable before plugging it into the charging jack. Improper orientation/contact will short-circuit the battery and voids any warranty.

Short-circuiting the battery pack will render it immediately inoperative.

Replace the Battery Pack

See Install the Battery Pack.

Notes and Cautions

- Use of a repaired or rebuilt battery pack voids any warranty and the UL Listing for intrinsic safety.
- Use only SKC-approved charger and battery pack designed for the Universal Sample Pump to ensure reliable performance. Failure to do so voids any warranty and UL Listing for intrinsic safety.
- Use of any device other than the approved battery pack to power the pump voids the UL Listing for intrinsic safety and any warranty.

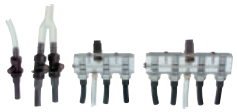
For more information on SKC pump batteries, visit the Knowledge Center at www.skcinc.com.

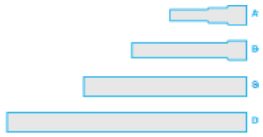
Pump Service

Pumps under warranty should be sent to SKC Inc. for servicing. *See Limited Warranty and Return Policy.*

Accessories/Replacement Parts

Accessories	Cat. No.
Medium Flow chek-mate Flowmeter, 0.5 to 5 L/min, includes 9-volt battery	
with NIST standard traceable calibration certificate	**375-0550N**
with UK standard traceable calibration certificate	**375-0550**
with ISO standard traceable calibration certificate	**375-0550S**
Low Flow (5 to 500 ml/min) applications	
Adjustable Tube Holders	
Single	**224-26-01**
Dual	**224-26-02**
Tri	**224-26-03**
Quad	**224-26-04**
Protective Sample Tube Covers	
A - 70 mm, standard charcoal	**224-29A**
B - 110 mm, large charcoal	**224-29B**
C - 150 mm	**224-29C**
D - 220 mm	**224-29D**
Battery Maintenance	
PowerFlex Charging System for SKC Personal Pumps	
5 Stations, 100-240 V	**223-1000**
Single, 100-240 V	**223-2000**
PowerFlex Pump Cable, for Universal XR models	**223-1002**
Battery Eliminator,* connects pump to line power for extended sampling	
115 V	**223-325**
230 V	**223-325B**
Pump Accessories	
Screwdriver Set, included with pump	**224-11**
Protective Nylon Pouch with belt and shoulder strap	
Black	**224-87**
Red	**224-95A**





Protective Nylon Pouch

** Not UL Listed for intrinsic safety*

SKC Limited Warranty and Return Policy

SKC products are subject to the SKC Limited Warranty and Return Policy, which provides SKC's sole liability and the buyer's exclusive remedy. To view the complete SKC Limited Warranty and Return Policy, go to www.skcinc.com/warranty.

Replacement Parts

Pump Case Parts

P21411	Case Parts, excluding Battery Case
P21661MH	Battery Pack Assembly, NiMH
P22417BC	Belt Clip with screws
P22433Q	Control Board
P22433R	Cap Screws, set of 2
P22433RS1	Replacement Stack, does not include flowmeter and filter housing assemblies or motor
P2243001	Battery Connector, pk/10
P22417C	Exhaust Port

Pump Stack Parts

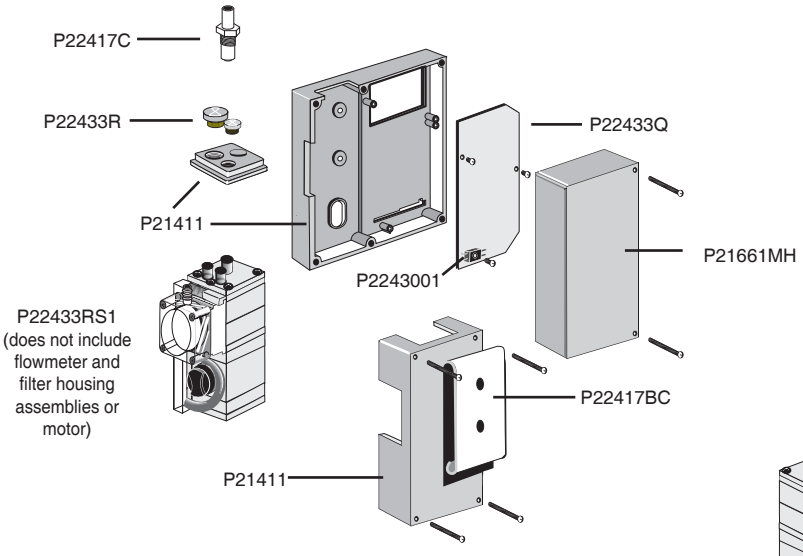
P22417D	Filter Housing Assembly
P22417F	Valve Plate Assembly
P22417G	Pump Body
P22417HC	Diaphragm/Yoke Assembly
P22417J	Regulator Assembly
P22417K	Pulsation Dampener Assembly (2)
P22417W	Bottom Plate Assembly
P22433L	Flowmeter Assembly

Parts Not Shown in Illustration

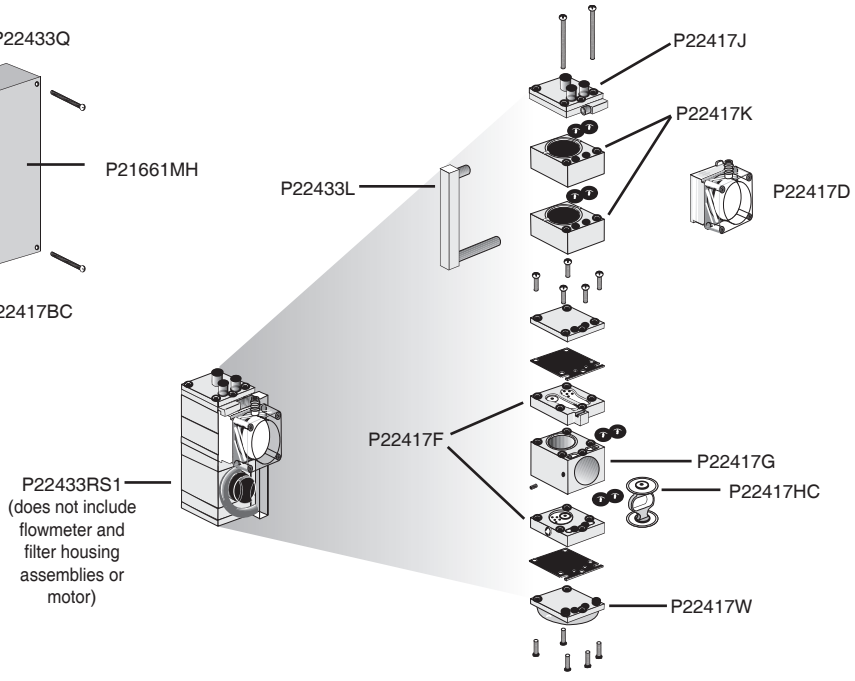
P21251	Half Stack includes pump body, valve plates, diaphragm/yoke, gaskets, and O-rings
P2243201	Charging Jack, pk/5
P22433C	Tamper-resistant Cover
P22433ES	External Screw Kit

Replacement Filters

P22409	Replacement Filter Set, 3 filters/3 O-rings
P2240901	Filters only, pk/10
P2240902	Filter/O-ring Set, 100 filters/10 O-rings



Pump Case Parts



Pump Stack (Cat. No. P22433RS1) Exploded

Appendix

Performance Profile

<table>
<tr><td>Flow Range</td><td>1000 to 5000 ml/min (UL Listed) (5 to 500 ml/min requires adjustable low flow holder)</td></tr>
<tr><td>Weight</td><td>34 oz (964 gm)</td></tr>
<tr><td>Dimensions</td><td>5.1 x 4.7 x 1.9 in (13 x 11.9 x 4.8 cm)</td></tr>
<tr><td>Compensation Range</td><td>1000 to 2500 ml/min at 40 inches water back pressure
3000 ml/min at 35 inches water back pressure
4000 ml/min at 20 inches water back pressure
5000 ml/min at 10 inches water back pressure</td></tr>
<tr><td>Typical Back Pressure of Sampling Media (inches water)</td><td>
<table>
<tr><th>Flow Rate (L/min)</th><th>1</th><th>1.5</th><th>2</th><th>2.5</th><th>3</th></tr>
<tr><th>Filter/Pore Size (µm)</th><th></th><th></th><th></th><th></th><th></th></tr>
<tr><td>25-mm MCE/0.8</td><td>6</td><td>9</td><td>12</td><td>15</td><td>18</td></tr>
<tr><td>25-mm MCE/0.45</td><td>14</td><td>22</td><td>28</td><td>35</td><td>40</td></tr>
<tr><td>37-mm MCE/0.8</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
<tr><td>37-mm PVC/5.0</td><td>1</td><td>1</td><td>2</td><td>2</td><td>2.5</td></tr>
</table>
Compare the information in this table to pump compensation range to determine appropriate applications.</td></tr>
<tr><td>Flow Control</td><td>Holds constant flow to ± 5% of the set point</td></tr>
<tr><td>Run Time</td><td>NiMH Battery: 12 hrs minimum at 4000 ml/min and 20 inches water back pressure; dependent on media used. See Table 1.
Battery Eliminator: Pump provides extended runs.</td></tr>
<tr><td>Flow Indicator</td><td>Built-in rotameter with 250-ml division; scale marked at 1, 2, 3, 4, and 5 L/min</td></tr>
<tr><td>Power Supply</td><td>6-V plug-in NiMH battery pack, rechargeable, 3.5-Ah capacity
A Battery Eliminator is available (see Accessories); use voids the UL Listing for intrinsic safety.</td></tr>
<tr><td>Charging Time
(varies with capacity and level of discharge)</td><td>6 to 8.5 hrs with PowerFlex charger</td></tr>
<tr><td>Intrinsic Safety</td><td>UL Listed for: Class I, Division 1 and 2, Groups A, B, C, D; Class II, Division 1 and 2, Groups E, F, G; and Class III, Temperature Code T3C
ATEX-approved models available. Contact SKC.</td></tr>
<tr><td>Operating Temperature</td><td>32 to 104 F (0 to 40 C)</td></tr>
<tr><td>Storage Temperature</td><td>-4 to 113 F (-20 to 45 C)</td></tr>
<tr><td>Charging Temperature</td><td>50 to 113 F (10 to 45 C)</td></tr>
<tr><td>Operating Humidity</td><td>0 to 95% non-condensing
Protect sample pump from weather when in use outdoors.</td></tr>
<tr><td>Multiple-tube Sampling</td><td>Built-in constant pressure regulator allows user to take up to four simultaneous tube samples at different flow rates up to 500 ml/min each using optional adjustable tube holder.</td></tr>
<tr><td>RFI/EMI Shielding</td><td>Complies with requirements of EN 55022, FCC Part 15 Class B, EN 50082-1; frequency range of the radiated susceptibility test was 27 to 1000 MHz.</td></tr>
<tr><td>Tubing</td><td>Requires 1/4-inch ID tubing</td></tr>
<tr><td>Certifications</td><td>• UL Listed
• CE, UKCA marked
• ATEX-approved models available</td></tr>
</table>

Typical Run Times

Table 1 contains the typical run times achieved when using a fully charged nickel-metal hydride (NiMH) battery pack. Data is sorted by type of sample media. All run times are listed in hours. Results obtained using a new pump and new fully charged battery. Pump performance may vary.

Table 1. Pump Run Time in Hours with NiMH Battery

Mixed Cellulose Ester (MCE) filter, 0.8-µm pore size

	Filter Diameter	
Flow Rate (L/min)	37 mm	25 mm
2	37	33
2.5	34	26
3	31	21
3.5	29	18
4	25	15
4.5	20	14

Polyvinyl Chloride (PVC) filter, 5.0-µm pore size

	Filter Diameter	
Flow Rate (L/min)	37 mm	25 mm
2	47	41
2.5	38	33
3	35	30
3.5	26	27
4	22	25
4.5	21	23

Note: *Increases in back pressure during sampling due to buildup of sample on the filter can decrease battery life.*