

Operating Instructions
Universal Sample Pump
Catalog No. 224-PCXR8

SKC Inc.
863 Valley View Road
Eighty Four, PA 15330 USA

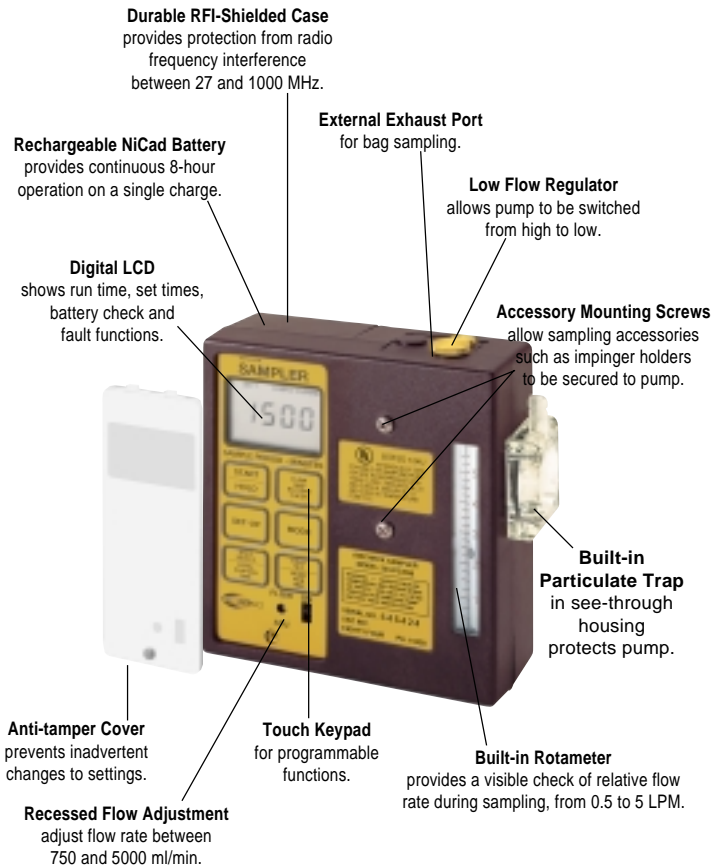
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Description

The result of extensive research and development, the PCXR8 is a constant flow air sampler suited for a broad range of applications. It is ideal for industrial hygiene studies as well as environmental testing.

Specifically designed for “on worker” and “fenceline” applications, the PCXR8 is typically used with collecting devices such as filters, impingers, sorbent sample tubes and sample bags.



Specifications

Operating Range: 5-5000 ml/min
(5-500 ml/min requires adjustable low flow holder)

Weight: 34 oz (964 gm)

Dimensions: 1.9 x 4.7 x 5.1 inches; 46.5 cubic inches
(4.9 x 11.9 x 13 cm, 758 cubic cm)

Compensation Range: 750 to 2500 ml/min—to 40 inches water back pressure
2500 to 4000 ml/min—to 20 in water back pressure

Flow Control: $\pm 5\%$ set point constant flow

Run Time: 8 hrs min at 4000 ml/min & 20 in water back pressure

Flow Indicator: Built-in flow indicator with 250 ml division;
scale marked at 1, 2, 3, 4, and 5 LPM

Battery Assembly: Plug in battery pack, rechargeable NiCad 2.0 Ah,
6.0 V UL Listed.

Intrinsically Safe: UL Listed for: Class I, Groups A, B, C, D;
Class II, Groups E, F, G; and Class III.
Temp Code T3C.

Operating Temp: -20 C to 45 C (-4 F to 113 F)

Storage Temp: -40 C to 45 C (-40 F to 113 F)

Charging Temp: 5 C to 45 C (41 F to 113 F)

Operating Humidity: 0 to 95% Relative

Multiple Sampling: Built-in constant pressure regulator allows user to
take up to four simultaneous samples at different flow
rates up to 500 ml/min (maximum total combined
flow 1350 ml/min) using optional low flow control.

RFI-Shielding Performance: Complies with requirements of EN 55022, FCC Part 15
Class B, EN 50082-1, Frequency range of the radiated
susceptibility test was 27 MHz to 1000 MHz.
CE approved.

Specifications (cont)

Flow Fault:	Fault shutdown with LCD indicator and time display retention if flow is restricted.
Battery Test:	LCD shows battery condition prior to sampling.
Time Display:	LCD shows sampler run time in minutes for sampler period elapsed time, pump run-time or total elapsed time including delayed start time.
Timing Accuracy:	$\pm 0.05\%$ (± 45 seconds/day)
Sampling Pause:	Allows user to temporarily halt sampling without loss of timing data. Restart does not require resetting time.
Timed Shutdown:	Allows user to select minutes of operation before automatic shutdown.
Delay on:	Allows user to select minutes to delay of test up to 9999 minutes (7 days).
Intermittent Sampling:	Programmable to allow user to extend short term samples over an extended period of time to meet time weighted average (TWA) requirements with a reduced number of samples. Elapsed time maximum is 9999 minutes (7 days).

Operation

High Flow Applications (750-5000 ml/min)

Setup

Fully charge the battery by connecting the charger plug to the sampler charging jack (Figure 1, #22). Use only an SKC charger designated for this model. **CAUTION: DO NOT CHARGE IN A HAZARDOUS ENVIRONMENT.** Using flexible tubing, connect the sampling media to the pump intake (Figure 1, #13). Make sure the pump is set for high flow. (See "Return to High Flow" p. 7).

Setting the Flow Rate

Test the battery pack by turning the sampler on using the ON/OFF switch (Figure 1, #8). Press the START/HOLD key (Figure 1, #3) then the FLOW AND BATTERY CHECK key (Figure 1, #2). Adjust the flow to 2 L/min using the FLOW ADJUST SCREW (Figure 1, #11). The LCD should indicate "BATT OK" in the upper left corner, if not, recharge the battery. Press the FLOW AND BATTERY CHECK key to place the pump in "HOLD" mode.

Connect a flowmeter to the intake of the sampling media using flexible tubing. [For pressure applications, insert the exhaust port fitting into the exhaust port (Figure 1, #19) and connect the sample bag to this fitting.] Press the FLOW AND BATTERY CHECK key to start the pump and set the flow rate using the FLOW ADJUST SCREW. When the flow rate is set, press the FLOW AND BATTERY CHECK key to place the pump in "HOLD".

Caution: When using impingers, place an in-line trap between the pump and the impinger to protect the sampler from liquid or vapors. **FAILURE TO USE THE IMPINGER TRAP VOIDS THE WARRANTY.** The impinger and trap may be mounted to the sampler using the accessory mounting screws (Figure 1, #12).

Programming the PCXR8

From HOLD, press the SET-UP key (Figure 1, #5) to enter the "Delayed Start" mode. Enter the number of minutes delay before the sampling period begins by pressing the DIGIT SELECT (Figure 1, #7) and DIGIT SET (Figure 1, #6) keys. The DIGIT SELECT key advances the flashing digit and the DIGIT SET key increases the value of the flashing digit. Press the MODE (Figure 1, #4) key to enter the "Sample Period" mode. Press the DIGIT SELECT and DIGIT SET keys to enter the sampling time period in minutes. **Note:** The sample period is the total period in which sampling is performed and not the pump run time. Press the MODE key to enter the "Pump Period" mode. This is the actual running time of the pump. Use the DIGIT SELECT and DIGIT SET keys to enter the pump run time in minutes. If intermittent sampling is not desired, set the sampling period to equal the pump period. If the pump running time is less than the sampling period, the computer will automatically calculate and control the

on/off cycling to complete the pump run time during the sampling period. Pressing the MODE key will scroll through the program sequence.

Sampling

For personal sampling, clip the sample collection media to the worker in the breathing zone. While the LCD shows "HOLD," start the test cycle by pressing the START/HOLD key. If a time delay has been programmed, the "DELAYED START" indicator will flash and the LCD displays the amount of time remaining until the sampling period starts. "SAMPLE RUNNING" will display when the delay sequence has ended. The time display will automatically track the sampling period time elapsed.

User options during sampling:

Pause - pause (shutdown) by pressing the START/HOLD key. All timing data will freeze. To resume sampling press the START/HOLD key, timing data will resume.

Fault shutdown - during restricted flow or low battery conditions the sampler will shut down. "HOLD" will display on the LCD and timing functions will pause. "LO BATT" or "FLOW FAULT" will display on the LCD depending on the cause of the shutdown. To restart a pump in "FLOW FAULT," correct the flow blockage and press the START/HOLD key. A pump displaying "LO BATT" must be recharged before sampling.

Display times - The LCD continuously shows the elapsed sampling period. Press and hold the PUMP RUN TIME (Figure 1, #6) key to display the pump run time. Press and hold the TOTAL ELAPSED TIME (Figure 1, #7) key to display the total elapsed time, including the delayed start time.

Low Flow Applications (5-500 ml/min)

Setup

Low Flow applications (only) require an adjustable low flow holder (Fig. 2). Fully charge the battery by connecting the charger plug to the sampler charging jack (Figure 1, #22). Use only an SKC charger designated for this model. **CAUTION: DO NOT CHARGE IN A HAZARDOUS ENVIRONMENT.**

Test the battery pack by turning the sampler on using the ON/OFF switch (Figure 1, #8). Press the START/HOLD key (Figure 1, #3) then the FLOW AND BATTERY CHECK key (Figure 1, #2) and adjust the flow to 1.5 L/min using the FLOW ADJUST SCREW (Figure 1, #11). If performing multiple sampling using an adjustable flow tube holder (dual, tri, or quad), the flow rate of the pump must be greater than the sum of the flow rates through the tubes; the flow rate through any one tube cannot exceed 500 ml/min. The LCD should indicate "BATT OK" in the upper left corner. If not, recharge the battery. Press the FLOW AND BATTERY CHECK key to place the pump in "HOLD" mode.

Remove the screw cap (Figure 1, #18) covering the regulator isolation valve. Turn the exposed screw 4-5 turns counterclockwise. Replace the screw cap. The pump is now set for low flow. Connect an adjustable low flow holder (Figure 2) to the pump intake (Figure 1, #13) using flexible tubing. Insert an opened sorbent tube into the rubber sleeve (Figure 2, #3) of the low flow holder so the arrow on the tube points toward the holder.

Caution! Long duration color detector tubes require a special tube cover which accommodates an in-line trap tube. The trap tube protects the pump from caustic fumes which are often released from detector tubes. **FAILURE TO USE THE TRAP TUBE VOIDS THE WARRANTY.**

Setting the Flow Rate

Connect a flowmeter to the exposed end of the sorbent tube. Loosen the screw on the low flow holder, for Tri and Quad models first rotate the anti-tamper cover (Figure 2, #1) to expose the brass screw(s) (Figure 2, #2). Activate the pump by pressing the FLOW AND BATTERY CHECK key and adjust the flow rate by turning the brass screw until the flowmeter indicates the desired flow. Do not adjust the flow on the pump. Adjust the flow only by using the brass screw (Figure 2, #2) on the low flow holder.

When the flow rate is set, place the pump in "HOLD" by pressing the FLOW AND BATTERY CHECK key and disconnect the flowmeter. Replace the sorbent tube used for setting the flow with a new sorbent tube for sample collection. Place the appropriate size tube cover (Figure 2, #5) over the tube, and screw it in place on the low flow holder.

Programming the PCXR8

From HOLD, press the SET-UP key (Figure 1, #5) to enter the "Delayed Start" mode. Enter the number of minutes delay before the sampling period begins by pressing the

DIGIT SELECT (Figure 1, #7) and DIGIT SET (Figure 1, #6) keys. The DIGIT SELECT key advances the flashing digit and the DIGIT SET key increases the value of the flashing digit. Press the MODE (Figure 1, #4) key to enter the "Sample Period" mode. Press the DIGIT SELECT and DIGIT SET keys to enter the sampling time period in minutes. **Note:** The sample period is the total period in which sampling is performed and not the pump run time. Press the MODE key to enter the "Pump Period" mode. This is the actual running time of the pump. Use the DIGIT SELECT and DIGIT SET keys to enter the pump run time in minutes. If intermittent sampling is not desired, set the sampling period to equal the pump period. If the pump running time is less than the sampling period, the computer will automatically calculate and control the on/off cycling to complete the pump run time during the sampling period. Pressing the MODE key will scroll through the program sequence.

Sampling

For personal sampling, clip the sample collection media to the worker in the breathing zone. While the LCD shows "HOLD," start the test cycle by pressing the START/HOLD key. If a time delay has been programmed, the "DELAYED START" indicator will flash and the LCD displays the amount of time remaining until the sampling period starts. "SAMPLE RUNNING" will display when the delay sequence has ended. The time display will automatically track the sampling period time elapsed.

User options during sampling:

Pause - pause (shutdown) by pressing the START/HOLD key. All timing data will freeze. To resume sampling press the START/HOLD key, timing data will resume.

Fault shutdown - during restricted flow or low battery conditions the sampler will shut down. "HOLD" will display on the LCD and timing functions will pause. "LO BATT" or "FLOW FAULT" will display on the LCD depending on the cause of the shutdown. To restart a pump in "FLOW FAULT," correct the flow blockage and press the START/HOLD key. A pump displaying "LO BATT" must be recharged before sampling.

Display times - The LCD continuously shows the elapsed sampling period. Press PUMP RUN TIME (Figure 1, #6) key to display the pump run time. Press the TOTAL ELAPSED TIME (Figure 1, #7) key to display the total elapsed time, including the delayed start time.

Return to High Flow

Remove the low flow holder. To return to High Flow, remove the screw cap (Figure 1, # 18) covering the regulator isolation valve. Turn the exposed screw clockwise until it stops. (Do not over-tighten.) Replace the screw cap. The pump is now set for high flow.

Bag Sampling by Positive Pressure

Using flexible tubing, connect the sampling media to the pump intake (Figure 1, #13). [For sample bags using positive pressure filling, insert the exhaust fitting into the exhaust port (Figure 1, #19). After setting the flow rate, you will connect the sample bag to this fitting instead.]

Preventive Maintenance

Battery Pack Maintenance

Removal—Remove the two screws (Figure 1, #20) which secure the battery pack (Figure 1, #21) and loosen the four case screws above and below the belt clip (Figure 1, #23). Carefully slide the battery pack out from under the belt clip being careful to keep it straight.

Replacement—Slip the front edge of the battery pack under the belt clip and rotate the battery pack so the rails engage the slots on the case front. Push the battery pack until it is properly located. Reinstall battery screws (Figure 1, #20) and tighten the case screws.

Charge Maintenance

For proper maintenance of battery packs, SKC produces an optional cycling charger (Catalog No. 223-426) which discharges and recharges the battery automatically to protect against memory effects.

Rotate the use of any spare pack to avoid idle periods in excess of one month. Fully charge packs before or after use or storage.

SKC UL listed battery packs (SKC Catalog No. P21661) contain a fuse which blows to prevent fires resulting from a short-circuit while the pump is in use. If the indicator light on the charger will not light while charging, either the battery pack, charger, or wall outlet is inoperative. If you are unable to determine which is inoperative, please contact SKC Technical Support at 724-941-9701 or e-mail skctech@skcinc.com.

Caution: Do not charge in a hazardous environment.

Warning: Using a non-approved charger voids the SKC warranty.

Warning: Tampering with the battery pack voids the SKC warranty and the UL Intrinsic Safety listing.

Pump Inlet Filter

The SKC sampler is fitted with a filter/trap inside the clear plastic intake port housing. This prevents particulates from being drawn into the pump mechanism. Occasionally, the filter should be visually checked to assure that it does not become clogged. If maintenance is necessary:

1. Clean all dust and debris from around the filter housing.
2. Remove the four screws (Figure 1, #14) and the front filter housing.
3. Remove and discard the filter membrane (Figure 1, #16) and O-ring (Figure 1, #15).
4. Clean the filter housing.
5. Insert a new filter membrane and o-ring.
(Filter Replacement Kit, SKC Catalog No. P22409)
6. Reattach the front filter housing and cross-tighten the four screws.

Pump Service

Pumps under warranty should be sent to SKC Inc. for servicing (see Service p. 4). For further information on pump maintenance, testing and replacing pump components, and troubleshooting, request the Universal Pump Service Manual (SKC Publication No. 1377).

Notice: This operating instruction may not address all safety concerns (if any) associated with this product and its use. The user is responsible for determining and following the appropriate safety and health practices and regulatory limitations (if any) before using the product. The information contained in this document should not be construed as legal advice, opinion, or as a final authority on legal or regulatory procedures.

Diagrams/Part Description for Figure 1

Model 224-PCXR8

No. Description

1. **LCD:** Indicators for all sampler functions.
2. **FLOW AND BATTERY CHECK Key:** Allows setting flow rate and testing battery condition.
3. **START/HOLD Key:** Used when ready to begin the sampling cycle, pause the sampling cycle and restart the cycle after pause.
4. **Mode Key.** During set-up allows changing between delayed start, pump run time and total elapsed time.
5. **Set-up Key.** Allows setting the delayed start, pump run time and total elapsed time desired.
6. **Digit Set/Pump Run Time Key.** Allows setting the flashing digit to the desired value or viewing the actual pump run time during the actual sampling cycle.
7. **Digit Select/Total Elapsed Time Key.** Allows selecting which time digit is being set when in set-up mode or viewing total elapsed time during the actual sampling cycle.
8. **ON/OFF Switch:** Allows the pump to be shut down completely, clears time display.
9. **Anti-tamper Cover:** Protects controls from incidental contact or tampering.
10. **Cover Screw:** Fastens anti-tamper cover.
11. **Flow Adjustment Control:** Adjusts flow from 750-5000 ml/min.
12. **Accessory Mounting Screws (2):** Secure accessories such as impinger and trap holders.
13. **Filter Housing (intake):** Air intake port and trap.
14. **Filter Housing Screws (4):** Secure filter housing.
15. **Filter O-ring:** Leak seal for filter in housing.
16. **Filter (10 micron nylon):** Filters particulates before entering pump.
17. **Built-in Flowmeter:** Monitors flow changes.
18. **Regulator Isolation Cap:** Accesses regulator isolation valve.
19. **Exhaust Port Cap:** Accesses exhaust port.
20. **Battery Pack Screws (2):** Secures pack to pump.
21. **Battery Pack Assembly:** Provides power to pump.
22. **Charging Jack:** Connector for battery charger.
23. **Belt Clip:** Secures pump to worker.
- A **Compensation Pot A:** Adjusts pump compensation which is factory set. Access screw guards against accidental contact or tampering.
- B **Compensation Pot B:** Adjusts pump compensation which is factory set. Access screw guards against accidental contact or tampering.

Figure 1

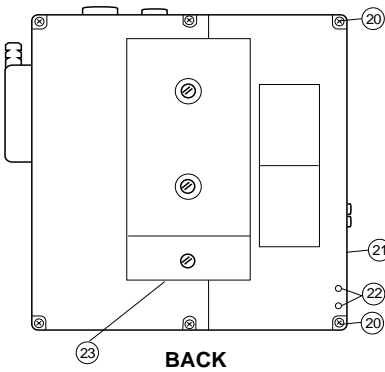
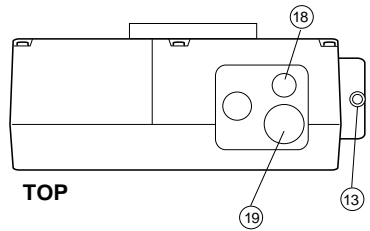
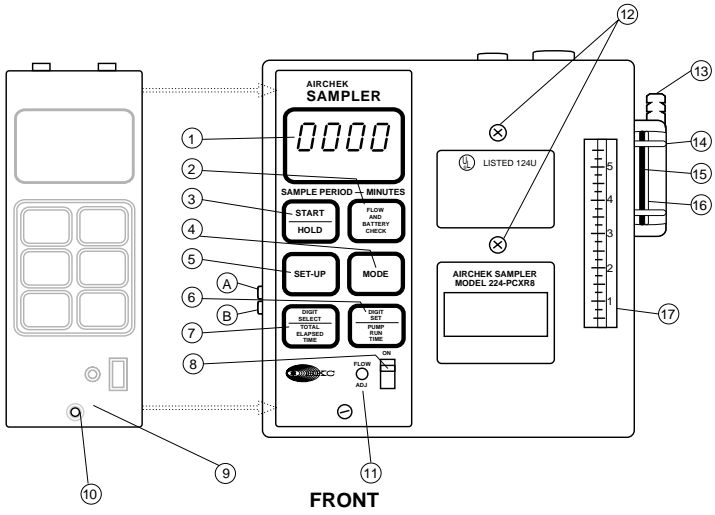


Figure 2

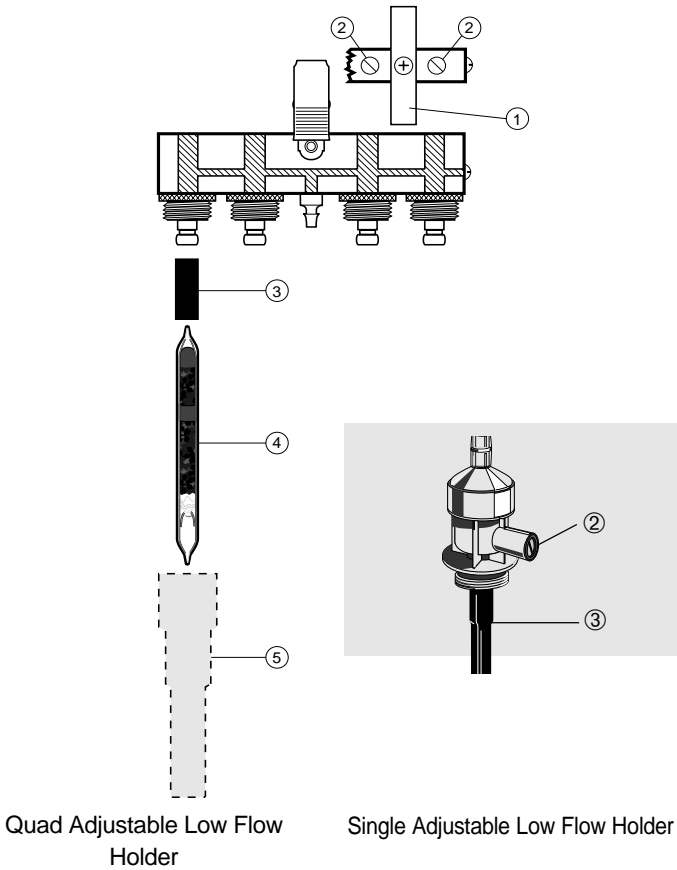
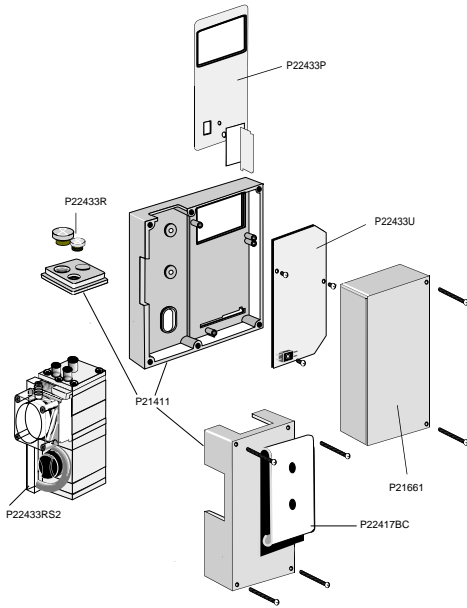


Figure 2 - Adjustable Low Flow Holder

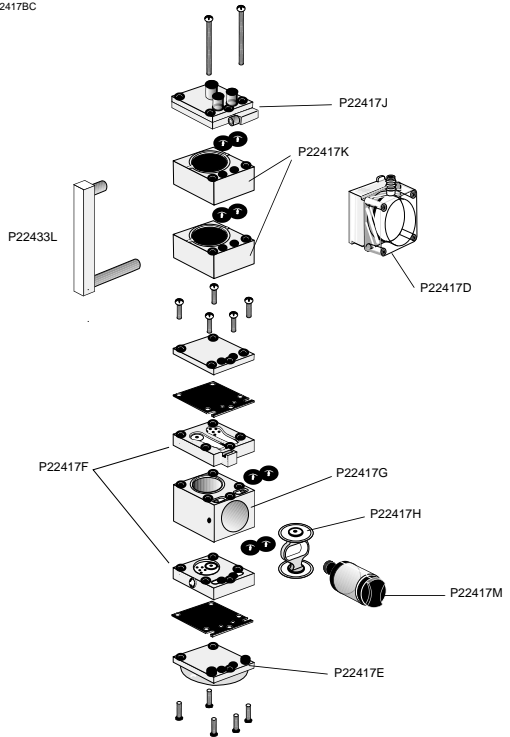
1. Anti-tamper Cover (tri and quad only)
2. Manifold Flow Adjustment
3. Rubber Sleeve
4. Sorbent Sample Tube
5. Protective Cover (not included)

Figure 3 — Replacement Parts for 224-PCXR8



Part Description for Figure 3 Replacement Parts

- P2240901* Replacement Filters (pk/10)
- P2240902 Replacement Filter Kit (with O-rings)
- P22433R Cap Screws (set of 2)
- P22417C* Exhaust Port Fitting
- P22417D Filter Housing Assembly
- P22417E Pressure Switch Assembly
- P22417F Valve Plate Assembly
- P22417G Pump Body
- P22417H Diaphragm/Yoke Assembly
- P22417J Regulator Assembly
- P22417K Pulsation Damper Assembly (2)
- P22417M Motor/Eccentric Assembly
- P21661 Battery Pack Assembly
- P21411 Case Parts (excluding Battery Case)
- P22417L Flowmeter Assembly



Exploded view of stack # P22433RS2

For further information on testing and replacing pump components, request the Universal Pump Service Manual (SKC Publication No. 1377).

Optional Accessories

Adjustable Flow Holders:

224-26-01	Single Holder
224-26-02	Dual Holder
224-26-03	Tri Holder
224-26-04	Quad Holder

Protective Covers:

224-29A	70 mm long
224-29B	110 mm long
224-29C	150 mm long
224-29D	220 mm long
224-29T	115 mm with tandem trap tube cover

Battery Chargers:

223-226	Single Battery Charger 115 V
223-227	Single Battery Charger 230 V
223-426	Deluxe 5 Station Battery Charger, Switchable for 115 or 230 V operation

Miscellaneous:

224-11	Sampler Tool Kit
224-95	Protective Nylon Pouch with belt and shoulder strap, brown
224-95A	Protective Nylon Pouch-red

Service

Product to be serviced should be sent, freight prepaid, to:

SKC Inc.
National Service Center
863 Valley View Road
Eighty Four, PA 15330

Care should be taken in packaging to prevent damage in transit. Please include a contact name and phone number, shipping address, and a brief description of the problem. For nonwarranty repairs, a purchase order number and billing address is also required. The Service Center will contact nonwarranty customers with an estimate before proceeding with repairs.

SKC QualityCare

QualityCare is a cost-effective preventive maintenance program that assures that pumps are tested, repaired, and calibrated on an annual basis. Participants will receive certificates of compliance for each pump, each year, to demonstrate adherence to Occupational Health and Safety Management Systems or company quality programs.

For more information on QualityCare call our SKC Customer Service Team at 724-941-9701.

Note: SKC Inc. will accept for repair any SKC product which is not contaminated with hazardous materials. Products determined to be contaminated will be returned unserviced.

Universal Pump Service Manual

Customers who wish to self-service their out-of-warranty pumps should request the Universal Pump Service Manual (SKC Publication No. 1377).

SKC INC. LIMITED ONE YEAR WARRANTY

1. SKC warrants that its instruments provided for industrial hygiene, air pollution, gas analysis, and safety and health applications are free from defects in workmanship and materials under normal and proper use in accordance with operating instructions provided with said instruments. The term of this warranty begins on the date the instrument is delivered to the buyer and continues for a period of one (1) year.
This warranty does not cover claims due to abuse, misuse, neglect, alteration, accident, or use in application for which the instrument was neither designed nor approved by SKC Inc. This warranty does not cover the buyer's failure to provide for normal maintenance, or improper selection or misapplication. This warranty shall further be void if changes or adjustments to the instrument are made by other than an employee of the seller, or if the operating instructions furnished at the time of installation are not complied with.
2. SKC Inc. hereby disclaims all warranties either expressed or implied, including any implied warranties of merchantability or fitness for a particular purpose, and neither assumes nor authorizes any other person to assume for it any liability in connection with the sale of these instruments. No description of the goods being sold has been made a part of the basis of the bargain or has created or amounted to an express warranty that the goods will conform to any such description. Buyer shall not be entitled to recover from SKC Inc. any consequential damages, damages to property, damages for loss of use, loss of time, loss of profits, loss of income, or other incidental damages. Nor shall buyer be entitled to recover from SKC Inc. any consequential damages resulting from defect of the instrument including, but not limited to, any recovery under section 402A of the Restatement, Second of Torts.
3. This warranty extends only to the original purchaser of the warranted instrument during the term of the warranty. The buyer may be required to present proof of purchase in the form of a paid receipt for the instrument.
4. This warranty covers the instrument purchased and each of its component parts.
5. In the event of a defect, malfunction, or other failure of the instrument not caused by any misuse or damage to the instrument while in possession of the buyer, SKC Inc. will remedy the failure or defect without charge to the buyer. The remedy will consist of service or replacement of the instrument. SKC Inc. may elect refund of the purchase price if unable to provide replacement and repair is not commercially practicable.
6. (a) To obtain performance of any obligation under this warranty, the buyer shall return the instrument, freight prepaid, to SKC Inc., at the following address:

SKC Inc., National Service Center
863 Valley View Road
Eighty Four, PA 15330 USA
- (b) To obtain further information on the warranty performance you may telephone 412- 941-9701 at the address above.
7. This warranty shall be construed under the laws of the Commonwealth of Pennsylvania which shall be deemed to be the situs of the contract for purchase of SKC Inc. instruments.
8. No other warranty is given by SKC Inc. in conjunction with this sale.

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