



**Operating Instructions**  
**Universal Sample Pump**  
**Cat. No. 224-PCXR8**

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

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*Indicates a warning or caution*



**Indicates a note or a premier feature of the pump**

*Universal Sample Pump Operating Instructions are also available in Spanish, German, Mandarin, and French Canadian.*

# Description

The PCXR8 Universal Sample Pump is a constant flow air sampler suitable for a broad range of applications. It is ideal for industrial hygiene studies as well as environmental testing.



*PCXR8 Universal Sample Pump*


# Performance Profile

- Flow Range:** 1000 to 5000 ml/min (UL Listed model)  
(5 to 500 ml/min requires adjustable low flow holder)
- Weight:** 34 oz (964 gm)
- Dimensions:** 5.1 x 4.7 x 1.9 in (13 x 11.9 x 4.8 cm)
- Compensation Range:** 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

## Typical Back Pressure of Sampling Media (*inches water*)

Flow Rate (L/min)	1.0	1.5	2.0	2.5	3.0
Filter/Pore Size ( $\mu\text{m}$ )					
25-mm MCE, 0.8	6	9	12	15	18
25-mm MCE, 0.45	14	22	28	35	40
37-mm MCE, 0.8	2	3	4	5	6
37-mm PVC, 5.0	1	1	2	2	2.5

Compare the information in this table to pump compensation range to determine appropriate applications.

- Flow Control:** Holds constant flow to  $\pm 5\%$  of the set point
- Run Time:** **NiCad Battery:** 8 hrs minimum at 4000 ml/min and 20 inches water back pressure; dependent on media used. *See Table 1 on page 4.*  
**NiMH Battery:** 12 hrs minimum at 4000 ml/min and 20 inches water back pressure; dependent on media used. *See Table 2 on page 4.*  
**Battery Eliminator:** Pump will provide extended runs.
- Flow Indicator:** Built-in rotameter with 250-ml division; scale marked at 1, 2, 3, 4, and 5 L/min
- Power Supply:** **6.0-V plug-in NiMH battery pack**, rechargeable, 3.5-Ah capacity or  
**6.0-V plug-in NiCad battery pack**, rechargeable, 2.0-Ah capacity  
A **battery eliminator** is available (*see Optional Accessories*); use voids the UL Listing for intrinsic safety.
- Charging Time:** 6 to 8.5 hrs with PowerFlex charger  
*(varies with battery capacity and level of discharge)*
- Intrinsic Safety:** 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.*
- Temperature:** **Operating:** 32 to 113 F (0 to 45 C)  
**Storage:** -4 to 113 F (-20 to 45 C)  
**Charging:** 50 to 113 F (10 to 45 C)
-  **Protect sample pump from weather when in use outdoors.**
- Operating Humidity:** 0 to 95% non-condensing
- Multiple-tube Sampling:** 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 low flow holder.
- RFI/EMI Shielding:** 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.

<b>Flow Fault:</b>	If the pump is unable to compensate for longer than 15 seconds due to excessive back pressure, the pump enters flow fault. During flow fault, the pump stops, displays FLOW FAULT, pauses timing functions, and displays elapsed time or pump time. Auto-restart is attempted up to 5 times.
<b>Low Battery Fault:</b>	Pumps stops, displays LO BATT, pauses timing functions, and displays elapsed time or pump time.
<b>Battery Test:</b>	LCD shows battery condition prior to sampling.
<b>Time Display:</b>	LCD displays up to 9999 minutes (6.8 days) at which point the display rolls over to 0. Displays include sampler run time in minutes for sampling period elapsed time, pump run time, or total elapsed time including delayed start
<b>Timing Accuracy:</b>	± 0.05% (± 45 seconds per day)
<b>Timed Shutdown:</b>	Allows user to select minutes of operation before automatic shutdown. Timed shutdown maximum setting is 9999 minutes (6.8 days).
<b>Sampling Pause (Hold):</b>	Allows user to temporarily halt sampling without loss of timing data. Restart does not require resetting time.
<b>Delay On:</b>	Allows user to select minutes to delay test up to 9999 minutes (6.8 days)
<b>Intermittent Sampling:</b>	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 setting is 9999 minutes (6.8 days), at which time the sample pump shuts down.
<b>Tubing:</b>	Requires 1/4-inch ID tubing



CE marked



UL Listed



ATEX-approved models available

## Table 1. Pump Run Time in Hours with NiCad Battery

Following are typical run times achieved when using a fully charged nickel-cadmium (NiCad) 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.

Mixed Cellulose (MCE) filter, 0.8- $\mu$ m pore size

Flow Rate (L/min)	Filter Diameter	
	37 mm	25 mm
2.0	24.1	16.3
2.5	21.4	14.5
3.0	19.1	11.0
3.5	17.8	10.7
4.0	15.4	**
4.5	14.6	**

Polyvinyl Chloride (PVC) filter, 5.0- $\mu$ m pore size

Flow Rate (L/min)	Filter Diameter	
	37 mm	25 mm
2.0	31.6	21.7
2.5	27.7	24.0
3.0	27.0	18.6
3.5	22.8	16.4
4.0	19.4	16.2
4.5	19.0	14.6

\*\* Filter back pressure exceeded pump capability during testing.

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

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## Table 2. Pump Run Time in Hours with NiMH Battery

Following are 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.

Mixed Cellulose (MCE) filter, 0.8- $\mu$ m pore size

Flow Rate (L/min)	Filter Diameter	
	37 mm	25 mm
2.0	37	33
2.5	34	26
3.0	31	21
3.5	29	18
4.0	25	15
4.5	20	14

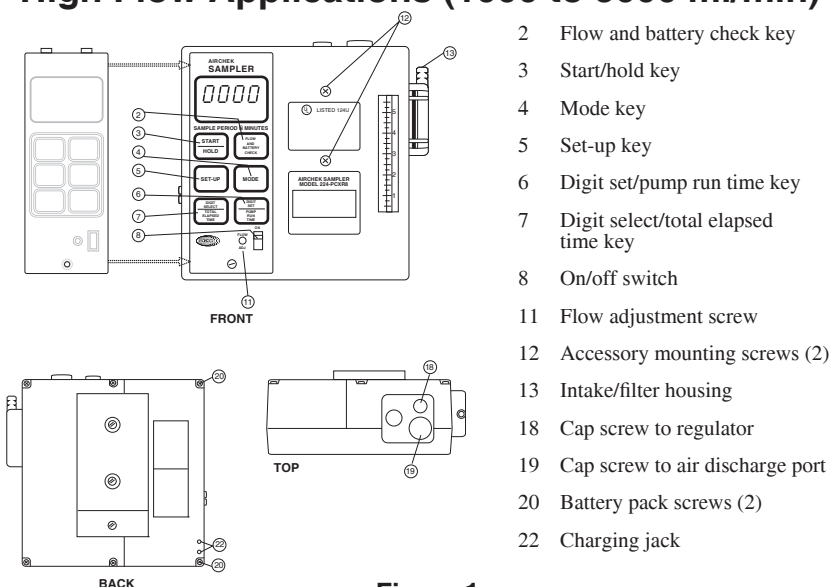
Polyvinyl Chloride (PVC) filter, 5.0- $\mu$ m pore size

Flow Rate (L/min)	Filter Diameter	
	37 mm	25 mm
2.0	47	41
2.5	38	33
3.0	35	30
3.5	26	27
4.0	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.*

# Operation

## High Flow Applications (1000 to 5000 ml/min)



**Figure 1**

Front, back, and top views of PCXR8 Sampler

For additional drawings, see pages 25 and 27.

### Setup

Install battery (see *Installing the Battery Pack* on page 21). For optimum charge, ensure pump is **not** running. Charge the battery by connecting the charger plug to the sampler charging jack (Figure 1, #22). Ensure that the battery is fully charged before sampling.



After charging the battery pack, it is good practice to run the pump for approximately five minutes before calibrating. This ensures the battery is in more steady-state conditions and improves the agreement in pre and post-sampling calibrations.

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Do not charge or operate pump from charger in hazardous locations.



Use only an SKC-approved charger designated for this model to ensure reliable performance. Failure to do so voids any warranty.



Ensure proper orientation of charge 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.



Charger and battery pack connected

2

## De-activating the Regulator

To ensure the pump is set for high flow, remove the cap screw (Figure 1, #18) covering the regulator valve and turn the exposed screw clockwise until it stops. (Do not overtighten.)

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



*For high flow,  
turn valve screw clockwise.*

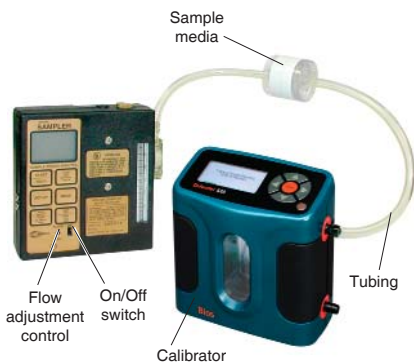
## Setting or Verifying Flow Rate



**Before use, allow pump to equilibrate after moving it from one temperature extreme to another.**

Ensure pump has run for five minutes before proceeding with calibration.

Using 1/4-inch Tygon® tubing, connect the sampling medium to the pump intake (Figure 1, #13).



*Calibration train with  
filter cassette*

Remove the tamper-resistant cover. Start the pump using the On/Off switch (Figure 1, #8). Press Start/Hold (Figure 1, #3). Press Flow and Battery Check (Figure 1, #2). Adjust the flow using the flow adjustment screw (Figure 1, #11) until the built-in rotameter reads 2 L/min. The LCD should indicate BATT OK in the upper left corner (if it doesn't, recharge the battery). Press Flow and Battery Check to place the pump in Hold.

Connect a calibrator to the intake of the sampling medium.

Press Flow and Battery Check to start the pump, and set the flow rate using the flow adjustment control (Figure 1, #11).

When the flow rate is set, press Flow and Battery Check to place the pump in Hold. Disconnect the calibrator.

When the flow rate is set, press Flow and Battery Check to place the pump in Hold. Disconnect the calibrator.

Replace the sampling medium used for calibration with an unexposed medium for sample collection.

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# 4

## Programming Delayed and Intermittent Sampling

### To enter Delayed Start Mode:

From Hold, press Set-up. Enter the number of minutes delay (up to 9999) before the sampling period begins by pressing Digit Select and Digit Set. Digit Select advances the flashing digit and Digit Set increases the value of the flashing digit.

### To enter Sample Period Mode:

Press Mode. Press Digit Select and Digit Set to enter the sampling time period in minutes (up to 9999). **Note:** The sample period is the total period in which sampling is performed and not the pump run time.

### To enter Pump Period Mode:

Press Mode. This is the actual running time of the pump. Use Digit Select and Digit Set to enter the pump run time in minutes (up to 9999).

### Intermittent Sampling Options:

#### **Option 1 - Sample Period and Pump Period Both > 10 Minutes**

Ensure the Sample Period and Pump Period are set to be **greater than 10 minutes**. Set the Pump Period for less time than the Sample Period to initiate intermittent sampling. The pump will automatically calculate pump “off” time and run 10 equal cycles of “on” and “off” over the sampling period beginning with the first “on” time. Delayed start may be used with this option.

#### **Option 2 - Sample Period and Pump Period Both < 10 Minutes**

Ensure the Sample Period and Pump Period are set to be **less than 10 minutes**. The minimum “on” or “off” time setting is one minute.



PCXR8 Keypad

continued on page 8

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Set the Pump Period for less time than the Sample Period to initiate intermittent sampling. The pump will automatically cycle “on” and “off” at one-minute intervals adjusting the final “on” or “off” time to as many minutes as needed to reach the total programmed time.

If intermittent sampling is **not** desired, set the Sample Period to equal the Pump Period.

Pressing Mode will scroll through the program sequence.



**For intermittent sampling, the elapsed time maximum setting is 9999 minutes (6.8 days), at which time the sample pump will shut down.**

## Sampling



**Before use, allow pump to equilibrate after moving it from one temperature extreme to another.**



**Protect sample pump from weather when in use outdoors.**



**Use of any device other than the approved battery pack to power the pump voids the UL Listing for intrinsic safety and any warranty.**



*Clip sample medium to worker and pump to belt.*

For personal sampling, clip the sample collection medium to the worker in the breathing zone.

While the LCD displays HOLD, start sampling by pressing Start/Hold. If a time delay has been programmed, DELAYED START will flash on the LCD and the amount of time remaining until sampling starts will appear. SAMPLE RUNNING will display when the delay sequence has ended. The LCD will automatically track sampling period time elapsed.

At the end of the sampling period, press Start/Hold and record the stop time.

*continued on page 9*

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### User Options During Sampling

**Pause** - Pause (shutdown) the pump by pressing Start/Hold. All timing data will freeze. To resume sampling, press Start/Hold; timing data will resume.

**Flow or Battery Fault Shutdown** - If the pump is unable to compensate due to excessive back pressure or a low battery condition exists the sampler will shut down. HOLD will display on the LCD and timing functions will pause, but continue to display total elapsed time or pump time when buttons are pressed. LO BATT or FLOW FAULT will display on the LCD depending on the cause of the shutdown. Fifteen seconds after flow fault shutdown, the pump will attempt to restart up to five times. To restart from flow fault, correct the blockage and press Start/Hold. If LO BATT is displayed, recharge the battery before sampling.

**Display Times** - Elapsed sampling period is continuously displayed on the LCD. Press and hold Pump Run Time (Figure 1, #6) to display pump run time. Press and hold Total Elapsed Time (Figure 1, #7) to display total elapsed time, including delayed start time.

### Sampling with Impingers

When using impingers, place an in-line trap between the pump and the impinger to protect the sampler from liquid or vapors. The impinger and trap can be mounted to the sampler using the accessory mounting screws (Figure 1, #12) or placed in a holster at the worker's waist.



*Impinger holder on pump with impinger and trap*

- ⚠ **Failure to use the impinger trap voids any warranty.**
- ⚠ **Protect sample pump from weather when in use outdoors.**
- ⚠ **Use of any device other than the approved battery pack to power the pump voids the UL Listing for intrinsic safety and any warranty.**

### Pressure Applications (Bag Sampling)

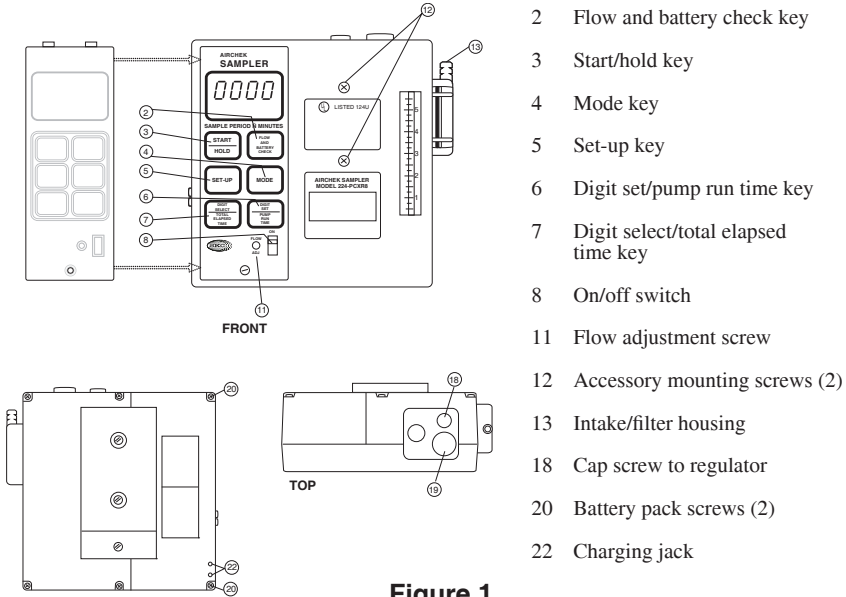
When using the pump for pressure applications, such as bag sampling, thread the exhaust port fitting supplied with the pump into the air discharge port on top of the pump (Figure 1, #19); hand tighten only. Using PTFE tubing, connect the inlet of the sample medium (e.g., sample bag) to the exhaust port fitting on the pump. Turn on the pump to collect the appropriate volume of air. Shut off pump and close inlet on sample medium to stop sampling.



*Thread exhaust port fitting into air discharge port on pump.*

# Low Flow Applications (5 to 500 ml/min)

## Using Single Adjustable Low Flow Holder



**Figure 1**

Front, back, and top views of PCXR8 Sampler  
For additional drawings, see pages 25 and 27.

### Setup

Install battery (see *Installing the Battery Pack* on page 21). For optimum charge, ensure pump is **not** running. Charge the battery by connecting the charger plug to the sampler charging jack (Figure 1, #22). Ensure that the battery is fully charged before sampling.



After charging the battery pack, it is good practice to run the pump for approximately five minutes before calibrating. This ensures the battery is in more steady-state conditions and improves the agreement in pre and post-sampling calibrations.



Do not charge or operate pump from charger in hazardous locations.



Use only an SKC-approved charger designated for this model to ensure reliable performance. Failure to do so voids any warranty.



Ensure proper orientation of charge 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.



Charger and battery pack connected

1

# 2

## Activating the Regulator

Remove the tamper-resistant cover. Start the pump using the On/Off switch (Figure 1, #8). Press Start/Hold (Figure 1, #3). Press Flow and Battery Check (Figure 1, #2). Adjust the flow using the flow adjustment screw (Figure 1, #11) until the built-in rotameter reads 1.5 L/min. The LCD should indicate BATT OK in the upper left corner (if it doesn't, recharge the battery). Press Flow and Battery Check to place the pump in Hold.

Remove the cap screw covering the regulator valve (Figure 1, #18) and turn the exposed screw four to five turns counterclockwise.

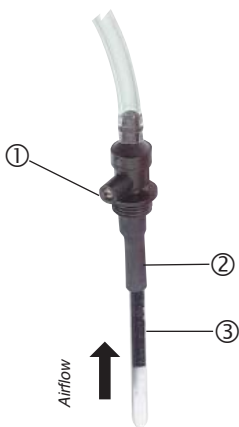
Replace the cap screw. The pump is now set for low flow.



*For low flow,  
turn valve screw  
counterclockwise.*

## Setting or Verifying Flow Rate

For a diagram of the pump, see Figure 1, page 5.



- 1 Flow adjust screw
- 2 Rubber sleeve
- 3 Sorbent tube

**Figure 2**  
Single Adjustable  
Low Flow Holder  
with sample tube

**!** Before use, allow pump to equilibrate after moving it from one temperature extreme to another.

Ensure pump has run for five minutes before proceeding with calibration.

Connect a single adjustable low flow holder (Figure 2) to the pump intake (Figure 1, #13) using 1/4-inch Tygon tubing.



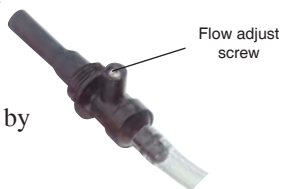
*Calibration train with tube  
in low flow holder*

Insert an opened sorbent tube (Figure 2, #3) into the rubber sleeve (Figure 2, #2) of the low flow holder with the arrow on the tube pointing toward the holder.

Connect a calibrator to the exposed end of the sorbent tube.

Loosen the brass flow adjust screw on the low flow holder. Activate the pump by pressing Flow and Battery Check.

Adjust the flow rate by turning the flow adjust screw (Figure 2, #1) on the holder until the calibrator indicates the desired flow.



*Turn screw on  
low flow holder to  
adjust flow.*

**!** Do not adjust the flow on the pump. Adjust the flow only by using the flow adjust screw on the low flow holder.

*continued on page 13*

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When the desired flow is set, place the pump in Hold by pressing Flow and Battery Check. Disconnect the calibrator. Replace the sorbent tube used for setting the flow with a new unexposed sorbent tube for sample collection.

Place the appropriate size tube cover over the tube, and screw it into place on the low flow holder.

## Programming Delayed and Intermittent Sampling

**To enter Delayed Start Mode:** From Hold, press Set-up. Enter the number of minutes delay (up to 9999) before the sampling period begins by pressing Digit Select and Digit Set. Digit Select advances the flashing digit and Digit Set increases the value of the flashing digit.

**To enter Sample Period Mode:** Press Mode. Press Digit Select and Digit Set to enter the sampling time period in minutes (up to 9999). **Note:** The sample period is the total period in which sampling is performed and not the pump run time.

**To enter Pump Period Mode:** Press Mode. This is the actual running time of the pump. Use Digit Select and Digit Set to enter the pump run time in minutes (up to 9999).

### Intermittent Sampling Options:

#### **Option 1 - Sample Period and Pump Period Both > 10 Minutes**

Ensure the Sample Period and Pump Period are set to be **greater than 10 minutes**. Set the Pump Period for less time than the Sample Period to initiate intermittent sampling. The pump will automatically calculate pump “off” time and run 10 equal cycles of “on” and “off” over the sampling period beginning with the first “on” time. Delayed start may be used with this option.

#### **Option 2 - Sample Period and Pump Period Both < 10 Minutes**

Ensure the Sample Period and Pump Period are set to be **less than 10 minutes**. The minimum “on” or “off” time setting is one minute.

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# 4

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Set the Pump Period for less time than the Sample Period to initiate intermittent sampling. The pump will automatically cycle “on” and “off” at one-minute intervals adjusting the final “on” or “off” time to as many minutes as needed to reach the total programmed time.

If intermittent sampling is **not** desired, set the Sample Period to equal the Pump Period.

Pressing Mode will scroll through the program sequence.

**!** *For intermittent sampling, the elapsed time maximum is 9999 minutes (6.8 days), at which time the sample pump will shut down.*

## Sampling

**!** *Before use, allow pump to equilibrate after moving it from one temperature extreme to another.*

**!** *Protect sample pump from weather when in use outdoors.*

**!** *Use of any device other than the approved battery pack to power the pump voids the UL Listing for intrinsic safety and any warranty.*



*Clip holder to worker and pump to belt.*

For personal sampling, clip the low flow holder to the worker in the breathing zone.

While the LCD displays HOLD, start sampling by pressing Start/Hold. If a time delay has been programmed, DELAYED START will flash on the LCD and the amount of time remaining until sampling starts will appear. SAMPLE RUNNING will display when the delay sequence has ended. The LCD will automatically track sampling period time elapsed.

At the end of the sampling period, press Start/Hold and record the stop time.

To return to high flow, remove the low flow holder and deactivate the regulator (*see page 6*).

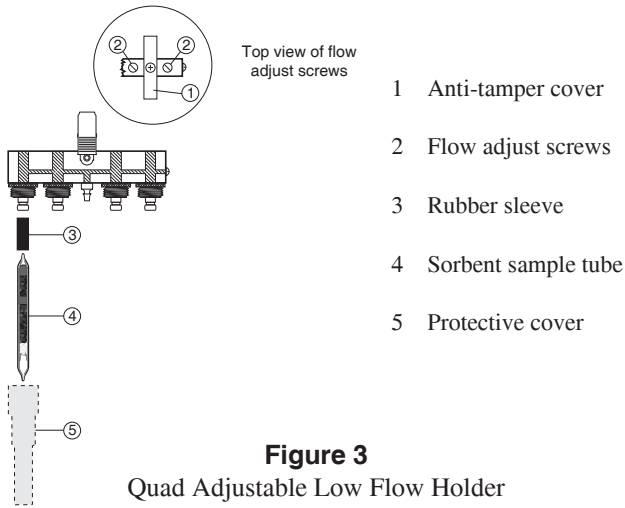
**For user options during sampling, see page 9.**

# 5



# Low Flow Applications (5 to 500 ml/min)

## Using Multiple-tube Adjustable Low Flow Holder



**Figure 3**  
Quad Adjustable Low Flow Holder

### Setup

For a diagram of the pump, see Figure 1, page 5.

Install battery (see *Installing the Battery Pack on page 21*). For optimum charge, ensure pump is **not** running. Charge the battery by connecting the charger plug to the sampler charging jack (Figure 1, #22). Ensure that the battery is fully charged before sampling.

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- ⚠ After charging the battery pack, it is good practice to run the pump for approximately five minutes before calibrating. This ensures the battery is in more steady-state conditions and improves the agreement in pre and post-sampling calibrations.
- ⚠ Do not charge or operate pump from charger in hazardous locations.
- ⚠ Use only an SKC-approved charger designated for this model to ensure reliable performance. Failure to do so voids any warranty.
- ⚠ Ensure proper orientation of charge 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.



Charger and battery pack connected

## Setting or Verifying Flow Rate

- !** When performing multiple-tube sampling using an adjustable low flow holder (dual, tri, or quad), ensure the regulator has been activated and the pump flow rate is set at 1.5 L/min. The maximum flow rate through any one tube is 500 ml/min\*. Calculate the sum of all tube flow rates. If the sum is  $\leq 1000$  ml/min, proceed with calibration and sampling without any further adjustment to pump flow rate. If the sum is  $> 1000$  ml/min, set the pump flow rate 15% higher than the sum of tube flow rates.

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

- !** Before use, allow pump to equilibrate after moving it from one temperature extreme to another.

Ensure pump has run for five minutes before proceeding with calibration.

Ensure the pump is set for low flow (*see Activating the Regulator, page 11*).

Connect the adjustable low flow holder (Figure 3, page 15) to the pump intake (Figure 1, #13) using 1/4-inch Tygon tubing.

Insert an opened sorbent tube into each rubber sleeve of the low flow holder (Figure 3, #3 and 4) with the arrow on the tube pointing toward the holder.

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



Connect holder to pump intake and tube inlet to calibrator.

Note the flow rates specified by each sampling method and add them together. If the sum is  $\leq 1000$  ml/min, proceed to the next step. If the sum is  $> 1000$  ml/min, multiply the total tube flow rate by 1.15 and set the pump for that flow rate.

Connect a calibrator to the exposed end of a sorbent tube, loosen the brass flow adjust screw on the low flow holder, and activate the pump by pressing Flow and Battery Check.

*continued on page 17*

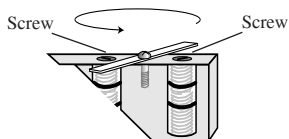
2

Turn the flow adjust screw (Figure 3, #2) for the appropriate port of the low flow holder until the desired flow rate is achieved. Turn clockwise to decrease the flow.

**!** *Do not adjust the flow on the pump. Adjust the flow only by using the flow adjust screw on the low flow holder.*

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

When the desired flow is set on the initial tube, place the pump in Hold by pressing Flow and Battery Check. Remove the calibrator from the tube and connect to the exposed end of the next sorbent tube. Press Flow and Battery Check and repeat the flow adjustment process until all tubes are flow calibrated. Changing the flow on one tube will not affect the flow rate through the remaining tubes.



**Figure 4**  
*Cut-away of Tri/Quad Low Flow Holder*

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

For tri and quad models, first rotate each anti-tamper cover (Figures 3 and 4) to expose the flow adjust screws, then adjust the appropriate screw until the calibrator indicates the desired flow.

When the flow rate is set for each tube, press Flow and Battery Check to place the pump in Hold and disconnect the calibrator.

Replace the sampling media used for calibration with unexposed media for sample collection. Use a protective tube cover to prevent tube breakage.

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

2  
(cont'd)

# 3

## Programming Delayed and Intermittent Sampling

**To enter Delayed Start Mode:** From Hold, press Set-up. Enter the number of minutes delay (up to 9999) before the sampling period begins by pressing Digit Select and Digit Set. Digit Select advances the flashing digit and Digit Set increases the value of the flashing digit.

**To enter Sample Period Mode:** Press Mode. Press Digit Select and Digit Set to enter the sampling time period in minutes (up to 9999). **Note:** The sample period is the total period in which sampling is performed and not the pump run time.

**To enter Pump Period Mode:** Press Mode. This is the actual running time of the pump. Use Digit Select and Digit Set to enter the pump run time in minutes (up to 9999).

### Intermittent Sampling Options:

#### *Option 1 - Sample Period and Pump Period Both > 10 Minutes*

Ensure the Sample Period and Pump Period are set to be **greater than 10 minutes**. Set the Pump Period for less time than the Sample Period to initiate intermittent sampling. The pump will automatically calculate pump “off” time and run 10 equal cycles of “on” and “off” over the sampling period beginning with the first “on” time. Delayed start may be used with this option.

#### *Option 2 - Sample Period and Pump Period Both < 10 Minutes*

Ensure the Sample Period and Pump Period are set to be **less than 10 minutes**. The minimum “on” or “off” time setting is one minute. Set the Pump Period for less time than the Sample Period to initiate intermittent sampling. The pump will automatically cycle “on” and



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continued on page 19

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“off” at one-minute intervals adjusting the final “on” or “off” time to as many minutes as needed to reach the total programmed time.

If intermittent sampling is **not** desired, set the Sample Period to equal the Pump Period.

Pressing Mode will scroll through the program sequence.

*For intermittent sampling, the elapsed time maximum is 9999 minutes (6.8 days), at which time the sample pump will shut down.*



## Sampling



*Before use, allow pump to equilibrate after moving it from one temperature extreme to another.*



*Protect sample pump from weather when in use outdoors.*



*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 personal sampling, clip the low flow holder to the worker in the breathing zone.



*Clip holder to worker and pump to belt.*

# 4

While the LCD displays HOLD, start sampling by pressing Start/Hold. If a time delay has been programmed, DELAYED START will flash on the LCD and the amount of time remaining until sampling starts will appear. SAMPLE RUNNING will display when the delay sequence has ended. The LCD will automatically track sampling period time elapsed.

At the end of the sampling period, press Start/Hold and record the stop time.

To return to high flow, remove the low flow holder and de-activate the regulator (see page 6).

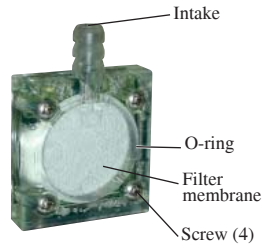
**For user options during sampling, see page 9.**

# Maintenance

## Pump Inlet Filter

The PCXR8 Sampler is fitted with a filter/trap inside a clear plastic intake port housing. This prevents particles from being drawn into the pump mechanism. The filter should be visually checked to assure 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 and discard the filter membrane.
4. Remove O-ring.
5. Clean the filter housing.
6. Insert O-ring\* and a new filter membrane.
7. Reattach the front filter housing and cross-tighten the four screws.



Close-up of inlet filter housing

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

## Battery Pack Care

For proper maintenance of battery packs, SKC offers chargers (*see Optional Accessories, page 28*) 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 battery packs before use. For information on SKC pump batteries, visit [www.skcinc.com/instructions/1756.pdf](http://www.skcinc.com/instructions/1756.pdf).*

- ❗ **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.**
- ❗ **Use of a repaired or rebuilt battery pack voids any warranty and the 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.**
- ❗ **Ensure proper orientation of charge 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.**

## Installing the Battery Pack



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

1. Loosen the two case screws above and below the belt clip.
2. Slip the front edge of the battery pack under the belt clip and position battery pack to engage the grooves in the case.
3. Slide battery pack toward the pump until it is flush with the pump case on all sides.
4. Install two battery screws and tighten the case screws loosened in Step 1.
5. Charge battery completely. For optimum charge, ensure pump is not running during charging.

## Replacing the Battery Pack

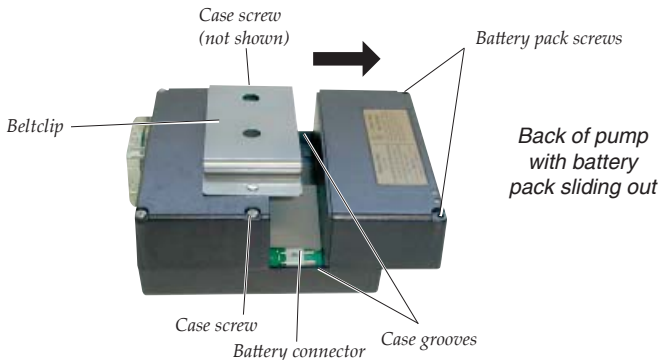


To enhance battery life, SKC ships battery packs separate from the pump. Once installed, completely charge battery pack before operating pump.



For information on SKC pump batteries, visit [www.skcinc.com/instructions/1756.pdf](http://www.skcinc.com/instructions/1756.pdf).

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 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 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 battery screws and tighten the case screws.



*Important Cautions/Warnings on next page*



*Use of a repaired or rebuilt battery pack voids any warranty and the UL Listing for intrinsic safety.*



*Do not charge or operate the pump from the charger in hazardous locations!*



*Use only an 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.*

## **Pump Service**

Pumps under warranty should be sent to SKC Inc. for servicing.

## **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 <http://www.skcinc.com/warranty.asp>.



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# Parts Descriptions

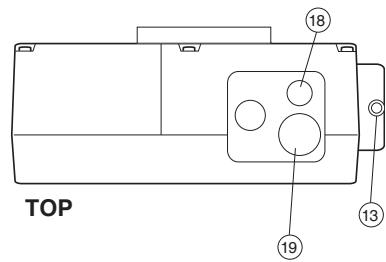
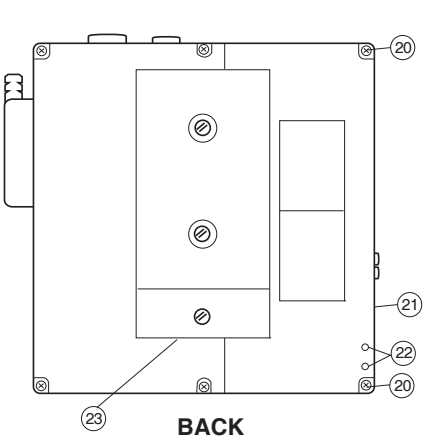
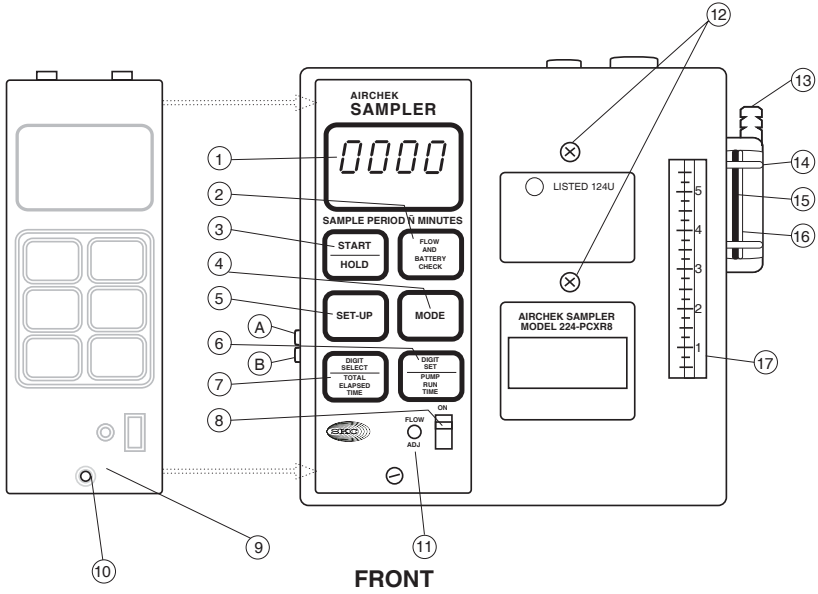
Use only SKC-approved parts to ensure reliable performance. Failure to do so voids any warranty and UL Listing for intrinsic safety.

*See page 25 for drawing.*

<b>No.</b>	<b>Description</b>
1	<b>LCD</b> indicates all sampler functions.
2	<b>FLOW AND BATTERY CHECK Key</b> allows flow rate setting and battery condition testing.
3	<b>START/HOLD Key</b> is used to start the sampling cycle, pause the sampling cycle, and restart the cycle after pause.
4	<b>MODE Key</b> is used during set-up, navigates between delayed start, pump run time, and total elapsed time.
5	<b>SET-UP Key</b> is used to enter setup mode to set delayed start, pump run time, and total elapsed time.
6	<b>DIGIT SET/PUMP RUN TIME Key</b> sets the flashing digit to the desired value or permits viewing of actual pump run time during sampling cycle.
7	<b>DIGIT SELECT/TOTAL ELAPSED TIME Key</b> selects the time digit to be set in setup mode or permits viewing of total elapsed time during the sampling cycle.
8	<b>ON/OFF Switch</b> shuts down the pump completely and clears time display.
9	<b>Tamper-resistant Cover</b> protects controls from incidental contact or tampering.
10	<b>Cover Screw</b> fastens tamper-resistant cover.
11	<b>FLOW ADJUSTMENT Control</b> adjusts flow from 1000 to 5000 ml/min.
12	<b>Accessory Mounting Screws (2)</b> secure accessories such as impinger and trap holders.
13	<b>Intake/Filter Housing</b> , air intake port and trap
14	<b>Filter Housing Screws (4)</b> secure filter housing.
15	<b>Filter O-ring</b> - leak seal for filter in housing
16	<b>Filter (crimped fiber polyester)</b> prevents particles from entering pump.
17	<b>Built-in Flowmeter</b> monitors flow changes.
18	<b>Cap Screw</b> accesses regulator.
19	<b>Cap Screw</b> accesses air discharge port.
20	<b>Battery Pack Screws (2)</b> secure pack to pump.
21	<b>Battery Pack Assembly</b> provides power to pump.
22	<b>Charging Jack</b> , connector for battery charger
23	<b>Belt Clip</b> secures pump to worker.
A	<b>Compensation Pot A</b> adjusts pump compensation which is factory set. Access screw guards against accidental contact or tampering.
B	<b>Compensation Pot B</b> adjusts pump compensation which is factory set. Access screw guards against accidental contact or tampering.

# 224-PCXR8 Sample Pump

See page 24 for parts listing.



# Replacement Parts

*See drawings on page 27.*

## **Pump Case Parts**

P21411	Case Parts (Excluding Battery Case)
P21661MH	Battery Pack Assembly, NiMH
P21661	Battery Pack Assembly, NiCad
P22417BC	Belt Clip with screws
P22433P	Keyboard Assembly
P22433R	Cap Screws (set of 2)
P22433U	Control Board
P22433RS2	Replacement Stack (with pressure switch) - does not include flowmeter and filter housing assemblies or motor
P22417C	Exhaust Port Fitting

## **Pump Stack Parts**

P22417D	Filter Housing Assembly
P22417E	Pressure Switch Assembly
P22417F	Valve Plate Assembly
P22417G	Pump Body
P22417HC	Diaphragm/Yoke Assembly
P22417J	Regulator Assembly
P22417K	Pulsation Dampener Assembly (2)
P22433L	Flowmeter Assembly

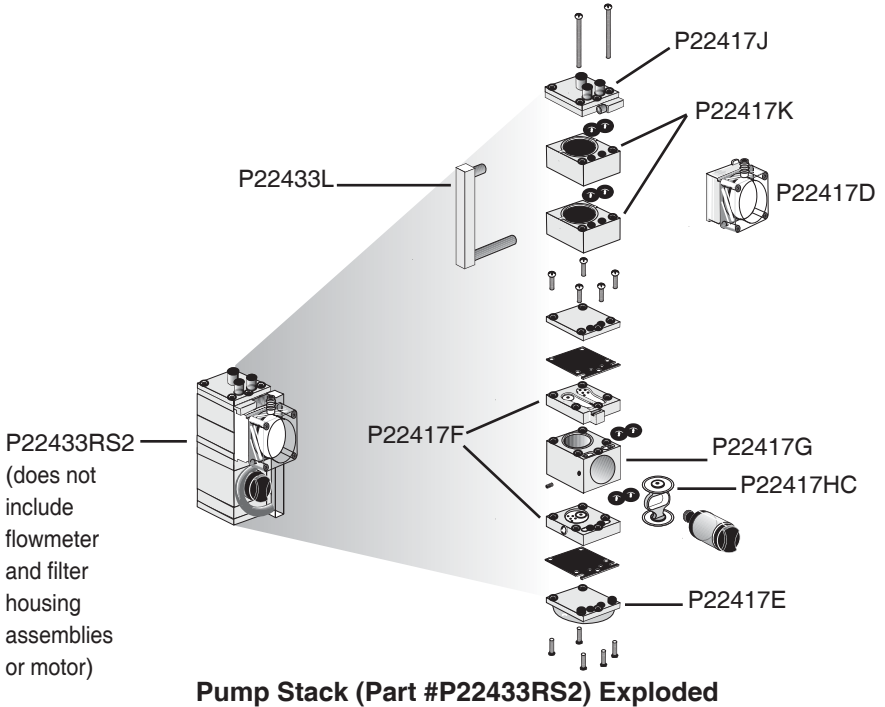
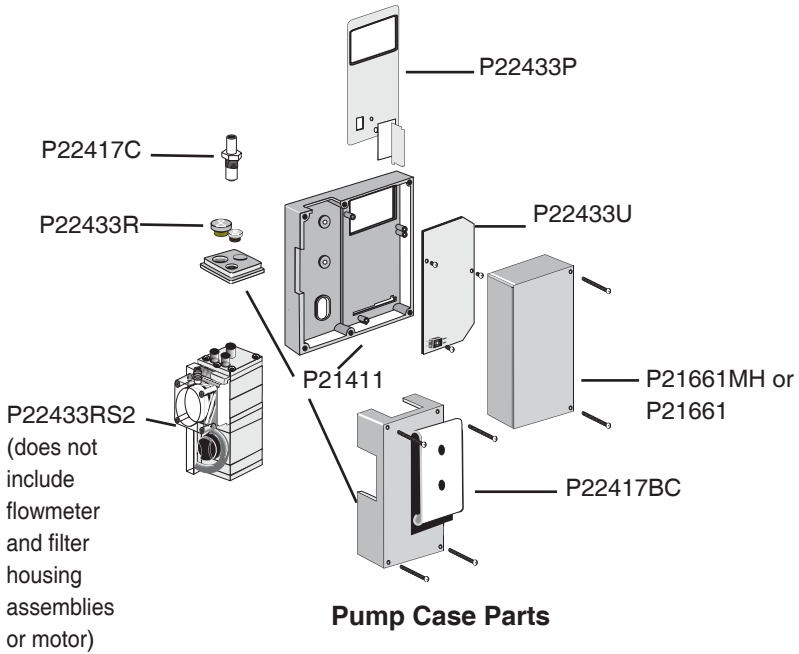
## **Parts not indicated in illustration**

P22417M	Motor/Eccentric Assembly
P22433C	Tamper-resistant Cover
P22433ES	External Screws
P72392	LCD
P5187	Foam cover for control board (pk/5)

## **Replacement Filters**

P22409	Filter/O-ring (pk/3)
P2240901	Filters (pk/10)
P2240902	Filter/O-ring (100 filters/10 O-rings)

See page 26 for replacement parts listing.



# Optional Accessories

## **Calibrator:**

Defender Primary Standard Calibrator,  
50 to 5000 ml/min, includes battery,  
charger (100-240 V), software, and  
serial cable

## **Cat. No.**

717-510M

## **Adjustable Low Flow Holders:**

Single Holder  
Dual Holder  
Tri Holder  
Quad Holder

## **Cat. No.**

224-26-01  
224-26-02  
224-26-03  
224-26-04



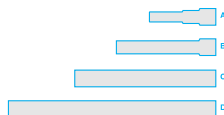
## **Protective Sample Tube Covers:**

Type *for tubes up to:*

A 70 mm long (standard charcoal)  
B 110 mm long (large charcoal)  
C 150 mm long  
D 220 mm long

## **Cat. No.**

224-29A  
224-29B  
224-29C  
224-29D



## **Battery Maintenance:**

PowerFlex Charging System for  
SKC Personal Pumps  
5-station, 100-240 V  
Single, 100-240 V

PowerFlex Cables

Universal XR (5-cell)

Replacement Battery Pack, NiMH

Replacement Battery Pack, NiCad

Battery Eliminator,

for sampling using line voltage,

*use voids the UL Listing for* 115 V

*intrinsic safety* 230 V

## **Cat. No.**

223-1000  
223-2000

223-1002

P21661MH

P21661

223-325

223-325B

## **Miscellaneous:**

Screwdriver Set (included with pump)

Protective Nylon Pouch with belt, adjustable  
waist, and shoulder strap, available in:

Black

Red

## **Cat. No.**

224-11

224-87

224-95A



*Protective  
Nylon Pouch*