

Operating Instructions
Universal Sample Pump
Catalog No. 224-PCXR4

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

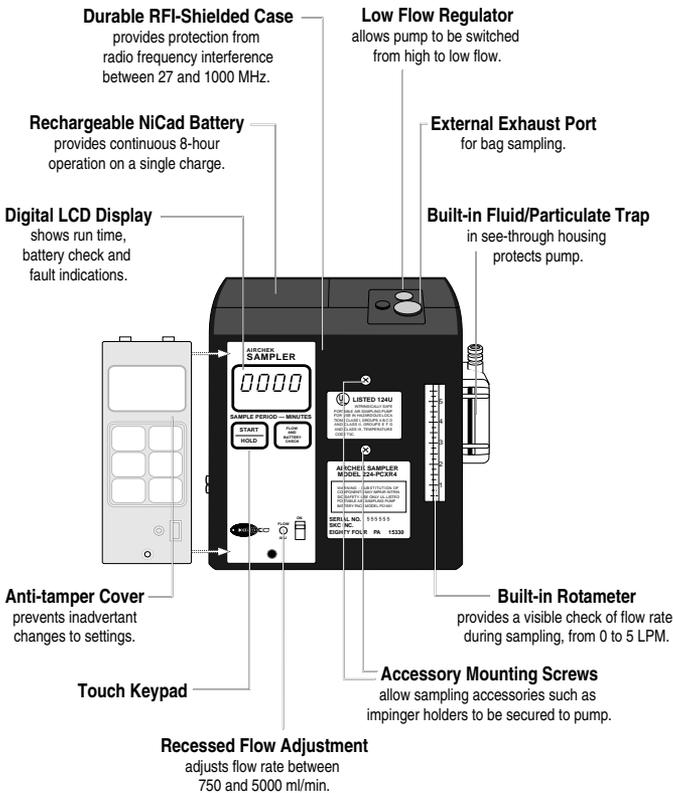
Table of Contents

Description	1
Specifications	2
Operation	4
High Flow Applications	4
Low Flow Applications	5
Preventive Maintenance	7
Battery Pack	7
Pump Inlet Filter	7
Diagrams/Part Description	9
Fig. 1 - Model 224-PCXR4	10
Fig. 2 - Adjustable Flow Holder	11
Fig. 3 - Replacement Parts	12
Optional Accessories	13
Service Policy	14
Warranty	15

Description

The result of extensive research and development, the PCXR4 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 PCXR4 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:	±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, & 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 indicator verifies battery condition prior to sampling.

Time Display: LCD indicator displays sampler run time in minutes.

Timing Accuracy: $\pm 0.05\%$

Sampling Pause: Allows user to temporarily halt sampling without loss of timing data. Restart does not require resetting time.

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, #18). 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, #9). Make sure the pump is set for high flow. (See “Return to High Flow” p. 4).

Setting the Flow Rate

Test the battery pack by turning the sampler on using the ON/OFF switch (Figure 1, #4). Press the START/HOLD key then the FLOW AND BATTERY CHECK key. Adjust the flow to 2 L/min using the FLOW ADJUST SCREW (Figure 1, #7). 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, #15) 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 (Figure 1, #7). 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, #8).

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 at the beginning of the desired sampling period. “SAMPLE RUNNING” will display. Record the start time. 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.

Low Flow Applications (5-500 ml/min)

Setup

Fully charge the battery by connecting the charger plug to the sampler charging jack (Figure 1, #18). 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, #4). Press the START/HOLD key then the FLOW AND BATTERY CHECK key and adjust the flow to 1.5 L/min using the FLOW ADJUST SCREW (Figure 1, #7). 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".

Remove the screw cap (Figure 1, #14) 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, #9) using flexible tubing. Insert an opened sorbent tube into the rubber sleeve 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.

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 at the beginning of the desired sampling period. "SAMPLE RUNNING" will display. Record the start time. 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.

Return to High Flow

To return to High Flow, remove the screw cap (Figure 1, # 14) 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,#9). [For sample bags using positive pressure filling, insert the exhaust fitting into the exhaust port (Figure 1, #15). 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, #16) which secure the battery pack (Figure 1, #17) and loosen the four case screws above and below the belt clip. Carefully slide the battery pack out from under the belt clip (Figure 1, #19) being careful to keep it straight.

Replacement—Slip the front edge of the battery pack (Figure 1, #17) under the belt clip (Figure 1, #19) 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 and tighten the case screws (Figure 1, #16).

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 protective device to eliminate potential short circuiting 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, #10) and the front filter housing.
3. Remove and discard the filter membrane (Figure 1, #12) and O-ring (Figure 1, #11).
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. 14). 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-PCXR4

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. **ON/OFF Switch:** Allows the pump to be shut down completely, clears time display.
5. **Anti-tamper Cover:** Protects controls from incidental contact or tampering.
6. **Cover Screw:** Fastens anti-tamper cover.
7. **Flow Adjustment Control:** Adjusts flow from 750-5000 ml/min.
8. **Accessory Mounting Screws (2):** Secure accessories such as impinger and trap holders.
9. **Filter Housing (intake):** Air intake port and trap.
10. **Filter Housing Screws (4):** Secure filter housing.
11. **Filter O-ring:** Leak seal for filter in housing.
12. **Filter (10 micron nylon):** Filters particulates before entering pump.
13. **Built-in Flowmeter:** Monitors flow changes.
14. **Regulator Isolation Cap:** Accesses regulator isolation valve.
15. **Exhaust Port Cap:** Accesses exhaust port.
16. **Battery Pack Screws (2):** Secures pack to pump.
17. **Battery Pack Assembly:** Provides power to pump.
18. **Charging Jack:** Connector for battery charger.
19. **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 2

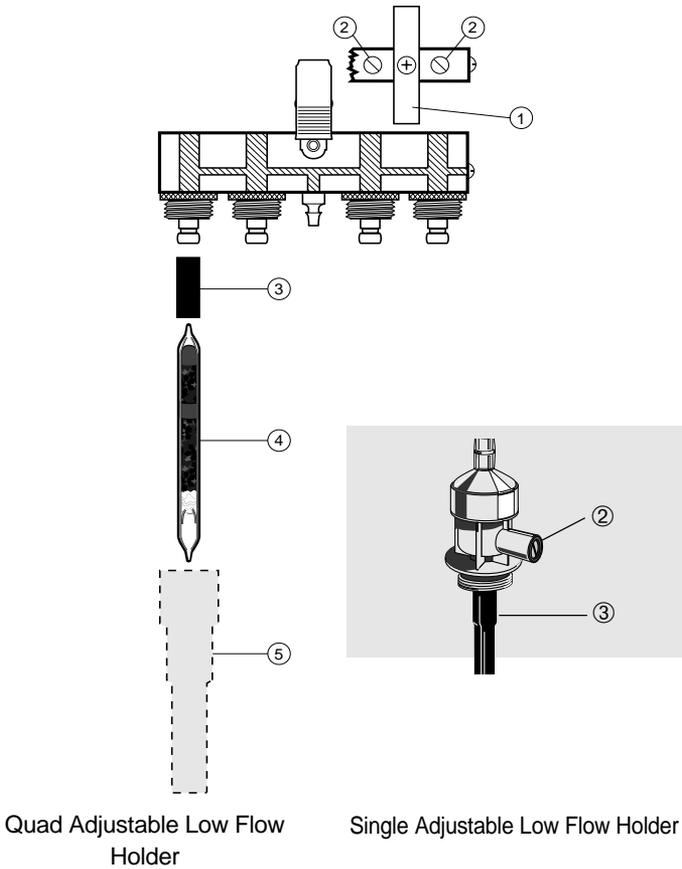
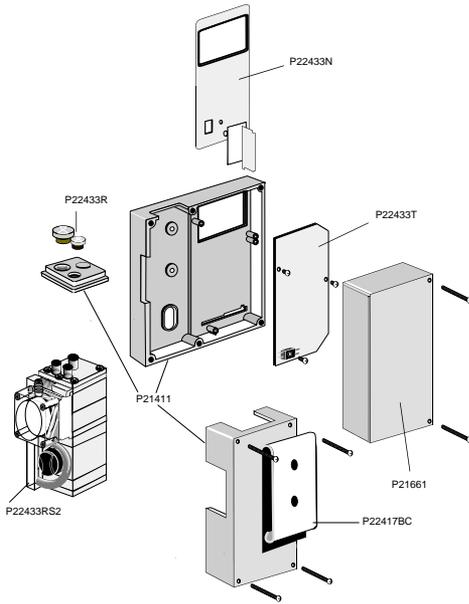


Figure 2 - Adjustable Low Flow Holder

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

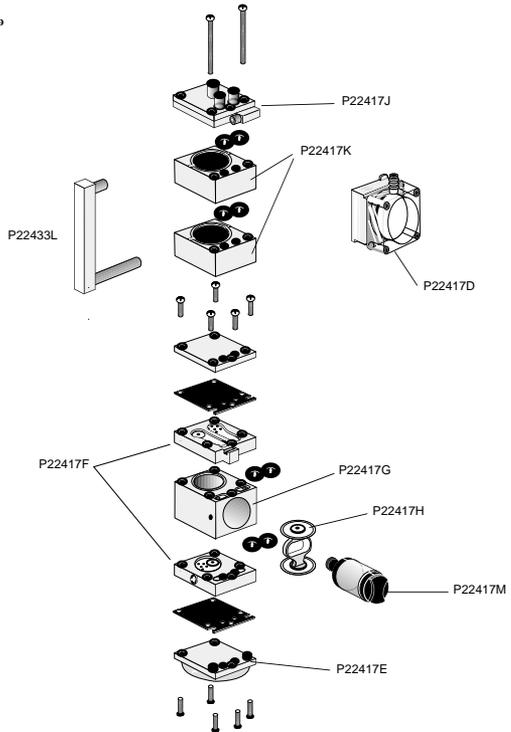
Figure 3 — Replacement Parts for 224-PCXR4



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

Part Description for Figure 3 Replacement Parts

- P22409* Replacement Filter Kit
- P22433R Cap Screws (set of 2)
- P22417C* Exhaust Port Fitting
- P22417D Filter Housing Assembly
- P22417E Bottom Plate Assembly
- P22417F Valve Plate Assembly
- P22417G Pump Body
- P22417H Diaphragm/Yoke Assembly
- P22417J Regulator Assembly
- P22417K Pulsation Dampener Assembly (2)
- P22417M Motor/Eccentric Assembly
- P21661 Battery Pack Assembly
- P21411 Case Parts (excluding Battery Case)
- P22433L Flowmeter Assembly
- P22433T Control Board
- P22433RS2 Replacement Stack
- P22417BC Belt Clip with Screws
- P22433N Keyboard Assembly
- P22433C* Anti-tamper Cover
- P22433ES* External Screw Pack



Exploded view of stack # P22433RS2

* Not shown in Figure 1 or 2

Optional Accessories

Adjustable Low Flow Holders:

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

Protective Sample Tube Covers:

for tubes up to:

- 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 with belt and shoulder strap, 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 use for a period of one (1) year.

This warranty does not cover claims due to abuse, misuse, neglect, alteration, or accident, or use in application for which the instrument was either not designed or not approved by SKC Inc., or due to the buyer's failure to maintain normal maintenance, 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 expressly 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, or 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.

4. Completion and return by the buyer of the instrument registration card is a condition precedent to warranty coverage and performance. In addition, the buyer may be required to present proof of purchase in the form of a paid receipt for the instrument.

5. This warranty covers the instrument purchased and each of its component parts.

6. 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, or refund of the purchase price, at the option of SKC Inc. However, SKC Inc. will not elect refund unless it is unable to provide replacement, and repair is not commercially practicable.

7. 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,

8. (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 (724) 941-9701 at the address above.

9. 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.

10. No other warranty is given by SKC Inc. in conjunction with this sale.

Form #3755 Rev 9409