

LECTRAVET®



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LectraVet®
Developed By:



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LECTRAVET®

INJECTION SYSTEM



Instruction Manual

LectraVet® Injection System Kit

The LectraVet is an electrically powered injection system for delivering subcutaneous and intramuscular injections to animals.

Injection volumes range from 0.25 cc to 5.0 cc. The two "Injection Heads" supplied with the kit allow dose ranges from 0.25 cc to 2.5 cc for the 2.5 cc Head and 1.0 cc to 5.0 cc for the 5.0 cc Head. The LectraVet automatically detects which Injection Head is installed and adjusts the allowable dose volume range accordingly.

Fluid can feed into the injector from either a vial attached to the injector (Vial Feed) or through tubing from a remote source (Line Feed).

Long-life rechargeable battery packs and a charger are supplied with the LectraVet Injection System Kit.

Each LectraVet Injection System Kit comes with all of the items shown here.



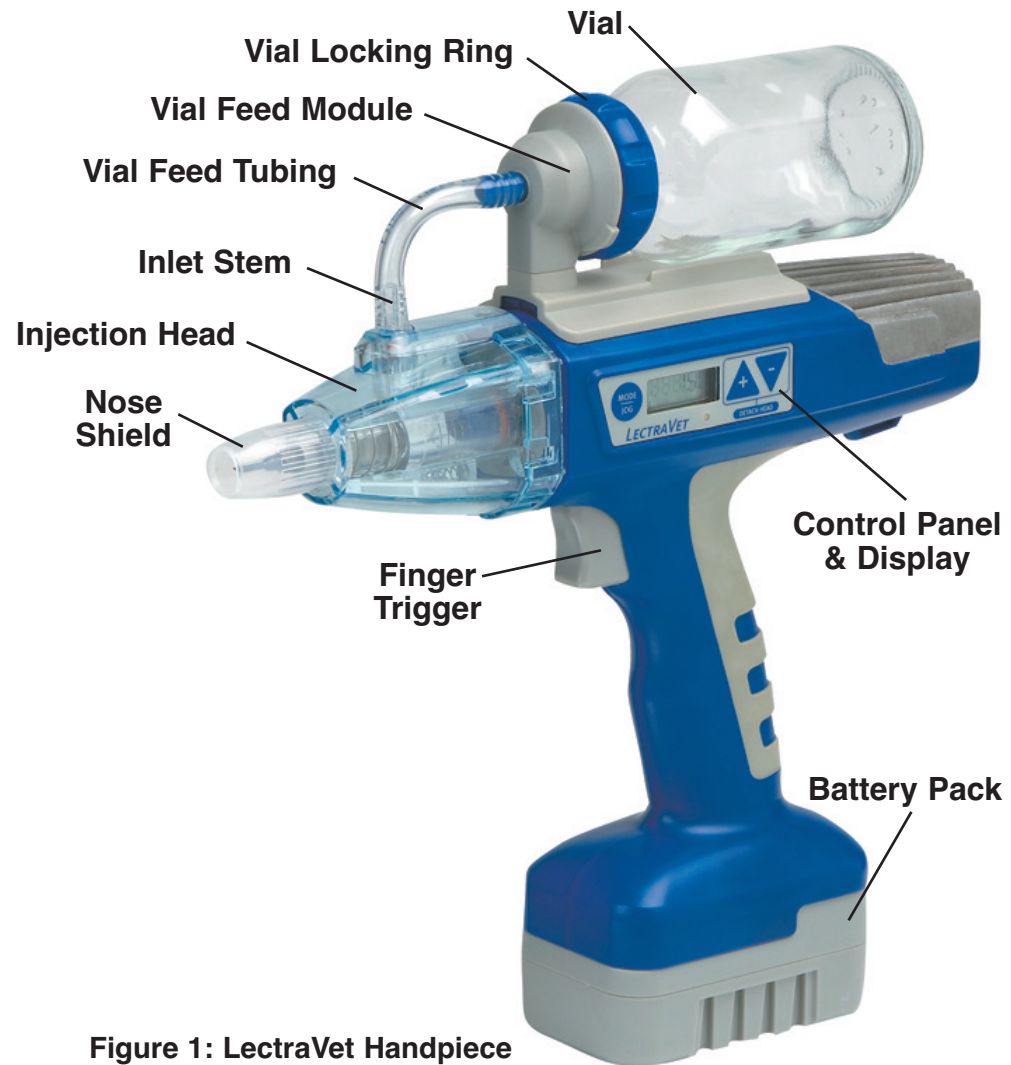


Figure 1: LectraVet Handpiece with Vial Feed

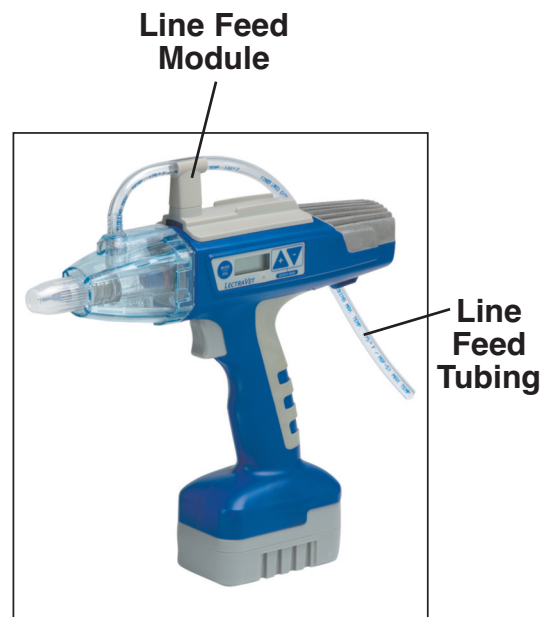


Figure 2: LectraVet Handpiece with Line Feed

SUMMARY OF INSTRUCTIONS FOR THE LECTRAVET INJECTION SYSTEM:

Preparing the LectraVet for injections:

- Charge Battery Pack
- Install charged Battery Pack
- Attach Piston to Plunger Rod
- Attach Injection Head to LectraVet Handpiece
- Set Dose Volume
- Select Line Feed or Vial Feed
- Prime Injection Chamber
- Install Perforator onto Injection Head
- Clear air from Injection Chamber

Delivering injections with the LectraVet:

- Press Finger Trigger and push Nose Shield flat against injection site

THE LECTRAVET CONTROL PANEL

The LectraVet is electronically controlled via the LectraVet Control Panel (Figure 3 and Table 2), which consists of the display, the system status LED and the control buttons (MODE/JOG, increase dose ▲, and decrease dose ▼).

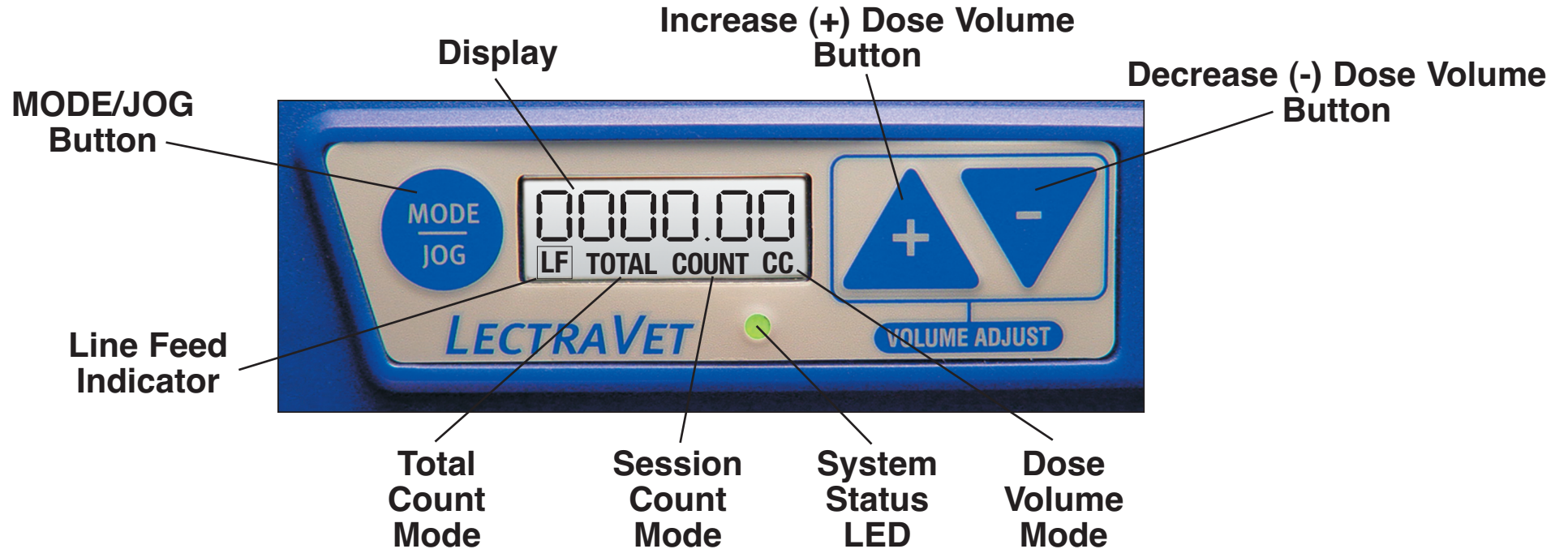


Figure 3: LectraVet Control Panel & Display

WARNING: The LectraVet can deliver injections in any display mode. Care must be used at all times while handling the injector.

THE LECTRAVET CONTROL PANEL (continued)**Display:**

There are three possible display modes:

1) CC (Dose Volume)

- Dose Volume display mode is indicated by **CC** in bottom right corner of display
- Allowable dose volume range depends on which Injection Head is installed.
 - > 5.0 cc Head: Variable from 1.0 to 5.0 cc with increments of 0.50 cc
 - > 2.5 cc Head: Variable from 0.25 to 2.5 cc with increments of 0.25 cc
- Two options for the fluid source
 - > Line Feed (**LF**)
 - Indicated by **LF** in the bottom left corner of display
 - Injector fills through line feed tubing from a bulk container
 - Do NOT use **LF** with a vial attached to LectraVet (air can be drawn into injection chamber resulting in inaccurate dose volume delivery)
 - > Vial Feed
 - No **LF** on display
 - Injector fills from vial mounted on top of injector
 - Front end of injector must be pointed downward to enable fill cycle (prevents air in injection chamber when refilling from a vial)

2) TOTAL COUNT

- Indicated by **TOTAL COUNT** at bottom center of display
- Displays total number of shots delivered by the LectraVet in its lifetime
- Permanent and cannot be reset

3) COUNT (Session Count)

- Indicated by **COUNT** at bottom of display
- Displays number of shots delivered since last session counter reset
- Resettable

System Status LED:

The LectraVet Handpiece is 'ON' when the System Status LED is illuminated. The System Status LED illuminates when a charged battery pack is installed. Table 1 shows the states available for the LED, the corresponding system status, and required actions, if any.

Table 1: System Status LED












LED Behavior	System Status	Required Action
Solid Green	System OK, Battery Level Good	
Flashing Green	Low Battery Warning	Prepare to change Battery
Flashing Red	Critically Low Battery (system disabled)	Change Battery
Solid Red	System Overheat or Stall condition	Press & release Finger Trigger
Off	System Powered Down/Inactive	Press any button or Trigger

Control Buttons:

The three control buttons on the LectraVet Control Panel

are   . Table 2 describes the function of each control button. 4

Table 2: DISPLAY and CONTROL PANEL

Function	Operator Input
Select Display Mode <ul style="list-style-type: none"> • CC - injection dose volume • TOTAL COUNT – total # of shots delivered (<i>not re-settable</i>) • COUNT – shots delivered in current session (<i>re-settable</i>) 	Press & release  repeatedly to cycle through three display modes
Set dose volume <ul style="list-style-type: none"> • Select CC display mode • With 5.0 cc head attached: <ul style="list-style-type: none"> - Increase dose volume in 0.5 cc steps (maximum: 5.0 cc) - Decrease dose volume in 0.5 cc steps (minimum: 1.0 cc) • With 2.5 cc head attached: <ul style="list-style-type: none"> - Increase dose volume in 0.25 cc steps (maximum: 2.5 cc) - Decrease dose volume in 0.25 cc steps (minimum: 0.25 cc) 	See “Select Display Mode” Press and release  repeatedly Press and release  repeatedly Press and release  repeatedly Press and release  repeatedly
Select fluid source <ul style="list-style-type: none"> • Select CC display mode • Select fluid source <ul style="list-style-type: none"> - Line Feed (LF on display) - Vial Feed (no indicator on display) 	See “Select Display Mode” Press and hold  and  for 3 seconds to switch between Line Feed and Vial Feed
Clear session counter (COUNT) <ul style="list-style-type: none"> • Select COUNT display mode • Clear Session Count 	See “Select Display Mode” Press and hold  or  for 3 seconds
Clear air bubbles from Injection Chamber <ul style="list-style-type: none"> • Jog piston forward to push air out of chamber 	Point nose of injector upward and press and hold  . Press and release Finger Trigger repeatedly to jog piston forward to clear air from chamber. Release  and Finger Trigger to refill. (When using Vial Feed: point nose of injector down to refill).

USING THE LECTRAVET INJECTION SYSTEM

Prior to first use:

- ◆ Each Battery Pack must be fully charged prior to using it for the first time.

Preparing the LectraVet for injections:

◆ Charge the Battery Pack

1. Attach Battery Charger Connector to Battery Pack Connector.
Align arrow on Charger Connector with top of Battery Pack Connector.
2. Plug Battery Charger into a standard outlet. Charger can accept any AC input from 100-240 V, 47-63 Hz. Table 3 shows how the Battery Charger LED behaves during the charging process. Approximate charging time is 1 hour 30 minutes.

Table 3: Charger LED

BATTERY STATUS	CHARGER LED BEHAVIOR
Rapid Charge	Glows Steadily
Trickle Charge	Flashes approx. once per second
Fault Condition	Flashes 3 times per second




3. To detach Battery Charger Connector from Battery Pack Connector, pull back on Release Collar.

NOTE: Number of shots per charge on the Battery Pack depends on ambient temperature, perforator gauge, fluid being delivered, size of dose, and injection head in use.

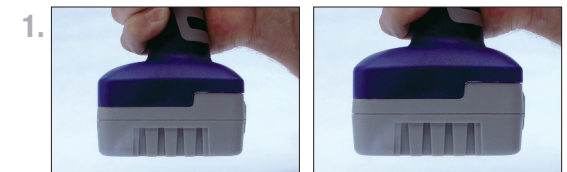
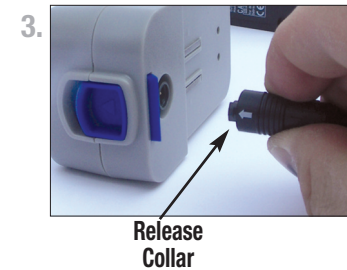
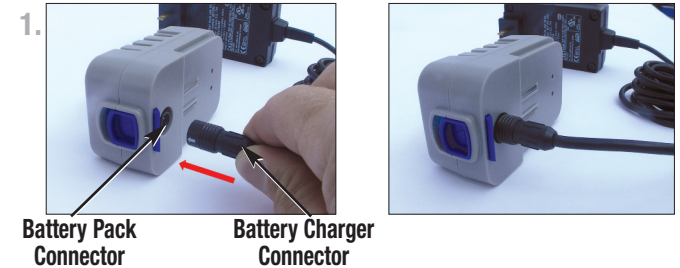
◆ Install charged Battery Pack

1. Slide Battery Pack into slot at base of LectraVet Handpiece until it clicks into place.






NOTES:

- LectraVet turns ON automatically (System Status LED turns green) when charged Battery Pack is installed.
If System Status LED does not illuminate, press , ,  or Finger Trigger to turn power ON.
- LectraVet turns OFF automatically after 10 minutes without use, or remove Battery Pack to turn LectraVet OFF.


2. To remove Battery Pack, press down on button at back of Battery Pack and slide Battery Pack off Handpiece.

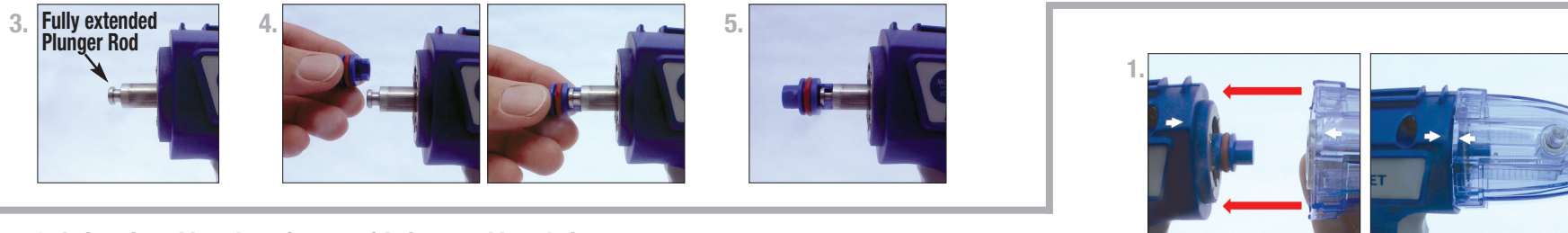


◆ Attach Piston to Plunger Rod

1. Select proper Piston and Injection Head for the application
 - Large Piston & dark blue Injection Head - maximum 5.0 cc
 - Small Piston & light blue Injection Head - maximum 2.5 cc
2. Lubricate Piston O-Ring with Syringe Lubricant supplied in LectraVet kit. (Vegetable oil may be substituted for the Syringe Lubricant.)
3. Hold LectraVet Handpiece horizontal. Press and hold , then press and release Finger Trigger repeatedly until Plunger Rod is fully extended.
4. Continue to hold  and slide back end of Piston onto Plunger Rod.
5. Release grasp on Piston then release  to retract Plunger Rod.
6. To detach Piston: Press and hold , press Finger Trigger repeatedly to extend Plunger Rod. Hold  and slide Piston off Plunger Rod.



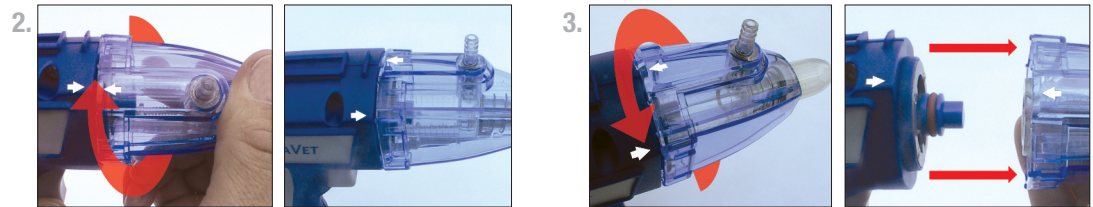
CAUTION: When  is released, Plunger Rod may retract rapidly and could cause injury to hand or finger if the Piston is not released first.



◆ Attach Injection Head to front of Injector Handpiece

WARNING: Check that NO PERFORATOR is installed before attaching Injection Head

1. Slide correct Injection Head over Piston. Align arrows on Injection Head and Injector Handpiece.
2. Push Injection Head firmly onto Injector Handpiece and rotate clockwise to lock into place. Injection Head stops rotating when in the correct position.
3. To detach Injection Head: Press Injection Head and Injector Handpiece together and rotate Injection Head counterclockwise until arrows on Injection Head and Handpiece are aligned. Pull the Injection Head away from the Injector Handpiece.






◆ Set dose volume

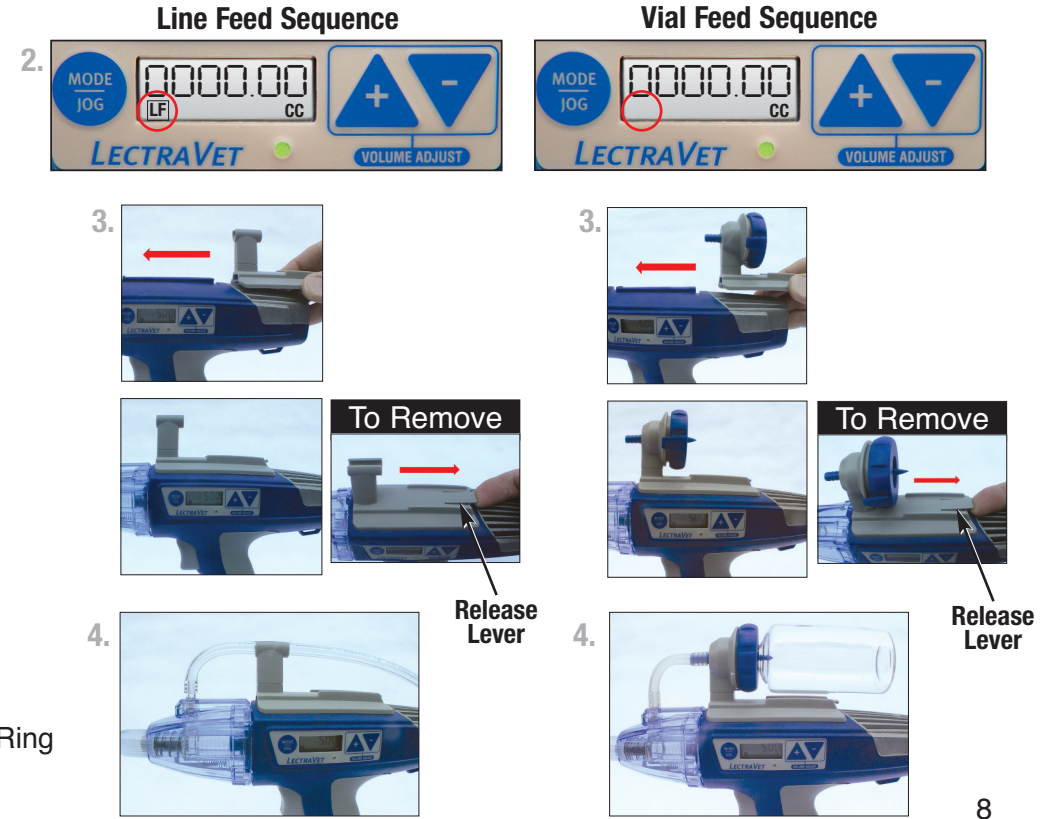
1. Press and release  repeatedly until **CC** appears on the display (Dose Volume Mode).
2. Press  or  to set dose to be delivered.
3. Press Finger Trigger and pull Nose Shield back to set Piston to the selected Dose Volume.

Dose Volume Mode



◆ Select Line Feed or Vial Feed

1. Press and release  repeatedly until **CC** appears on the display (Dose Volume Mode).
2. Press and hold  and  for three seconds to switch between feed modes:
 - Line Feed - **LF** in bottom left corner of display
 - Vial Feed - **LF** disappears from display
3. Install Line Feed or Vial Feed Module onto Injector Handpiece.
 - Slide Module onto mating ribs and push towards front of injector until Module clicks into place.
 - To remove Module: lift up on release lever and pull Module towards back of Injector Handpiece.
4.
 - a. Line Feed: Attach Line Feed Tubing to Inlet Stem on Injection Head and snap into groove on Line Feed Module.
 - b. Vial Feed: Attach one end of Vial Feed Tubing to Inlet Stem on Injection Head and the other end to Vial Feed Module. Press vial onto Vial Feed Module and rotate Vial Locking Ring clockwise until it stops. Vial should be securely coupled to Vial Feed Module.



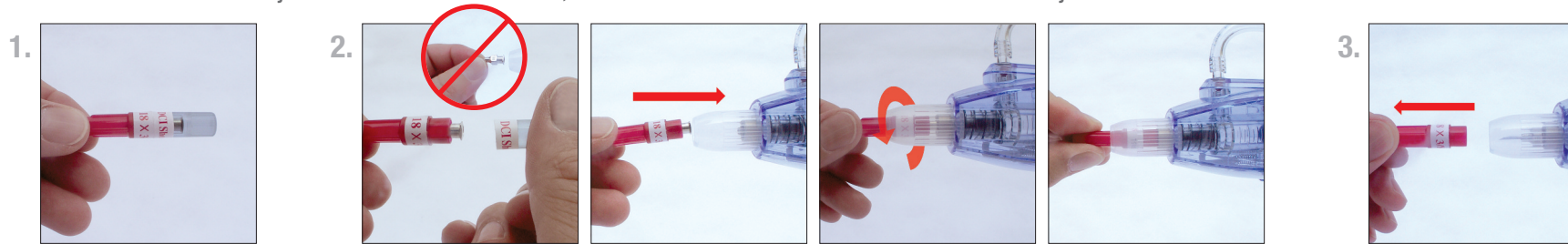
◆ **Prime the LectraVet injection chamber**

1. Pull Nose Shield back and press and release Finger Trigger. Repeat as needed until chamber is full.

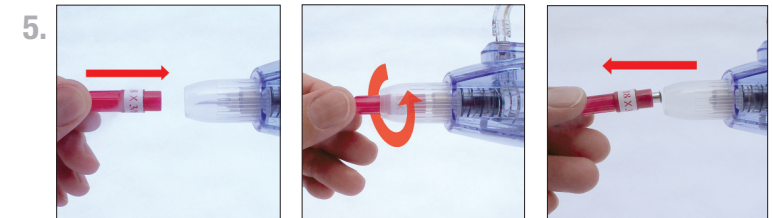
NOTE: If using Vial Feed, point nose of Injector Handpiece down to draw fluid into the injection chamber (pointing down enables Piston to retract).

◆ **Install LectraVet Perforator onto Injection Head**

NOTE: Before an injection can be delivered, a Perforator **MUST** be installed on the Injection Head.



1. Select the appropriate Perforator based on the Perforator Selection Guide on page 11.
2. Grasp red Perforator Cartridge and twist off clear protective cap, then press hub of Perforator into luer lock interface and twist clockwise to lock.
3. Pull off red Perforator Cartridge and save for removal of Perforator later.
4. Visually inspect to make sure Perforator is firmly seated and centered in Nose Shield.
5. To remove Perforator: Firmly slide the red Perforator Cartridge onto the Perforator and twist counter clockwise until Perforator releases from Injection Head. Properly dispose of Perforator in a designated sharps container.



WARNING: To avoid sharps injury:

- Attach Injection Head to LectraVet handpiece first, THEN install perforator.
- Keep fingers clear of Nose Shield.

WARNING: Use **ONLY** properly installed LectraVet Perforators. The LectraVet uses a custom interface that is incompatible with standard hypodermic needles. Failure to use LectraVet Perforators may result in device malfunction, wasted injectate, and/or possible injury.

◆ Clear air from Injection Chamber

NOTE: Air may be drawn into injection chamber when LectraVet draws first dose of fluid. Air must be cleared to insure accurate delivery of intended dose volume.

1. Hold LectraVet Handpiece with Nose Shield pointing upward. Tap Injection Head gently until air bubbles gather at front end of injection chamber.
2. Hold . Press and release Finger Trigger repeatedly to jog piston forward to expel air.
3. When all air has been expelled from the injection chamber, release  and Finger Trigger to completely fill chamber.

NOTE: If using Vial Feed, point Nose Shield down to draw fluid into the injection chamber (pointing down enables Piston to retract).

Deliver injection

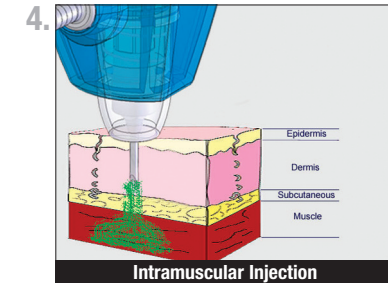
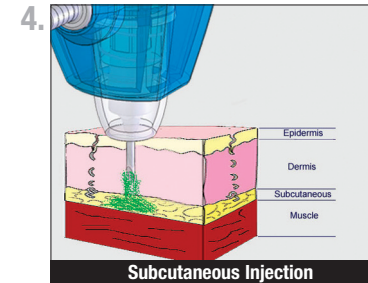
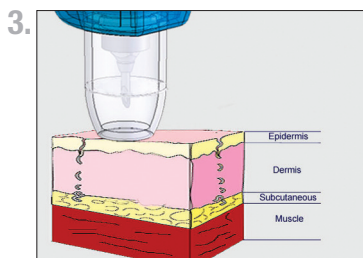
WARNING: NEVER strap Finger Trigger closed



1. Place hand through safety strap.
2. Press Finger Trigger.
3. Place Nose Shield perpendicular to injection site.
4. Press into injection site until Nose Shield is fully compressed. Hold Nose Shield against injection site until injection is complete.
5. Pull injector away from injection site. Release Finger Trigger if not delivering another injection.

NOTES:

- Compress Nose Shield and press Finger Trigger through the full injection to insure delivery of the entire dose.
- In Vial Feed, point Nose Shield down to refill injection chamber.



PERFORATOR SELECTION GUIDE

The following table is provided as an initial guideline for Perforator selection and should be used in combination with operator experience and judgment. Perforator selection is based on the species to be injected, the weight or age of the animal, and the desired depth of injection. In addition, selection considerations should include thickness of skin at injection site. At a given injection site, a longer perforator can be expected to inject deeper.

Species	Weight or Age	Recommended Perforators
SWINE	Sow	16 Gauge x 1/2 inch 16 Gauge x 3/8 inch
	~ 65 lb or ~ 10 weeks	16 Gauge x 3/8 inch 16 Gauge x 1/2 inch 18 Gauge x 3/8 inch
	~ 10 lb or ~ 3 weeks	20 Gauge x 5/16 inch 18 Gauge x 3/8 inch
CATTLE	Any	16 Gauge x 3/8 inch 16 Gauge x 1/2 inch

CAUTION: Use 20 gauge Perforator with 2.5 cc Head ONLY.
Using a 20 gauge Perforator with the 5 cc Head could stall the Injector.

MAINTENANCE, CLEANING & STORAGE

WARNING: Remove Perforator prior to performing maintenance, cleaning or storage

Maintenance

- ◆ **To maximize the life of the Piston O-Ring:**

1. Inspect O-Ring for damage (cracks, tears etc.) each time Battery Pack is changed.
2. Lubricate O-Ring with a drop or two of Syringe Lubricant when changing Battery Pack.

NOTE: If shots become inconsistent or air is getting into the Injection Chamber, the O-Ring should be inspected and replaced if necessary.

- ◆ **Replacing an O-Ring:**

1. Remove the Piston from the LectraVet.
2. Remove the O-Ring from the Piston. If needed, a toothpick can be used to remove the Piston O-Ring. (See Caution Below)
3. Gently slide the new O-Ring into the groove on the Piston. Be careful the O-Ring does not twist or get damaged in the process.

CAUTION: Do not use metal tools (pliers, screwdrivers, knives, etc.) to change the Piston O-Ring, as they may damage the Piston, causing increased wear on future O-Rings and possible malfunction of the LectraVet.



Cleaning

CAUTION: Do NOT use harsh chemicals or abrasives on the LectraVet or any of its components.

- ◆ **Cleaning the Injection Head:**

1. Soak Injection Head in a bucket of warm soapy water.
2. Attach Injection Head to front of LectraVet Handpiece and set the LectraVet for Line Feed (**LF**).
3. Attach a clean piece of line feed tubing to the Inlet Stem of the Injection Head and place the free end of the tubing into the soapy water.
4. Fire the LectraVet until the injection chamber is clean.
5. Refill the bucket with clean soap-free water and fire the LectraVet several more times to rinse any soap suds out of the Injection Head.

CAUTION: Do NOT submerge the LectraVet Handpiece in fluid, as this could damage the injector.

◆ **Cleaning the LectraVet Handpiece:**

1. Wipe the LectraVet Handpiece with a damp sponge or cloth using a mild detergent and warm water.

◆ **Cleaning the Vial Feed Module:**

1. Remove the Vial Feed Module from the LectraVet and soak it in warm soapy water.
2. Wash all exposed surfaces, and shake the Vial Feed Module back and forth to clean the fluid path inside the vial spike.
If necessary, use a pipe cleaner to scrub the fluid path.
3. Rinse the Vial Feed Module with clean, soap-free water.

◆ **Cleaning the Line Feed Module:**

1. Remove the Line Feed Module from the LectraVet and soak it in warm soapy water.
2. With a sponge or cloth wipe any residue off of the Line Feed Module.
3. Rinse the Line Feed Module with clean, soap-free water.

Storage

◆ **Preparing the LectraVet for storage:**

1. Thoroughly clean and dry the LectraVet and Injection Heads.
2. Remove the Piston from the LectraVet.
3. Do NOT lubricate the O-Ring before storing it.
4. Charge the Battery Pack before storing.

NOTE: For long term storage, the Battery Pack should be recharged every three (3) months, as the charge will slowly deplete on its own, and total discharge can damage the Battery Pack.

Table 4: TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	SUGGESTED SOLUTIONS
Fluid leaks around the Perforator hub during the shot	Perforator not properly installed. A standard hypodermic needle has been attached to Injection Head.	Remove and reinstall the Perforator. Remove needle and replace with approved LectraVet Perforator.
Injection is slow or stops	Perforator is partially blocked. Injection Head intake or output check valve is blocked. Piston O-Ring needs lubrication. Battery Pack charge is low. Shot location (cartilage, cyst or other obstruction) inhibits injection.	Change Perforator. Clean or replace Injection Head. Lubricate or change O-Ring. Recharge Battery Pack. Withdraw from animal and re-engage.
Injector does not refill injection chamber after a shot	Previous injection was not completed before injector was pulled away from injection site. Injector is set for Vial Feed, but front end is not pointed down after completing an injection.	Complete previous injection. Point nose of injector down to refill injection chamber.
Injector will not deliver an injection	Vial Feed: Injection chamber not filled. Nose Shield not fully compressed during injection. Perforator is blocked. Battery Pack charge is critically low. Injection Head not mounted correctly.	Point nose of injector down to refill. Press Nose Shield firmly against injection site. Change Perforator. Recharge Battery Pack. Rotate Head into proper alignment with injector.
When In Line Feed Mode (LF): Injection Chamber draws air into the chamber when refilling	A Vial is attached. Line Feed Tubing is damaged or is not properly attached. Line Feed Tubing is not properly attached to remote fluid source.	Switch to Vial Feed (see "Select Vial Feed or Line Feed" on page 8), or remove Vial and attach Line Feed Tubing. Examine Line Feed Tubing for cuts or holes. Examine attachment of tubing to all barbed fittings. Reattach Line Feed Tubing to remote fluid source.

Table 4: TROUBLESHOOTING (continued)

SYMPTOM	POSSIBLE CAUSE	SUGGESTED SOLUTIONS
When In Vial Feed Mode: Injection Chamber draws air into the chamber when refilling	Vial is empty.	Remove the empty vial and attach a full one.
	Vial is not seated properly into Vial Feed Module.	Loosen Vial Locking Ring, press vial firmly onto Vial Feed Module and retighten Vial Locking Ring.
	Vial Feed Tubing is damaged or is not properly attached.	Examine Vial Feed Tubing for cuts or holes. Examine attachment of tubing to all barbed fittings.
	Vial septum is damaged.	Replace vial.
Injection Chamber draws air when refilling	Piston O-Ring is damaged or has dried out.	Lubricate or change Piston O-Ring.
	Debris in fluid path (intake or output check valves).	Clean or change Injection Head.
Injection chamber does not prime (draw fluid) properly	Injection Head valves are contaminated or otherwise not functioning properly.	1. Soak then clean Injection Head (See "Cleaning the Injection Head" on page 12).
		2. If soaking/cleaning does not fix, manually agitate valve by gently inserting a toothpick or other cylindrical object into valve and moving the ball to clear debris. Re-wet intake and output valves with a drop of syringe lubricant. Cycle injector several times.
		3. If Injection Head still does not draw fluid, replace with new Injection Head.
Red System Status LED is ON	Injector is stalled or overheated.	Clean or change Injection Head. If still does not work, allow injector to cool.

LIMITED WARRANTY

Genesis Instruments provides a limited warranty on the LectraVet® Handpiece against any defects in material and workmanship for one (1) year from the date of original purchase or 250,000 injections, whichever comes first; provided that the purchaser uses and maintains the LectraVet® Handpiece strictly in accordance with the Instruction Manual. Genesis Instruments' obligation under this warranty shall be limited to the repair or exchange of any part or parts of the LectraVet® Handpiece which our examination proves to be defective.

This warranty does not apply to accessories, whether included in the original LectraVet® System Kit or purchased separately.

Any Warranty and Service issues should be directed to Genesis Instruments by calling 1-715-639-9209. Please have your LectraVet Serial Number available when calling. (The Serial Number is located under the handpiece where the battery pack attaches).

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PURPOSE AND OF ALL OTHER OBLIGATIONS OR LIABILITIES ON OUR PART, AND WE NEITHER ASSUME, NOR AUTHORIZE ANY OTHER PERSON TO ASSUME FOR GENESIS INSTRUMENTS ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF THE LECTRAVET® HANDPIECE. THIS WARRANTY SHALL NOT APPLY TO THE LECTRAVET® HANDPIECE OR ANY PART THEREOF WHICH HAS BEEN SUBJECT TO ACCIDENT, NEGLIGENCE, ALTERATION, ABUSE, OR MISUSE. GENESIS INSTRUMENTS MAKES NO WARRANTY WHATSOEVER IN RESPECT TO PARTS NOT SUPPLIED BY GENESIS INSTRUMENTS. GENESIS INSTRUMENTS SHALL NOT BE RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOST INCOME FROM THE USE OF THE LECTRAVET®. IN NO EVENT SHALL GENESIS INSTRUMENTS LIABILITY UNDER THIS WARRANTY EXCEED THE PURCHASE PRICE OR COST OF REPLACEMENT OF THE UNIT. THIS WARRANTY SHALL BE INTERPRETED UNDER AND ENFORCED PURSUANT TO THE LAWS OF THE STATE OF WISCONSIN. THE PURCHASER AGREES THAT ANY ACTION FOR ENFORCEMENT SHALL BE BROUGHT IN THE STATE COURTS OF WISCONSIN, AND THE PURCHASER AGREES TO SUBMIT TO THE JURISDICTION OF THE SAME FOR THE PURPOSES OF ENFORCEMENT OF THIS WARRANTY. SOME STATES OR JURISDICTIONS MAY NOT ALLOW LIMITATIONS OF SOME DAMAGES, AND YOUR RIGHTS MAY VARY FROM STATE TO STATE.

DISCLAIMER

Genesis Instruments shall not be liable to the purchaser of the LectraVet® System or any other person for injury, death, animal injury or property damage, for damages, losses, claims, or other compensation in the event the purchaser or any other user of the LectraVet® System fails to use and maintain the LectraVet® System strictly in accordance with the Instruction Manual.

The LectraVet® is Patent Protected: US 5,569,190; US 6,056,716; and additional patents pending.
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