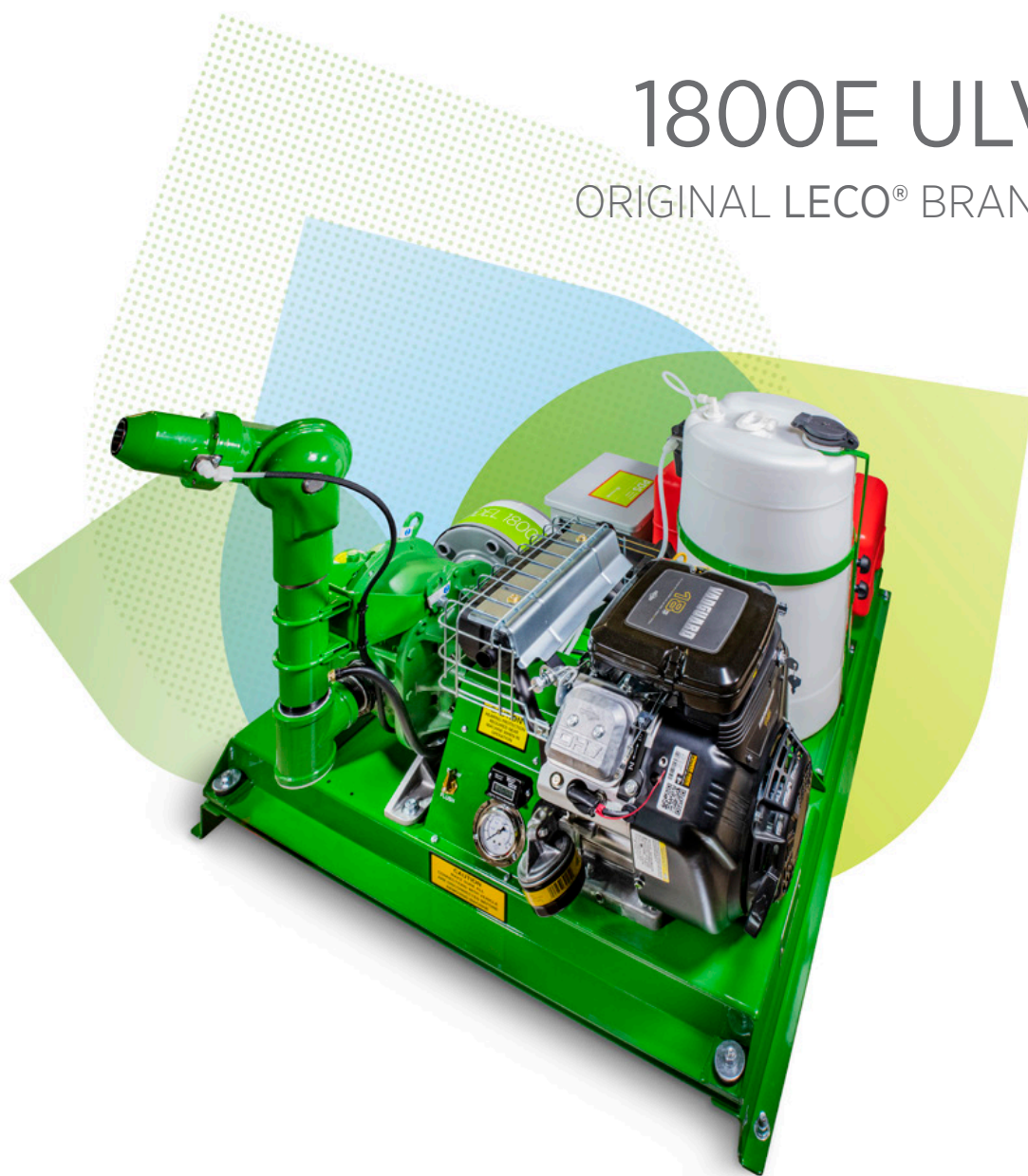
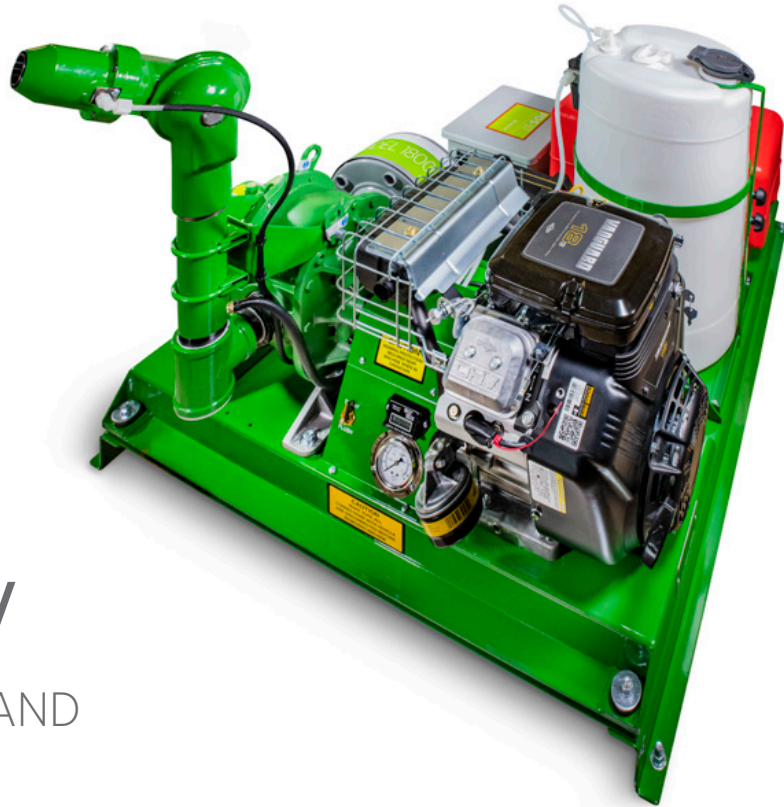


# INSTRUCTION MANUAL AND PARTS LIST

1800E ULV  
ORIGINAL LECO® BRAND







# 1800E ULV

## ORIGINAL LECO® BRAND

The 1800E cold aerosol Ultra-Low-Volume (ULV) sprayer sets the standard for professional equipment. An 18 HP Briggs & Stratton Over Head Valve (OHV) engine combined with the powerful features you demand make the 1800E the ideal choice for the big, tough jobs. Industry recognized as a dependable heavy duty ULV sprayer, its top performance and competitive price make the 1800E a perfect choice for professionals in public health programs.

**The 1800E is a great choice for mosquito control, public health and odor control. It features application rates up to 495 ml/min (17 oz/min) and all the standard features professionals demand.**

- The Industrial High Performance Laminar Air-Flow Technology nozzle swivels 360° horizontally and 200° vertically and is specifically designed for dengue control programs
- Rotary positive displacements specified at 350 CFM @ 10 P.S.I.
- Glycerin filled pressure gauge
- Meets all the label requirements for ground ULV products, including malathion at 32.2 kph (20 mph) rate
- Remote cab flow control
- Non-shear anti-vibration mounts
- FMI electric lab pump, with waterproof, lockable enclosure
- Electric start
- Flush system with 3.8 liter (1 gallon) solution tank
- Lockable pour-clean 56.7 liter (15 gallon) poly chemical tank
- 18 HP OHV Briggs & Stratton engine with automotive type lubrication with spin-on-oil filter
- All steel construction with Z-base rails for easier vehicle mounting
- 45.4 liter (12 gallon) marine poly gas tank with gauge
- Engine hour meter and tachometer
- Two stage powder coat finish on all frame parts

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## CLARKE LECO 1800E ULV SPRAYER

## Clarke Leco 1800E ULV Sprayer Specifications

## THIS MANUAL IS FOR MY CLARKE LECO 1800E ULTRA LOW VOLUME (ULV) SPRAYER

SERIAL NUMBER \_\_\_\_\_

MANUFACTURING DATE \_\_\_\_\_

The above information, which can be found on the CHASSIS, should be filled in.  
Your prompt attention to this matter will make it convenient for you in the future,  
as this information must be given when ordering parts.

Every effort has been made to make this manual as complete as possible so that it will provide maximum assistance in operating and maintaining your Clarke Leco 1800E ULV Sprayer.

### CLARKE LECO 1800E ULV SPRAYER SPECIFICATIONS

Engine Blower	18HP (570 cc)
Blower Specifications	350 CFM @ 10 P.S.I.
Weight	216 kg (475 lbs.)
Nozzle	IHPLAT
Dimensions	121.9L cm x 98W cm x 91.4H cm 48L" x 39W" x 49H"
Flow Rate ULV	530 ml/min (18 oz)
Formulation Tank	56.7 liter (15 gal.)
Flush Tank	3.8 liter (1 gal.)
Fuel Tank	45 liters (12 gal.)
Emission Filter	High Vacuum Carb Evaporation Vent

*\*Droplet size would be affected by large flow rates*

#### Warranty Information

Your 1800E is warranted to the original purchaser by Clarke against defects in workmanship or materials for a period of one (1) year from the date of purchase from Clarke. If any warranted component fails within that period, return the component to Clarke, shipping prepaid, for repair or replacement. This warranty does not include incidental damages arising from machine failure, from incorrect use, or from improper or neglect of maintenance.

This warranty covers only the repair or replacement of warranted defective parts. It does not cover components which normally wear out or are used up during operation or through time. In the latter category are items such as tubing, fittings and rubber mountings.

**Parts which prove to be defective will be repaired or replaced free of charge FOB factory, provided:**

1. The component was properly installed, as per enclosed manual, given reasonable care, protected from wet weather conditions and freezing temperatures and used for its intended purpose.
2. No repairs have been attempted by other than factory personnel. No alterations or adjustments have been made to the electrical controls.
3. The component(s) have been returned properly packaged, insured, and with transportation charges prepaid.
4. Upon examination, Clarke personnel are satisfied that the defects were not caused by abuse, or subjection to conditions that violate the system specifications or neglect.
5. When the component is plugged into a vehicle electrical system, a Volt check confirms that the vehicle's alternator is meeting automotive standards 13.8 V to 14.8 V (15 V max) at the alternator. This is required for both the component and vehicle reliability.

All returns must have  
an authorization number  
issued by Clarke.

**Please call ahead to save  
time and cost of having  
items returned.**

**+1-630-894-2000**

**Thank you!**

## CLARKE LECO 1800E ULV SPRAYER

### Important Notes to Help You Get the Most out of Your Sprayer and Maintain the Warranty

1. Read and understand this instruction booklet before operating your sprayer. If you have questions about operating the sprayer, proper applications, or insecticides, call Clarke and ask for technical support.
2. Use only insecticides that are specifically registered by the appropriate state and federal agencies for ultra-low-volume (ULV) adult mosquito and/or fly control.
3. Read and follow the insecticide label. It is a federal offense to use any pesticide in a manner not in accordance with its labeling. This includes directives on the use of protective clothing and safety equipment.
4. To obtain the best results with a ULV sprayer, the operator must be knowledgeable of space spraying concepts. Many insecticide labels list specific training and/or certification requirements for users. Consult Clarke or your nearest cooperative extension agent for information.
5. Operate the sprayer only when:
  - The vehicle is moving in a forward direction.
  - Winds are less than 16 KPH.
  - Insects are exposed to spray (evening or early morning is the best time for most species).
6. Before attempting to start your unit the first time, study the complete Operation Instructions carefully and identify all parts referred to. You will find that the operation of your Clarke 1800E ULV Sprayer is a simple matter. However, like all mechanical equipment, your unit requires a certain amount of maintenance.
7. The Maintenance Instructions section will enable your 1800E to give you continuous and trouble-free service. **It is highly recommended that some system be established to assure the performance of this maintenance as its importance cannot be overemphasized.**

Although, with proper maintenance, your unit should operate indefinitely without any trouble, there might come a time when trouble does develop. For such an occasion, a complete Trouble Shooting section has been prepared and included in this manual.

The Parts Book section of the manual is made up of photos and parts list. Assemblies and parts of the unit are shown and identified with a part number. **Always order parts by part number, description and the serial number of your unit.**

## SAFETY

### CLARKE LECO 1800E ULV SPRAYER

#### Safety

This Clarke Leco 1800E is manufactured and sold for use only with insecticides which have been duly registered and approved. **DO NOT EXCEED the dosage set forth on the registration label of the insecticide to be used.**

Only qualified personnel should operate the 1800E.

The **SPRAY** switch must be in the OFF position before the **SPRAYER** is turned on.

Observe all safety precautions set forth on the registration label of the insecticide to be used.

Never operate the sprayer in an enclosed area unless the exhaust gases are piped to the outside. Exhaust gases contain carbon monoxide, which is colorless, odorless and poisonous gas.

Do not fill the fuel tank while the engine is in operation. Gasoline spilled on a hot engine may explode and cause serious injury to personnel.

Do not attempt repairs in the insecticide system without protection until the system has been thoroughly flushed with a flushing solution for the insecticide used.

## CAUTION



### HEARING PROTECTION REQUIRED

Note: Hearing protection must be worn when outside the vehicle in close proximity with the Clarke Leco 1800E ULV Sprayer when it is running.

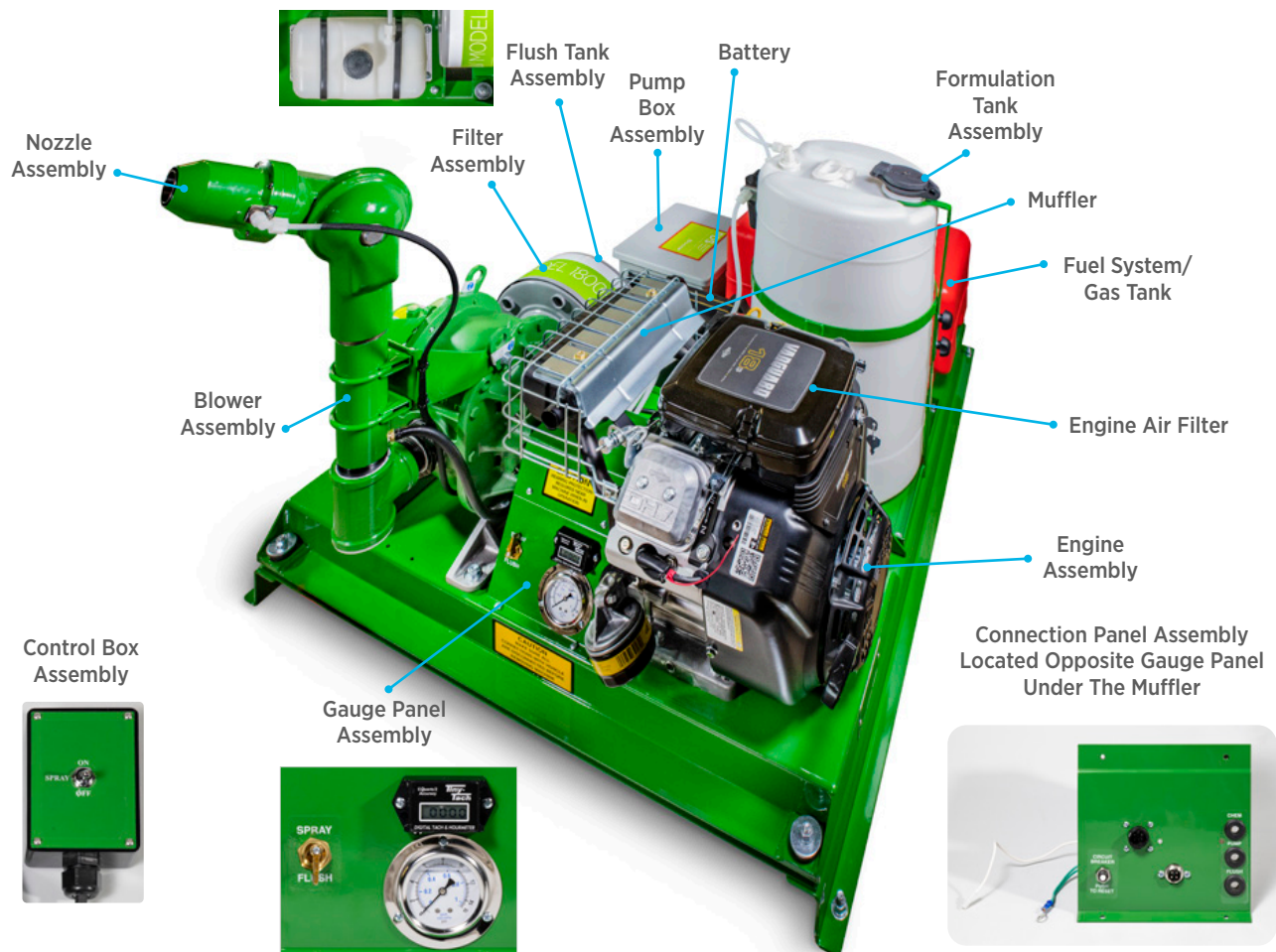
## CLARKE LECO 1800E ULV SPRAYER

### Description

This manual provides the description, theory of operation, assembling instructions, mounting instructions, operation instructions, calibration instructions, maintenance instructions and illustrated parts breakdown for the Clarke Leco 1800E Ultra Low Volume (ULV) Sprayer.

The Clarke Leco 1800E Ultra Low Volume (ULV) Sprayer consists of an engine, fuel tank, a rotary blower capable of developing 10 P.S.I. maximum pressure, an adjustable discharge nozzle head assembly, a flow control, an insecticide tank, a flush tank, a remote cab flow control switch and a filter-silencer with a stainless steel element.

FIGURE 1: CLARKE LECO 1800E ULV SPRAYER



Installation

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## CLARKE LECO 1800E ULV SPRAYER

### Installation Instructions

Uncrate. Remove from skid.



FIGURE 2: UNCRATE MACHINE

**NOTE: Save machine box for long-term storage use.**

FIGURE 3: CLARKE LECO 1800E ULV SPRAYER



### MACHINE OPTION

CLARKE INSTALL KIT  
ORDER PART NO. 347741

If you wish to permanently install the sprayer into a vehicle, a Clarke Install Kit is available for easy installation to your vehicle's battery. This kit includes cables, vehicle circuit breaker and terminals.

**Install Kit must be ordered separately.**



Remote Control

### Installation Instructions *(continued)*

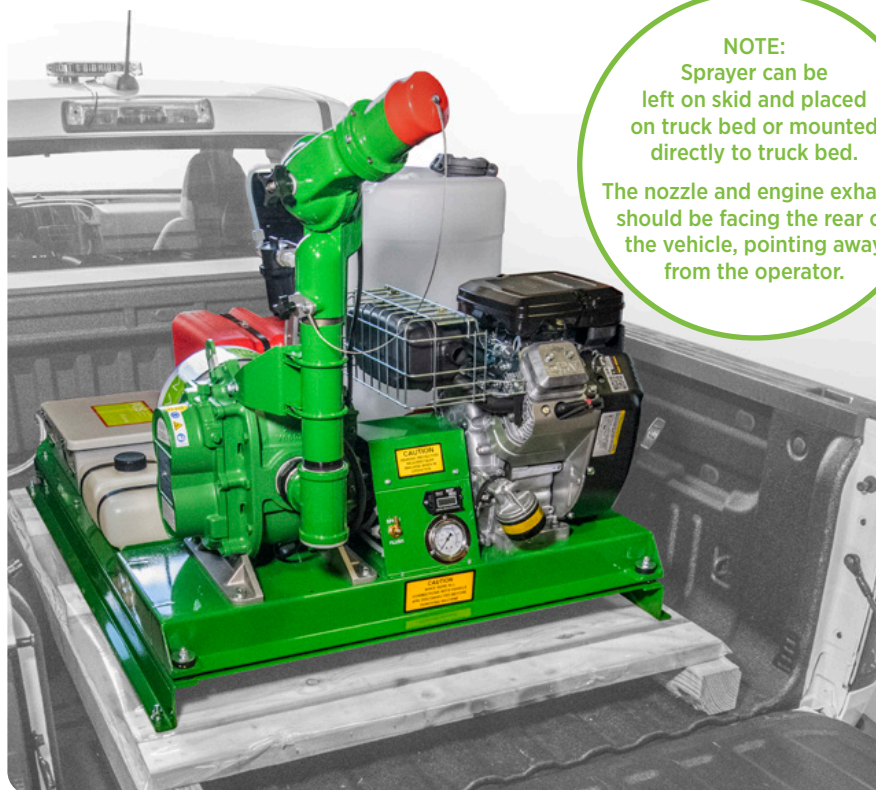
#### Mount to vehicle.

The 1800E ULV Sprayer can be conveniently mounted on a variety of trucks and utility vehicles. To easily move and lift the machine, **we recommend using some type of lifting device, such as a forklift.**

The sprayer can be placed anywhere on the truck bed, but must be positioned with the nozzle aimed to the rear of the vehicle.



FIGURE 4: 1800E ULV SPRAYER (MOUNTING)



**NOTE:**  
Sprayer can be left on skid and placed on truck bed or mounted directly to truck bed.  
The nozzle and engine exhaust should be facing the rear of the vehicle, pointing away from the operator.

FIGURE 5: 1800E ULV SPRAYER (MOUNTED)

**NOTE:** The warranty is voided if the unit is damaged due to improper mounting.



## CLARKE LECO 1800E ULV SPRAYER

### Supplying Power

A small automotive or marine battery can be installed using the mounted battery box on the 1800E for stand-alone use.

**NOTE:** An Installation Kit can be purchased to connect to your vehicle's battery, and will eliminate the need for the additional battery.

See page 68 for Installation Kit purchasing information.

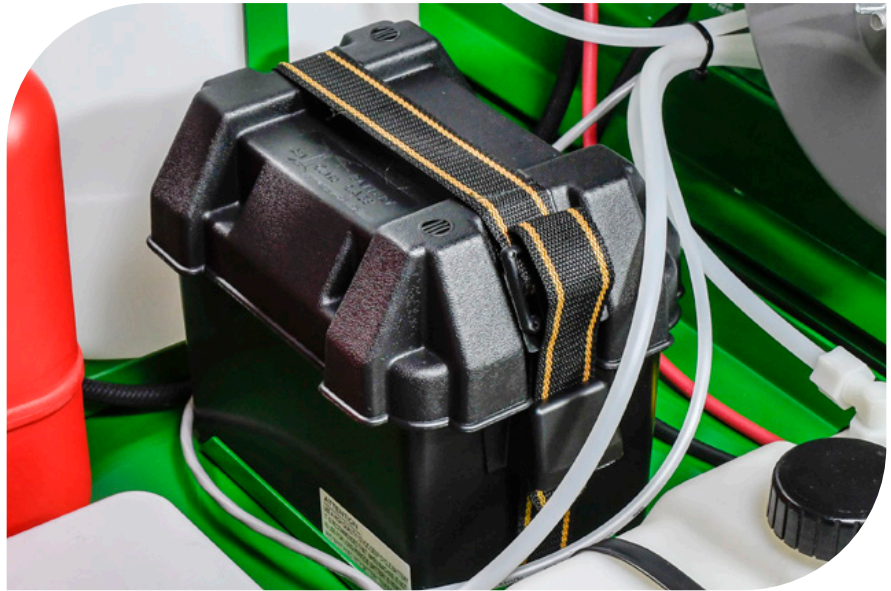


FIGURE 6: 1800E BATTERY BOX AND BATTERY

FIGURE 7: 1800E BATTERY BOX AND BATTERY



### Installation

#### Remote Control Cable Connection and Routing.

The 1800E Remote Control box functions as a remote machine control that can turn the spray on or off from the truck's cab or other vehicle. The Remote Control Box contains the SPRAY switch, which turns the Spray or Flush on and connects to the 1800E through a heavy duty cable. Mount the Remote Control box in the cab of the vehicle in a convenient location. Route the cable back to the 1800E in a way that affords protection against cutting and snagging. Plug the cable into the socket located on the Rear Coupling Cover Panel on the machine. (See Figure 9).

FIGURE 8: REMOTE BOX



FIGURE 9: REAR COUPLING COVER PANEL



FIGURE 10: CONNECTING POLARIZED PLUG



The plug is polarized and can only be inserted in one position. Be sure to hand tighten the knurled locking cap onto the socket.

## CLARKE LECO 1800E ULV SPRAYER

### Supplying Power with the Clarke Installation Kit

If using the Clarke Install Kit, you will not need an external battery.

**FIRST**, remove existing red and black power cables from the sprayer. Note where you're removing them from so you can replace with the pre-made power whip in the Installation Kit.

**NOTE:** The Clarke install Kit also allows the option of charging the external battery.

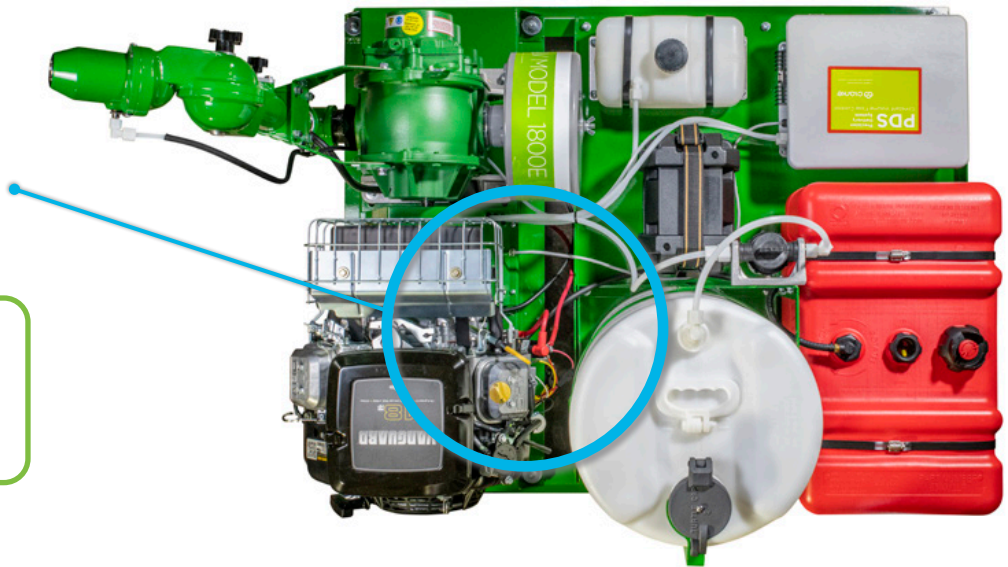


FIGURE 11: 1800E ULV SPRAYER POWER SUPPLY

FIGURE 12: 1800E ULV SPRAYER POWER WHIP

**NEXT**, hook up the 32" power whip in the Installation Kit (the shortest in the box), along with the pump box power wires to the ground on the engine block, and the other to the starter solenoid.

32" power whip





### Connecting the 1800E to Your Vehicle's Electrical System

*Step-by-step images on pages 17-18.*

The Clarke Installation Kit contains vehicle circuit breaker and terminals.

If you intend to supply your own cabling and circuit protection components, **we recommend a minimum of 6 awg multi-stranded copper power cable with a 60 amp inline fuse located near the sprayers onboard battery as well as a 50 amp circuit breaker located near the vehicles power source.** This is extremely important to protect against electrical short and fire. It is critical that both ends of the power cable are protected.

**NOTE:** Vehicle Installation cables and breakers must meet Clarke systems vehicle installation specifications or 1800E Warranty will be voided.

The Remote Control can be located in any convenient location within easy reach of the operator. Take care not to obstruct the driver's view or view of vehicle's instruments. The control cable plugs into the rear coupling cover panel. **(Figure 13)**

#### Parts Required to complete Vehicle Installation:

- Vehicle Installation Kit P/N 347741 (or comparable)
- 12 Volt battery
- Tools required to complete vehicle installation
- Screw driver
- Wrench set up to 5/8"
- Crimping tool for insulated ring lugs wire size
- **AWG6 if using your own cabling**
- Electric hand drill and power source
- 3/16" drill bit (for mounting breaker bracket)
- 2" hole saw that fits your hand drill
- Sharp knife



FIGURE 13: 9-PIN CONNECTOR

**NOTE:** For proper plug insertion, the largest rib on the remote control socket should be at the 12:00 position.

#### Where to Install The Power Cable on the Vehicle

You may choose to run the power cable out through a hole in the front panel of the truck bed, in through the rear panel of the cab, under the seat, out through the fire wall into the engine compartment, and over to the vehicle battery.

Or you may choose to run the power cable out through a hole in the front panel of the truck bed, down under the cab, up into the engine compartment, and then over to the vehicle battery. With the first choice you could also bring the 1800E Operator Control Unit Cable into the cab through the same holes as the power cable, providing the hole is large enough to accept both cables, which would be a 2-inch hole.

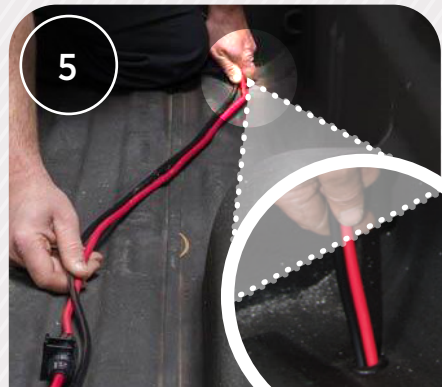
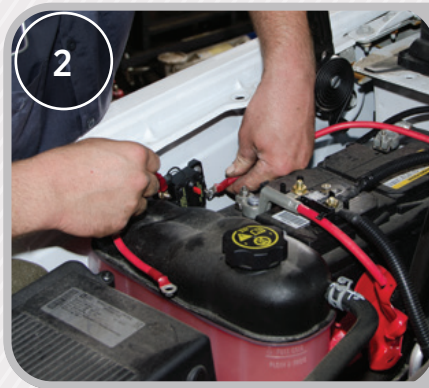
**NOTE:** Repeated bending or pinching of cable can cause cable failure.



## CLARKE LECO 1800E ULV SPRAYER

### Connecting the 1800E to Your Vehicle's Electrical System (continued)

1. Disconnect the long lead from the 50 Amp breaker.
2. Mount the 50 Amp breaker very close to the positive battery terminal.
3. Take the long cable sections (now free from the breaker). Connect the plug end to the newly installed whip.
4. Drill a hole in the bed of the truck or find alternate path to run the cables to the vehicle battery. Use a heavy-duty rubber grommet around hole to protect cable.
5. Run both the black and red leads toward the front of the truck in the direction of the vehicle's battery and the mounted 50 amp breaker. Then, feed the cables through the hole.

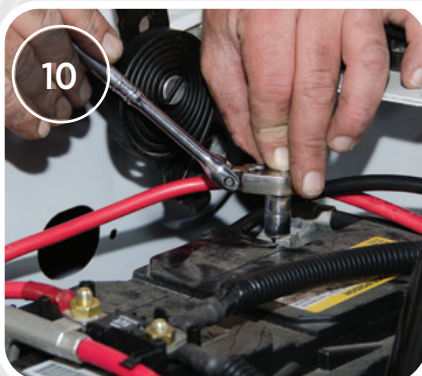
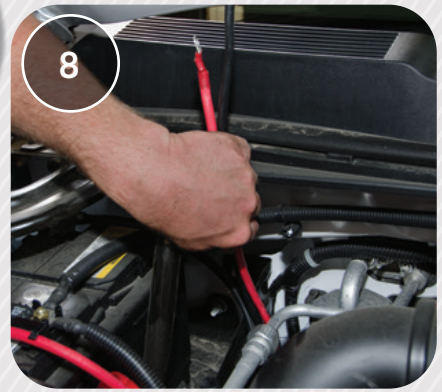


## INSTALLATION

### CLARKE LECO 1800E ULV SPRAYER

#### Connecting the 1800E to Your Vehicle's Electrical System (continued)

6. From the underside of the truck, pull the cables through continuing towards the vehicle's battery and 50 Amp breaker.
7. Secure cable using ties and protect from sharp edges and surfaces.
8. Pull the cables into the engine compartment, to the mounted breaker.
9. Secure the ring terminal of the red cable to the breaker. The black cable will connect to the negative battery terminal in a future step of this instruction.
10. Connect the power leads to the vehicle battery terminals.



CLARKE LECO 1800E ULV SPRAYER

NOTES

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Operation

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## CLARKE LECO 1800E ULV SPRAYER

## Theory of Operations

The Clarke 1800E ULV sprayer is designed for precision metering of concentrated insecticide through the discharge nozzle head. Any desired flow rate, within limits, can be calibrated to your desired flow rate. When fogging, the concentrated insecticide is drawn from the insecticide tank and pumped at the preset rate with constant, even flow to the discharge nozzle head where it is sheared into optimum size droplets by the air blast from the blower and dispersed into the atmosphere. After dispersal, the droplets stay suspended in the air and drift with prevailing winds to insect-infested areas.

The **optimum size** of a particular insecticide is defined on the registration label for that insecticide and can be controlled by varying either the nozzle air pressure, the insecticide flow rate, or both. Changing the speed of the engine will vary the nozzle air pressure. Slowing down the engine decreases the pressure which increases the droplet size, because of less shearing action and conversely, speeding the engine up increases the pressure which decreases the droplet size for a particular flow rate.

The **correct flow rate** will be defined on the registration label for that insecticide. As stated above, the flow rate also affects the droplet size. The droplet size tends to increase as the flow rate increases. Optimum size droplets must be maintained and should be checked periodically by an authorized person.

## Particle Size

**The air pressure at the nozzle and the volume of the chemical flow changes particle size.** Particle size is specified on the label of the insecticide for that insecticide. This is a part of the label and a part of the legal use of that insecticide.

It is the responsibility of the user to determine the proper particle size produced by the Clarke 1800E ULV. This should be in accordance with the chemical label, as required by law.

Insecticide labels discuss the determination of particle size and the suppliers of the insecticide should be equipped to measure, or help you measure, the particle size produced by your Clarke 1800E ULV sprayer.

**The 1800E ULV sprayer should not be operated unless the required particle size is known and measured.**

Clarke cannot tell you what air pressure to use with a particular insecticide to get the particle size required by the label. There are too many variables involved, such as chemical mixture, flow rate and the temperature of the insecticide.



### Operation Instructions

When operating the Clarke 1800E ULV Sprayer for the first time, move to an uncongested and well-ventilated work area in an open area away from flammable materials.

#### Pre-Start (All switches should be in the OFF position.)

1. Verify that the battery cable connections are correct and tight. This is a negative ground system.
2. Verify that no foreign objects or tools have been left in or about the Clarke 1800E ULV Sprayer.
3. Check the oil in the engine. If necessary, add oil until the level reaches the mark on the dipstick. The engine manual supplied with the Clarke 1800E ULV Sprayer will advise the correct oil to use. **Reference Figure 15.**
4. Check the oil and lubrication levels on the blower. See the Blower section (page ??).
5. Fill the gasoline tank. **Reference Figure 16.**

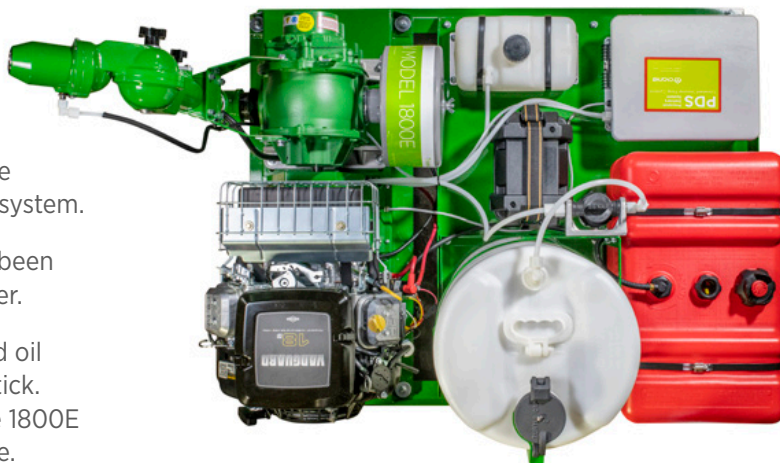


FIGURE 14: 1800E ULV SPRAYER

FIGURE 15: ENGINE OIL



Dipstick and Oil Fill

FIGURE 16: 1800E GASOLINE TANK, LARGE KNOB IS GAS FILL



Add gas here



## CLARKE LECO 1800E ULV SPRAYER

6. Fill the formulation tank/tanks with appropriate formulation. Always use a funnel with a strainer screen when adding insecticide to the tank.  
**Reference Figure 17.**

7. Place flushing solution in the flush tank.  
**Reference Figure 18.**

8. Verify that the Remote Control Console is within easy reach of the operator.

9. Verify that the nozzle is in the correct position for spraying. The nozzle is adjustable both horizontally and vertically. To rotate the nozzle, loosen the appropriate knob on the side of the mast or side of the nozzle head and rotate the nozzle. Retighten the knobs after adjustment.  
**Reference Figure 19.**



FIGURE 17: FILLING FORMULATION TANK



FIGURE 18: FILLING FLUSH TANK



FIGURE 19: NOZZLE POSITION — ADJUSTMENT KNOBS

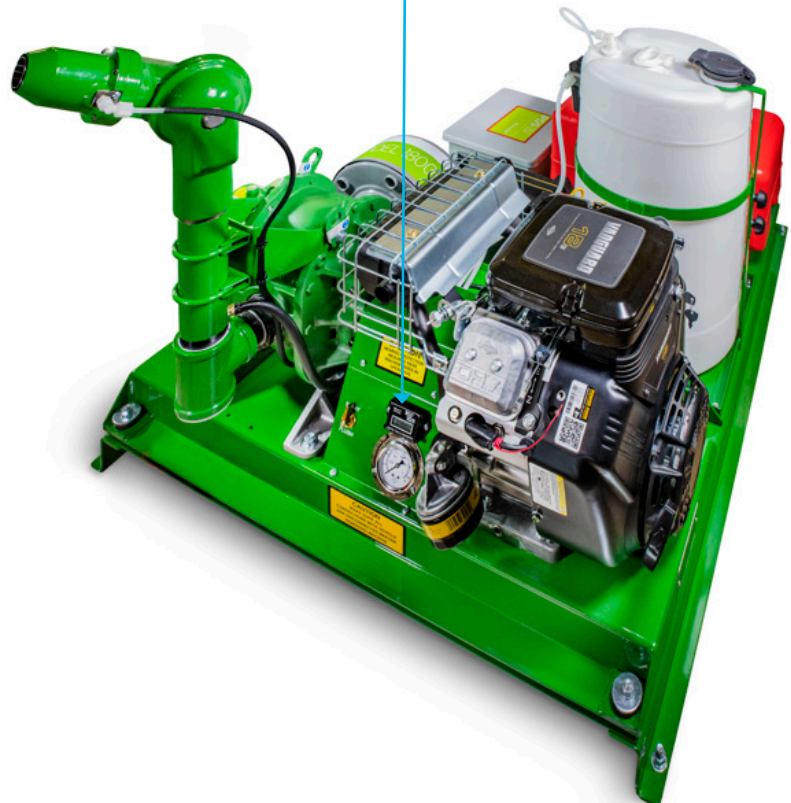
### Operation Instructions

#### Spray/Flush Valve

The 1800E is equipped with a manual SPRAY/FLUSH valve that connects either the insecticide or flush solution to the nozzle. This switch is located next to the pressure gauge on the sprayer. Moving the switch to SPRAY on the Pressure Gauge connects the insecticide tank to the nozzle. Moving this switch to FLUSH connects the flush tank to the nozzle. When the SPRAY switch is turned on, either the insecticide or flush solution will be sprayed from the nozzle.

**Reference Figure 20.**

FIGURE 20: PRESSURE GAUGE



## CLARKE LECO 1800E ULV SPRAYER

## Operation Instructions

## Start-UP

1. On the Remote Control Box, set the Spray ON/OFF switch to the OFF position. **Reference Figure 21.**
2. Set the Spray/Flush valve to SPRAY. **Reference Figure 20 on page 24.**
3. For a cold engine, choke the engine, turn the key or use the pull start until the engine fires.
4. When the engine fires, release the engine choke.
5. For a hot engine, turn key or use the pull start until the engine fires. Switch to the OFF position.

FIGURE 21: REMOTE CONTROL BOX



PULL START



KEY START

**WARNING:** If the sprayer's KEY switch is in the ON position the Pump can INADVERTENTLY be activated by flipping the REMOTE CONTROL switch to SPRAY ON. To avoid flooding chemical into the blower DO NOT RUN PUMP if your engine is not running. Exception is when CALIBRATING; the FLUID LINE DISCONNECTED FROM NOZZLE AND YOU ARE INTENTIONALLY PUMPING FLUID INTO A CONTAINER.



Operation Instructions

Pressure Gauge

The unit is equipped with a glycerin filled pressure gauge (Figure 22) that reads the nozzle air pressure and is mounted on the front of the sprayer, and is between the engine and blower. Nozzle air pressure is one of the main criteria for good particle size. The nozzle air pressure, measured in pounds per square inch (PSI) is directly related to and is a resulting effect of the sprayer's engine's speed.

Adjusting Nozzle Air Pressure

Air pressure is one of the main criteria for good particle size. The nozzle air pressure can be adjusted by checking the pressure gauge as the engine speed is increased or decreased using the large silver hex nut that is located in the front of the sprayer between the engine and the muffler. Adjusting this large hex nut affects the engine's speed that is measured in revolutions per minute (RPM) and in turn affects the PSI of the blower. The RPMS can be seen in the Tiny Tach Tachometer (located above the Pressure Gauge). Range is about 2,150 RPMs (minimum) – 4,000 RPMs (maximum). A rise or drop in the RPM affects the PSI in the same way. *Reference Figures 23.*

**NOTE:** The hex nut should be turned in small amounts only after the engine has reached normal operation temperature.

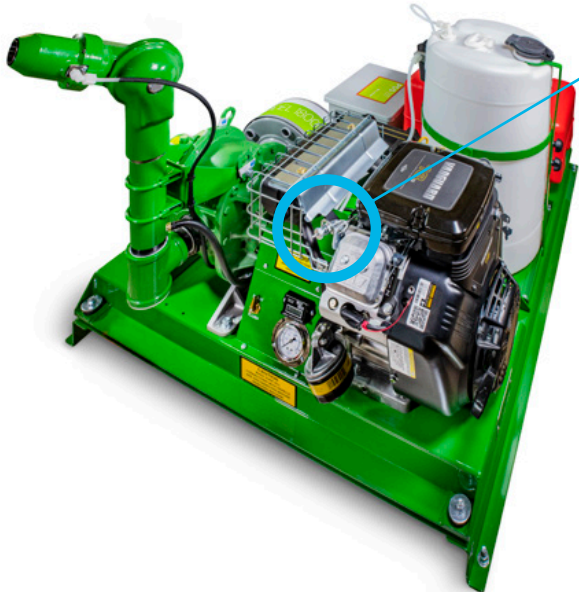
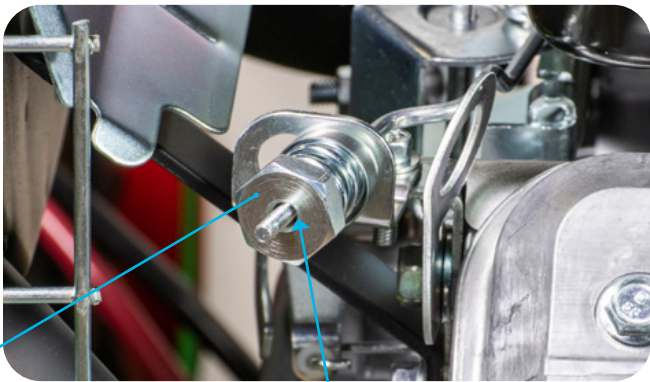


FIGURE 22: PRESSURE GAUGE



Tiny Tach Tachometer      Pressure Gauge

FIGURE 23: THROTTLE HEX NUT



Throttle Hex Nut

Pump Setting	ml/min*	oz/min*	Blower PSI*	Engine RPM
"1"	75	3	3-5	1800
"2"	130	4	4-6	2000
"3"	180	5	5-7	2400
"4"	240	6	6-8	2600
"5"	280	9	7-9	2600
"6"	320	11	8-9	2700
"7"	390	13	9+	2800
"8"	440	15		
"9"	460	16		
"10"	490	17		

\*Estimated values. Actual calibrated readings may vary.

## CLARKE LECO 1800E ULV SPRAYER

## Operation Instructions

## Setting the Flow Rate

The 1800E sprayer is equipped with the Clarke Precision Delivery System (PDS) Flow Control.

The angular deflection of the cylinder of the pump with respect to the zero point on the calibration scale of the pump controls the flow rate and direction. With the cylinder pointer at 10 on the lower calibration scale, fluid will be passed from the front port to the rear port at 100% on the maximum rated volume. With the pointer at 10 on the upper calibration scale, fluid will pass from the rear port to the front port at a maximum rate. Set at 5 on the scale, flow rate will be 50% of maximum; at 4, it will be 40%, etc. The flow rate control setting may be changed at any time while the pump is operating or idle. Since the insecticide flows only in one direction, use only the half of the pointer scale numbers from 0 to 10 nearest the pump outlet port. The other half of the pump scale reverses the pumping direction. In other words, for positive flow, always move the pointer in the direction of the lower calibration scale (nearest the 0.64 cm. or 1/4 in. line) which is in the direction of the pump outlet port.

**NOTE:** This procedure is necessary only on the initial setting of a flow rate.

FIGURE 24: PUMP BOX

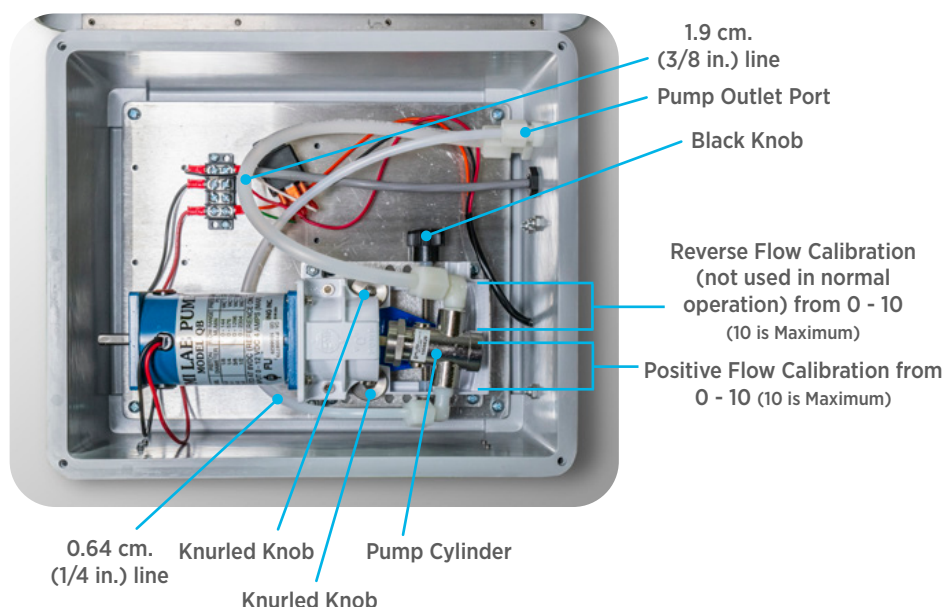
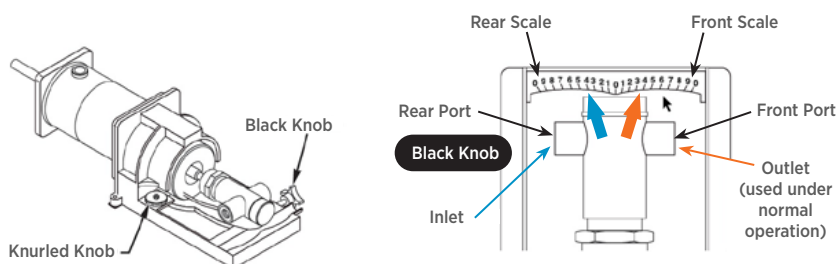


FIGURE 25: ADJUSTING THE FLOW SCALE



To set the flow rate, do the following:

1. Open the cover of the flow control box.
2. Loosen the pump pointer locking plate by loosening the two round knurled knobs, one on each side of the locking plate. Loosen only enough to move the pointer. The pointer should be moved against a slight pressure. Reference Figure 25.
3. Turn the black knob on the side of the pump to increase or decrease the flow setting. The flow scale is an arbitrary scale and is marked from 0-10 (zero to ten), which represents 0-100% of flow rate. Reference Figure 25.
4. Set the flow rate by following the instructions in the CALIBRATION section on pages 31-35. The correct flow rate, along with correct nozzle pressure, is one of the main criteria for good particle size. Always retighten the round knobs before checking the flow rate, as a loose pointer will affect the pump accuracy.

### Operation Instructions

#### Spraying

1. With the engine running, check to make sure the nozzle pressure is within the preset pressure range. The insecticide label will define the correct nozzle pressure needed to produce the optimum particle size. The 1800E sprayer is preset at the factory at 6 P.S.I. If a different nozzle pressure is required change the engine speed by adjusting the engine throttle.

2. To turn spray on: On the front of the sprayer, next to the Pressure Gauge, move the Spray/Flush valve switch to SPRAY. (Reference Figure 26) On the Remote Control, move the spray switch to ON position.

**(Reference Figure 27)**

3. To turn spray off: On the Remote Control, turn the spray off by moving the spray switch to the OFF position. **(Reference Figure 27)**

**NOTE:** On the initial start, it may take several seconds for the insecticide to move from the insecticide tank, fill the lines and start spraying. This is normal.

FIGURE 26: PRESSURE GAUGE SPRAY/FLUSH VALVE SWITCH



FIGURE 27: REMOTE CONTROL





## CLARKE LECO 1800E ULV SPRAYER

## Operation Instructions

## Flushing Instructions

It is absolutely necessary to use a flushing solution that will cut your insecticide. Do Not use diesel oil as a flushing solution. It is a simple matter to flush the system as follows:

1. If the engine is not running, start the engine as explained in the START-UP section on **page 25**.
2. On the Pressure Gauge panel, turn Spray/Flush valve switch to FLUSH.
3. On the Remote Control Box, turn the Spray switch ON. When the flushing solution starts spraying from the nozzle, spray for 2 to 3 minutes. This is ample time to flush the system.
4. After 2 to 3 minutes turn the Spray switch OFF on the Remote Control Box. It is highly recommended that the sprayer be shut down immediately after flushing to prevent insecticide from being accidentally drawn into the system.

## Shut-Down

Before shutting down the engine **be sure the spray is turned off** as explained in the SPRAYING section on page 28. To stop the engine, turn key off on engine. (Reference Figure 29) After stopping the engine, place the Spray/Flush valve switch on the sprayer to SPRAY. The 1800E is now ready for spraying the next time it is used.

## Operating Instruction Summary

- Pre-Start as shown on page 22-24.
- Start-Up as shown on page 25.
- Pressure Gauge/Nozzle Air Pressure page 26.
- Setting the Flow Rate as shown on page 27.
- Spraying as shown on page 28.
- Flushing as shown on page 29.
- Shut-Down as shown on page 29.

FIGURE 28: SPRAY/FLUSH VALVE



FIGURE 29: ENGINE KEY



**WARNING:** If the sprayer's KEY switch is in the ON position the Pump can INADVERTENTLY be activated by flipping the REMOTE CONTROL switch to SPRAY ON. To avoid flooding chemical into the blower DO NOT RUN PUMP if your engine is not running. Exception is when CALIBRATING; the FLUID LINE DISCONNECTED FROM NOZZLE AND YOU ARE INTENTIONALLY PUMPING FLUID INTO A CONTAINER.

**NOTE:** The engine does not have to be running when performing the calibration of flow rate into a container. See the CALIBRATION section on pages 31-35 for calibrating to a correct flow rate. The flow rate needs only be set initially when a new flow rate is desired or a different insecticide is being used.



NOTES

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CLARKE LECO 1800E ULV SPRAYER

Calibration

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### Calibration and Methods

Calibration is a system of accurately checking how much insecticide is dispersed in a certain time period. In order to do this, a stopwatch, simple container and a graduated cylinder are needed.

There are two methods of obtaining a calibrated sample, the Timed Method and the Pre-Determined Amount Method.

#### Timed Method

The Timed Method consists of taking a timed insecticide sample while using a stopwatch. This method measures the actual flow for a specified period of time, (such as 1 minute) and determines the exact flow rate.

**NOTE:** The longer the period of time used on checking, the more accurate the calibration will be. While this method is fairly accurate, it is sometimes difficult to watch the sprayer, the cylinder and the stopwatch all at the same time.

### Calibrating using the TIMED METHOD:

1. Disconnect the insecticide discharge line from the nozzle and place in a suitable container. Reference Figures 30 and 31. **Do not allow insecticide to be discharged into the nozzle.**
2. Be sure the Spray switch on the Remote Control is in the **OFF** position.
3. Move the Select Spray/Flush switch (on the Pressure Gauge panel) to the SPRAY position.
4. No need to start the engine. Just turn the key on the engine to ON. (With the key switch to ON the pump will run regardless whether or not the engine is actually running. To Calibrate, the engine doesn't need to run.)
5. Turn the spray ON and let the insecticide flow into the container. Be sure the sprayer's insecticide lines are free from air bubbles. On initial start-up, it may be useful to temporarily move the cylinder pointer to the pump box to a higher scale reading to get the system primed and purged of any air bubbles. *Reference Figure 34 on page 33.*



FIGURE 30: DISCONNECTING INSECTICIDE LINE



FIGURE 31: DISCHARGING AIR BUBBLES

## CLARKE LECO 1800E ULV SPRAYER

### Timed Method cont.

6. Set an arbitrary flow rate by moving the cylinder pointer that is in the Pump Box. To move the cylinder pointer, loosen the two knurled knobs holding the pointer in place and turn the adjustment knob on the side of the cylinder pointer housing to set the pointer to an arbitrary setting and lock the pointer in place. The pointer should be moved against a slight pressure. Loosen the two knurled knobs only enough to move the pointer. **Reference Figure 34.**



FIGURE 32:  
MEASURING THE  
ACTUAL FLOW

7. Measure the actual flow for a specified period of time by quickly moving the insecticide discharge line from the container to the graduated cylinder at the start of timing. **Reference Figure 32.** When the time period is up, quickly move the insecticide discharge line back into the container.

8. Turn the spray OFF.

9. Determine the exact flow rate by dividing the measured (actual) amount collected in the graduated cylinder by the time period. This will give volume of flow per time of flow, i.e. milliliters per minute (ml./min.) or fluid ounces per minute (oz./min.).

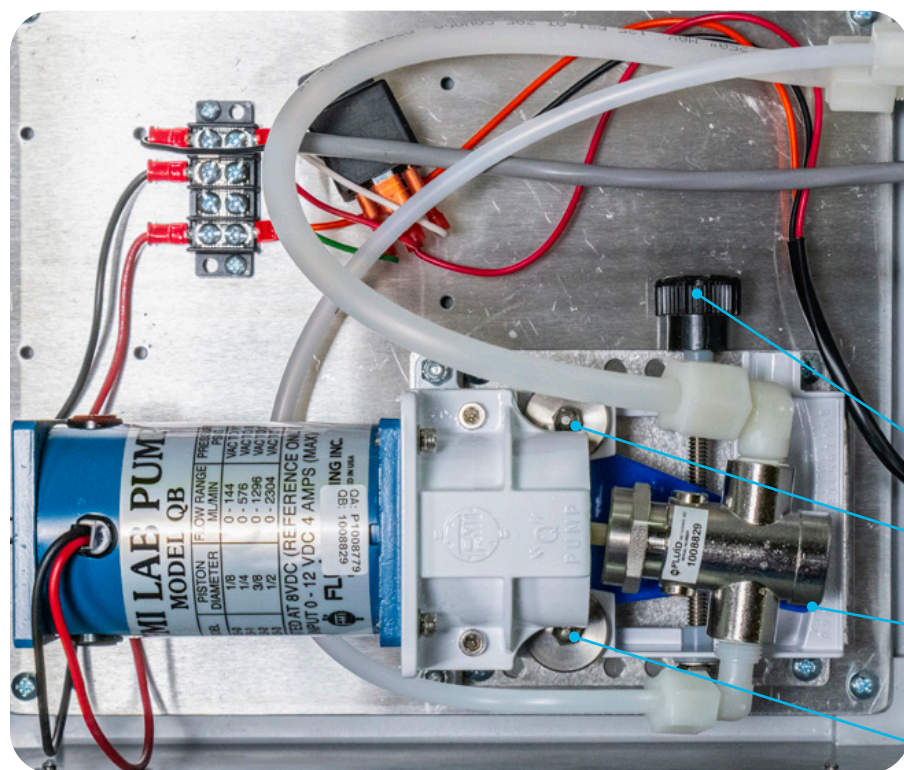
10. If this is not the desired flow rate, repeat steps 5 through 8 above and by trial and error, continue to move the cylinder pointer until the desired flow rate is achieved.

11. When the desired flow rate is obtained, check to make sure the cylinder pointer is locked into place, close the pump box cover and shut down the sprayer.

12. Return the insecticide discharge line to the nozzle. **Reference Figure 33.**



FIGURE 33: RECONNECTING  
INSECTICIDE LINE



Adjustment Knob

Knurled Knob

Cylinder Pointer

Knurled Knob

FIGURE 34: PUMP BOX CYLINDER POINTER & KNOBS



### PRE-DETERMINED AMOUNT METHOD

Another method is to measure an amount of fluid to be pumped and then time how long it takes to collect this amount. Since this method allows you to simply push a stopwatch at the beginning and end of the amount, you only need to be watching the graduated cylinder. This method allows you to use larger samples since you are not dependent on time. This is the Pre-Determined Amount Method.

#### To calibrate using the PRE-DETERMINED AMOUNT METHOD:

**EXAMPLE:** Assume you decide to calibrate by collecting a 100 milliliter (ml.) sample. You simply choose a point on the graduated cylinder (such as the 130 ml. mark) and start the stopwatch as the fluid level passes this mark. When the fluid level passed the mark that is 100 ml. higher (in this case, the 230 ml. mark), stop the stopwatch.

1. Disconnect the insecticide discharge line from the nozzle and place in a suitable container. Do not allow insecticide to be discharged into the nozzle of an idle sprayer. *Reference Figure 31 on page 32.*
2. Be sure the Spray switch on the Remote Control is in the OFF position.
3. Move the Select Spray/Flush switch (on the Pressure Gauge panel) to the SPRAY position.
4. Start the sprayer according to the Operation Instructions and continue to the section on setting the flow rate.
5. Turn the spray ON and let the insecticide flow into the container. Be sure the sprayer's insecticide lines are free from air bubbles. On initial start up, it may be useful to temporarily move the cylinder pointer to a higher scale reading to get the system primed and purged of any air bubbles. *Reference Figure 34 on page 33.*

6. Set an arbitrary flow rate by moving the cylinder pointer. To move the cylinder pointer, open the pump box cover, loosen the two knurled knobs holding the pointer in place and turn the adjustment knob on the side of the cylinder pointer housing to set the pointer to an arbitrary setting and lock the pointer in place. The pointer should be moved against a slight pressure. Loosen the two knurled knobs only enough to move the pointer. *Reference Figure 34 on page 33.*

7. Quickly move the insecticide discharge line from the container to the graduated cylinder. As soon as the fluid level passes the pre-determined point on the graduated cylinder, start the stopwatch. When the fluid level passes a mark, such as 100 ml. higher, stop the stopwatch.

8. Quickly move the insecticide discharge line from the graduated cylinder to the container.

9. Turn the spray OFF.

**NOTE:** If it takes 38 seconds to spray this 100 ml. sample, you will need to adjust to what would have sprayed in one minute.  $60 \text{ seconds} \div 38 \text{ seconds} = 1.57$  times as much in one minute. The 100 ml. sample times 1.57 = 157 ml. in one minute. To change ml. to fluid ounces (oz.) divide ml. by 29.57. There are 29.57 milliliters in one fluid ounce.  $157 \text{ ml.} \div 29.57 = 5.3 \text{ oz./min.}$

**If this is not the desired flow rate, repeat steps 5 through 8 above. By trial and error, continue to move the cylinder pointer until the desired flow rate is achieved.**

10. When the desired flow rate is obtained, check to make sure the cylinder pointer is locked into

place, close the pump box cover and shut down the sprayer.

11., Return the insecticide discharge line to the nozzle.

CLARKE LECO 1800E ULV SPRAYER

NOTES

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Maintenance

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## CLARKE LECO 1800E ULV SPRAYER

### General

Replace worn or damaged parts on the Clarke 1800E ULV Sprayer.

Service the engine according to Engine Maintenance section (**page 40**).

Service the blower according to the Blower Maintenance section (**pages 40-41**).

### Daily

Visually check the ULV sprayer each day before use, and make any necessary adjustment and/or major repairs.

Start up and warm the engine, and check the nozzle air pressure as indicated on the pressure gauge on the machine. **If the pressure varies more than + or - 1/2 PSI from the preset pressure range**, readjust the nozzle air pressure. See *Adjusting Nozzle Air Pressure* (**page 26**).

After use of the ULV sprayer, flush the insecticide system with a suitable flushing solution.

**NOTE:** It is highly recommended that a maintenance program be established to assure the performance of your machine.



### Every 50 Hours

**Check all bolts and fasteners**, and tighten if necessary.

**Check all gasoline hoses, insecticide lines and fittings** for cracks, leaks or wear. Replace if needed.

**Check all nozzle parts for wear or physical damage.** Replace damaged parts.

**Remove and clean the element in the filter-silencer** as follows. *See Figure 35:*

1. Remove wing nut and washer.
2. Remove the cover and filter element.
3. Clean the inside of the housing and the filter as required. If the element is damaged or bent, replace with a new one.
4. Replace the filter element, cover, washer and wing nut.



FIGURE 35: FILTER ELEMENT

# CLARKE LECO 1800E ULV SPRAYER

## Every 100 Hours

**NOTE:** 100 hours is an estimated amount of time. Depending upon formulation used, more frequent intervals might be necessary.

**Clean the insecticide filter.** If this filter becomes clogged, the insecticide flow will be restricted or stopped. There is a fine mesh screen located in the cylindrical housing. This screen can be removed for inspection and/or cleaned by manually unscrewing the housing bowl. *See Figure 36.*

**Check the battery voltage.** Test the battery with a voltmeter. Connect the positive (+) meter lead to the positive (+) battery terminal. Connect the negative (-) meter lead to the negative battery terminal. Set the meter on Volts. If the meter reads **11.5 - 12 or more Volts**, the battery voltage is okay. **If the meter reads less than 11.5 Volts**, check the specific gravity of the battery electrolyte.

**Replace the in-line gasoline filter.** Using pliers, loosen the tension on the two hose clamps and slide them off of the filter barbs. Remove the old filter from the gasoline hose. Install a new filter and replace the hose clamps. New filters can be installed with the direction of flow going either way. Never reverse an old filter. *See Figure 37.*

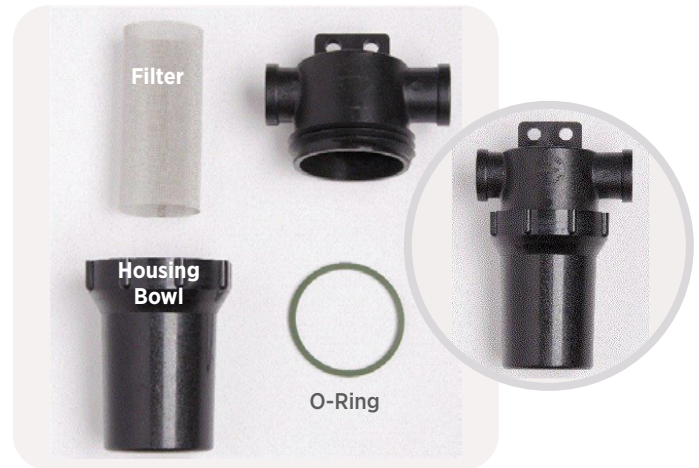


FIGURE 36: INSECTICIDE FILTER



FIGURE 37: IN-LINE GASOLINE FILTER

Engine

Lubricate and service the engine according to the engine manual. We recommend the use of high quality SAE 30-W detergent oil classified "for service SF, SG, SH" (such as Briggs & Stratton® 10005 or 100028) when operating at temperatures above 4.5° C. Below 4.5° C, SAE 10 W-30 or 5 W-30 oil is acceptable.

Recommended engine oil viscosity:

TEMPERATURE	OIL VISCOSITY.
above 4.5° C	SAE 30-W
below 4.5° C	SAE 10 W-30 SAE 5 W-30

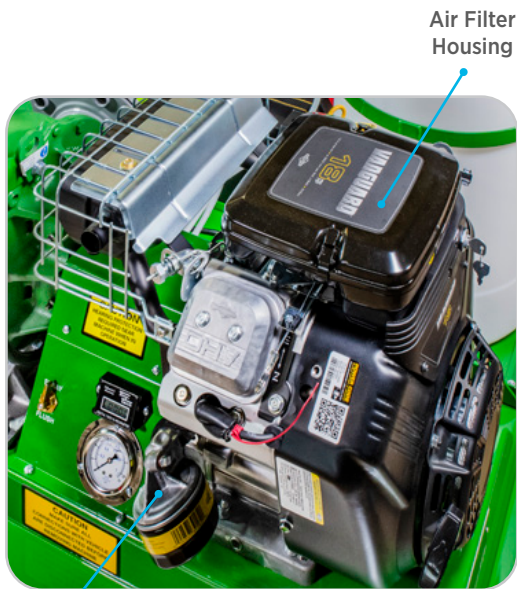


FIGURE 38: ENGINE FILTERS

Blower

A simple but very effective lubrication system is employed on the blower. At the drive shaft end, the bearings are grease lubricated using hydraulic pressure relief fittings. These relief fittings vent any excess grease, preventing pressure build-up on the seals. A restriction plug and metering orifice prevent loss of lubricant from initial surges in lubricant pressure, but permit venting excess lubricant under steadily rising pressures.

The blind end bearings and timing gears are enclosed by gear housing, located opposite the drive end of the blower. The lower timing gear functions as an oil slinger, carrying lubricant to the upper timing gear and providing splash lubricant for the bearings. Pressure within the gearbox is vented through the breather plug.

To fill the gearbox, remove the breather plug and the oil overflow plug. Fill the reservoir up to the overflow hole. Place the breather and the overflow plug into their respective holes. *See Figure 39, Page 41.*

Proper lubrication is usually the most important single consideration in obtaining maximum service life and satisfactory operation from the unit.

Under normal conditions, the oil level on the non-drive end of the blower should be checked **every 25 hours** of operation. Change the oil after the first 100 hours; then as per the intervals on the oil viscosity chart, *on page 41.* Under extremely hot or dusty operation conditions, the oil level should be checked more often and may require more frequent changes.



# CLARKE LECO 1800E ULV SPRAYER

## Blower cont.

**Every six months**, the oil breather plug should be removed, cleaned in solvent, and blown out with clean compressed air to provide unobstructed venting. Shaft bearings at the drive end of the blower are lubricated, and each bearing housing is equipped with pressure type grease fittings, and pressure type relief fittings. (When servicing drive end bearing, use a premium grade, petroleum base grease with high temperature and moisture resistance along with good mechanical stability.) Using a pressure gun, force new lubricant into each drive end bearing housing until traces of clean grease comes out of the relief fittings. Grease should be added using a hand-operated grease gun to the drive end bearings at varying times, in intervals depending on duty cycle.

## Recommended greasing intervals:

1. With the blower operating 8 hours per day, grease should be added every two weeks.
2. With the blower operating 16 hours per day, grease should be added every week.

**NOTE:** More frequent intervals may be necessary depending on the grease operation temperature and under unusual circumstances.

## Recommended blower oil viscosity:

TEMPERATURE	OIL VISCOSITY.
above 4.5° C	SAE 30
below 4.5° C	SAE 30

The oil used must be of the proper viscosity, and certified to meet M-S type specifications of heavy duty type. Use a National Lubricating Grease Institute Number 2 (NLGI-2) premium grade grease, such as Royal Purple 01312 High Performance Synthetic Grease. (Lithium-based greases are not compatible nor approved.) **Do not use multiple viscosity oils.** **Do not use automotive type lubricants**, as they are not formulated as non-detergent, rust inhibiting, anti-foaming and of correct viscosity.

FIGURE 39: BLOWER LUBRICATION



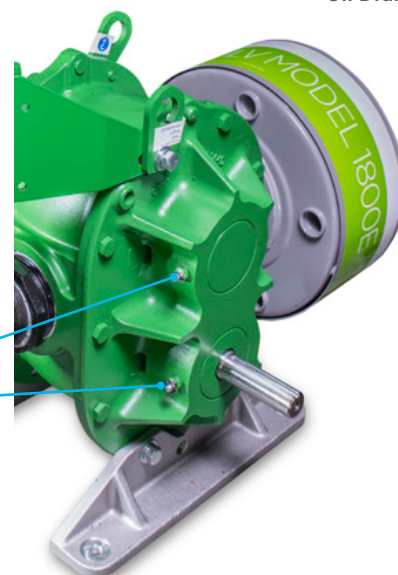
Oil Breather Plug



Oil Over Flow Plug

Oil Drain Plug

Blower Grease Fitting





### Coupler

To replace the engine or blower coupling or the coupling sleeve:

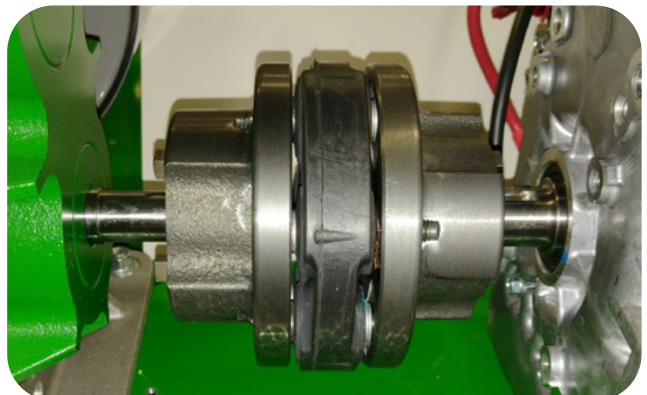
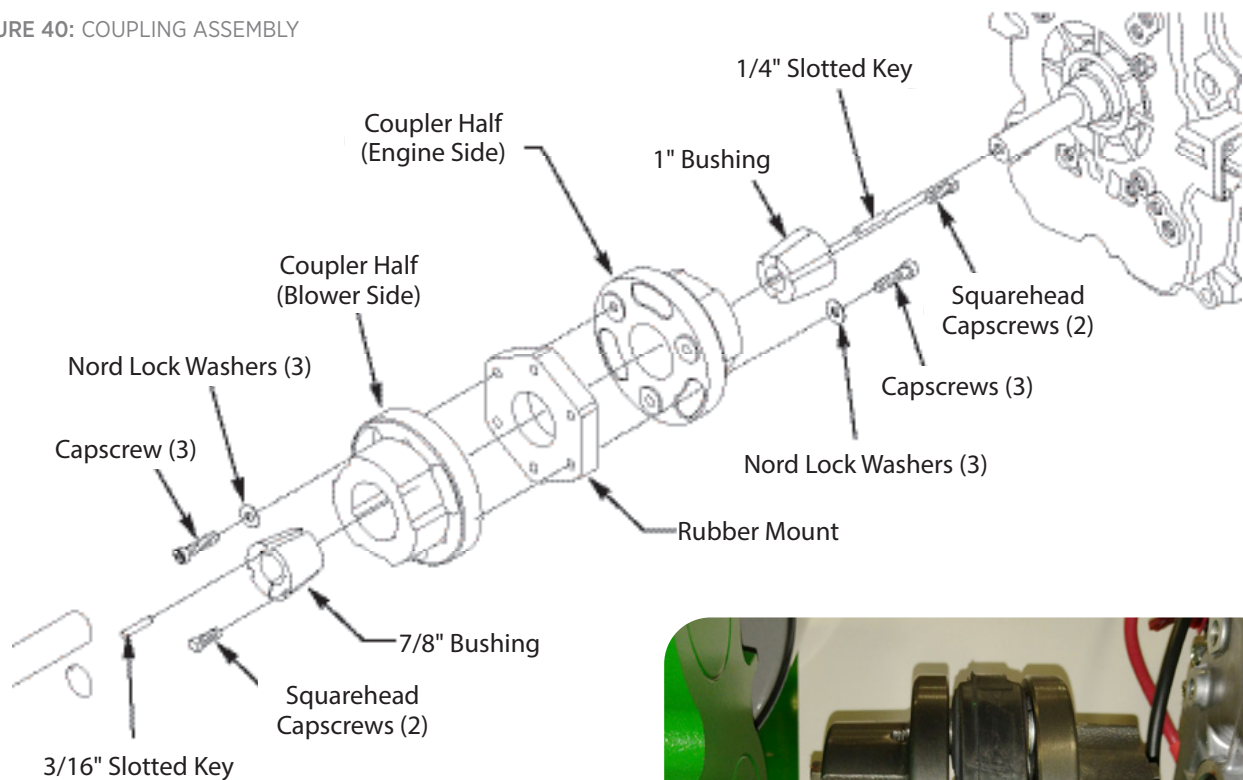
1. Disconnect the negative (black) battery cable on the battery.
2. Remove the coupling guard cover. (4 screws, internal washers)
3. Remove the pressure gauge panel assembly. (2 screws, internal washers) and set aside toward engine assembly.

**NOTE:** You do not need to disconnect hoses and wires on sprayer.

4. To remove coupling halves, remove the 6 capscrews with nord lock washers (3 on the blower side, 3 on engine side). Then remove the 4 squarehead capscrews located on the bushings, inside the coupler halves. (2 on the blower side, 2 on engine side). Take 1 squaredhead capscrew and tighten in the center hole of both the blower and engine bushing. Break loose from the shaft. **Reference Figure 40.**

**NOTE:** If these couplings are hard to remove, the couplings are rusted to the shafts. Take some penetration oil such as Marvel Mystery oil and spray onto shafts to loosen the rust from shafts and bushings.

FIGURE 40: COUPLING ASSEMBLY



# CLARKE LECO 1800E ULV SPRAYER

## Coupler cont.

5. Remove blower from the mainframe (4 nuts, bolts, lock washers). Carefully remove rust, dirt, burrs, etc. from both engine and blower shafts using a file or emery cloth.
6. Take the engine coupler half and place a 1" bushing into the center of the coupler aligning the 3 open holes.

Take 2 squarehead capscrews and screw finger tight into the two opposite holes across from each other on the bushing. Take 1/4" slotted key, install between bushing and slide coupler half onto the engine shaft. Leave loose, go to step 7. **Reference Figure 41.**



FIGURE 41: BUSHING/SHAFT INSTALLATION

7. Take the blower coupler half and place a 7/8" bushing into the center of coupler aligning the 3 hole openings. Take 2 squarehead capscrews and screw finger tight into the two opposite holes across from each other on the bushing. Take 3/16" slotted key, install between bushing and slide coupler half onto the blower shaft, make sure bushing and end of blower shaft are flush, then begin to tighten 2 squarehead capscrews on bushing and coupler turning equally onto the blower shaft. Torque to 14 ft. lbs. Take rubber mount and install 3 capscrews and nord lock washers to coupler half and tighten. Torque to 25 ft. lbs.
8. Install blower to main frame using 4 bolts, washers, lock washers, nuts. Finger tighten.
9. With both the engine and blower in place, slide engine coupler towards blower coupling and tighten equally together using 3 capscrews and nord lock washers. Torque to 25 ft. lbs. Take remaining 2 squarehead capscrews on engine bushing and coupler and tighten equally. Torque to 14 ft. lbs.
10. Check parallel alignment by placing a straight edge across the two coupling flanges and measure the maximum offset at various points around the edge of the coupling flanges without rotating the coupler flanges. Attempt to eliminate any measurable offset.

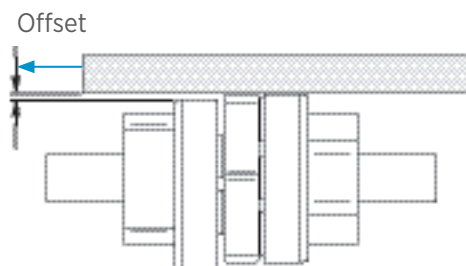


FIGURE 42: PARALLEL ALIGNMENT

### Coupler cont.

11. Check angular alignment with micrometer, vernier, or caliper. Measure from the outside of the one flange to outside of the other at intervals around the edge of the coupling flanges. Determine the maximum and minimum dimensions without rotating the flange couplings. If correction is necessary, be sure to recheck the parallel alignment. Attempt to eliminate any measurable offset.

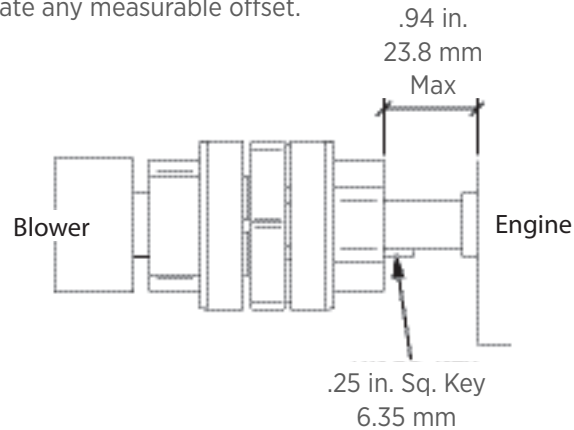


FIGURE 43: ANGULAR ALIGNMENT

12. Tighten 4 nuts on blower to main frame after alignment is completed. Recheck angular and parallel alignment.
13. Install pressure gauge panel assembly.  
(2 screws, internal washers)
14. Install the coupling guard cover.  
(4 screws, internal washers)
15. Connect the negative battery cable.

**NOTE:** The coupling, coupling rubber mount and connected equipment will normally operate longer and more economically when the couplings are carefully aligned.

### CAUTION

Coupling sleeve may be thrown from the coupling assembly with substantial force when the couplings are subjected to a severe shock load or abuse.

## CLARKE LECO 1800E ULV SPRAYER

### Prolonged Storage

#### To prepare for storage:

1. Flush the ULV sprayer for at least 10 minutes.
2. Drain the insecticide tank and thoroughly clean it.
3. Drain the flush tank and thoroughly clean it.
4. Pour one quart of light-weight oil into the flush tank. Engine oil can be used.
5. Pour enough light-weight oil into the insecticide tank to cover the bottom of the drop pipe.
6. Spray and flush the ULV sprayer until the oil in the insecticide and flush tanks is completely through the system and sprays out of the nozzle.

### 7. Engine

- a. All fuel should be removed from the tank. Run the engine until it stops from lack of fuel.
  - b. While the engine is still warm, drain the oil from the crankcase. Refill with fresh oil.
  - c. Remove the spark plugs and add a tablespoon of engine oil into the spark plug holes. Install the spark plugs, but do not connect the plug leads. Crank the engine slowly, 2-3 revolutions to distribute the oil. Replace the plug leads.
  - d. Clean dirt and chaff from the cylinders, cylinder head fins, engine blower housing, rotating screen and muffler areas.
  - e. Clean all other exterior surfaces of the engine.
  - f. Spread a light film of oil over any exposed metal surfaces of the engine to prevent rust.
8. Remove and clean the filter-silencer element and housing. **See Figure 45 on page 46.**

*Continued on page 46.*

### Prolonged Storage (continued)

#### 9. Blower

- a. Remove the oil breather plug, clean in solvent and blow out with clean, compressed air.
- b. Drain the oil from the oil reservoir and refill with fresh oil. Grease the bearings on the drive end.
- c. Remove the filter-silencer. If the filter-silencer is hard to unscrew from the blower inlet port, use penetrating oil to loosen the rusted threads.
- d. Pour one pint of lubrication oil (SAE-40) in the blower intake. **(Figure 44)**
- e. With the engine ignition switch off, use the starter to turn the blower slowly, so that the entire inner surface of the blower is coated with oil. This will prevent a coat of rust from forming in the blower, and in all probability will save the cost of a new blower or an expensive repair bill.
- f. Reinstall the filter-silencer.

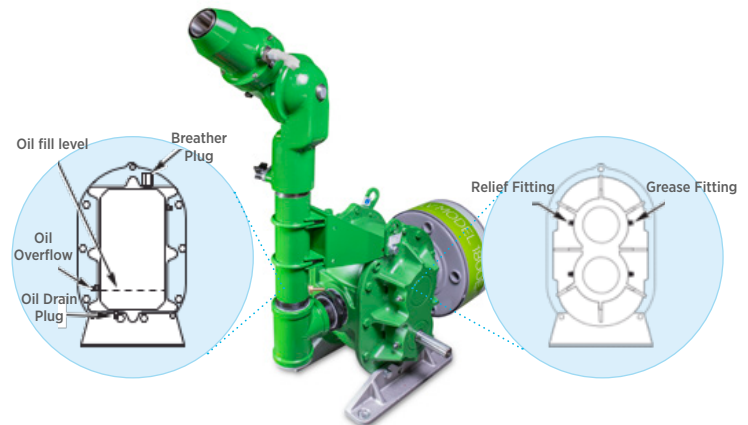


FIGURE 44: BLOWER LUBRICATION

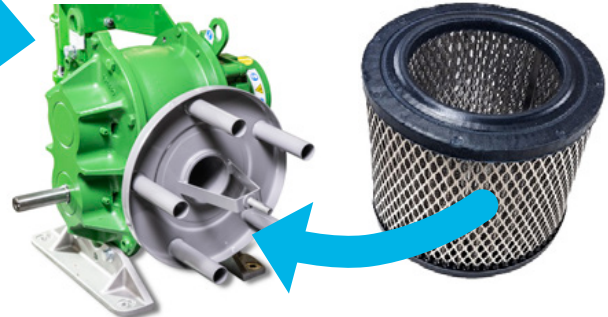
10. Disconnect and charge the battery, and store as recommended by the manufacturer.
11. Clean all insecticide residue and oil off the Clarke 1800E ULV Sprayer, and repaint if necessary.
12. Store Clarke 1800E ULV Sprayer in a clean, dry area under suitable cover, protected from the elements.



Air filter/silencer with cover



Remove wing nut from filter cover



Lobe chamber & Air Filter

FIGURE 45: BLOWER AIR FILTER/SILENCER

**CAUTION:** A major problem can be the blower rusting up over the winter. If moisture gets into the air chamber, the rotary lobes will rust together, preventing the blower from turning. When this happens, either the engine or blower shaft may be sheared when the engine is started. Following the storage recommendations of this manual can prevent this.

Remove the air filter cover, and pour light-weight penetration lubricant into the lobe chamber. This will usually loosen a rusted blower. The blower may need to sit for a day or two with the penetration oil in it before the engine is started. When trying to free the blower, don't turn the ignition switch on. Just momentarily activate the Start switch for less than 2 seconds until the blower turns. In extreme cases, the blower shaft may have to be turned by hand with the pipe wrench to loosen the lobes. Care must be taken not to damage the blower shaft with the pipe wrench. Once the blower turns, the engine can be started and the lobes should hone themselves free of rust.



CLARKE LECO 1800E ULV SPRAYER

NOTES

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Plumbing and Fluid Path

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## CLARKE LECO 1800E ULV SPRAYER

### Formulation Tank

On the pressure gauge, move the 3-way Valve Switch to SPRAY. Moving the valve to SPRAY connects the formulation tank to the nozzle. The 9.5 mm (3/8 in) tube coming from the 3-way spray/flush valve going to the pump is used for transporting both the Flush and the Insecticide depending on the position of the valve.

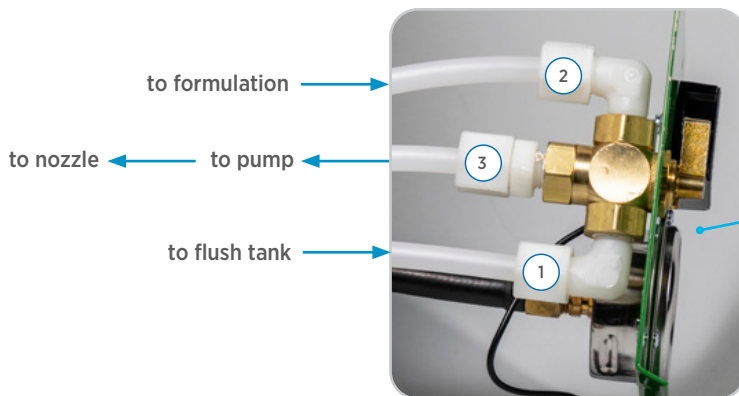
1. Insecticide leaves formulation tank and enters filter/strainer.



2. Insecticide then travels to the 3-way valve located behind the pressure gauge panel.

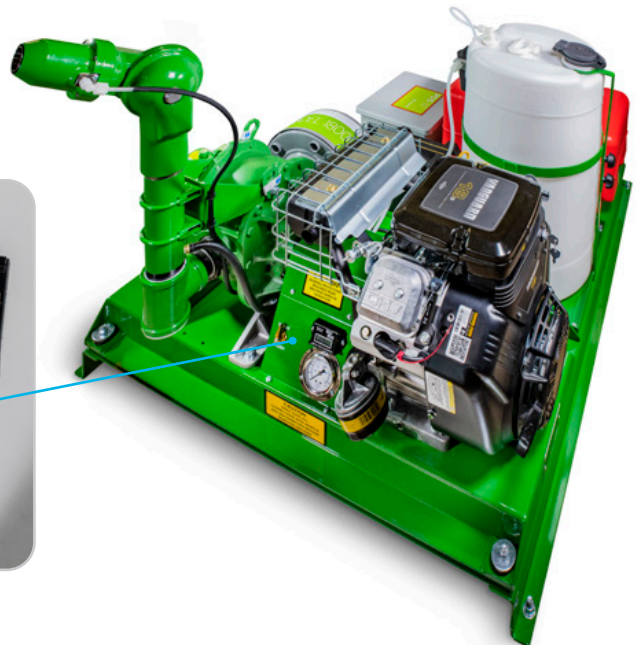


3-way valve switch



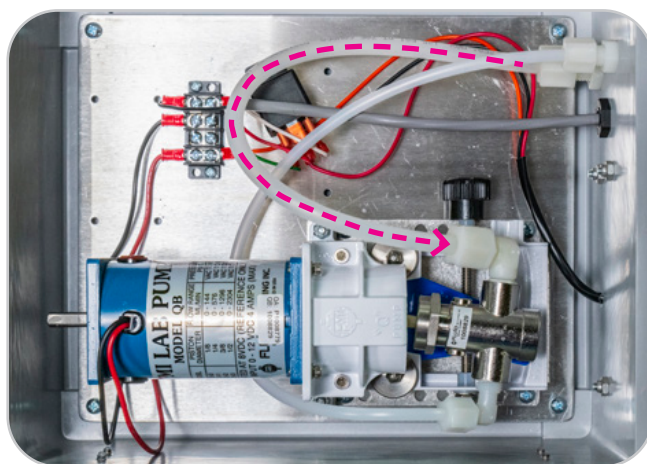
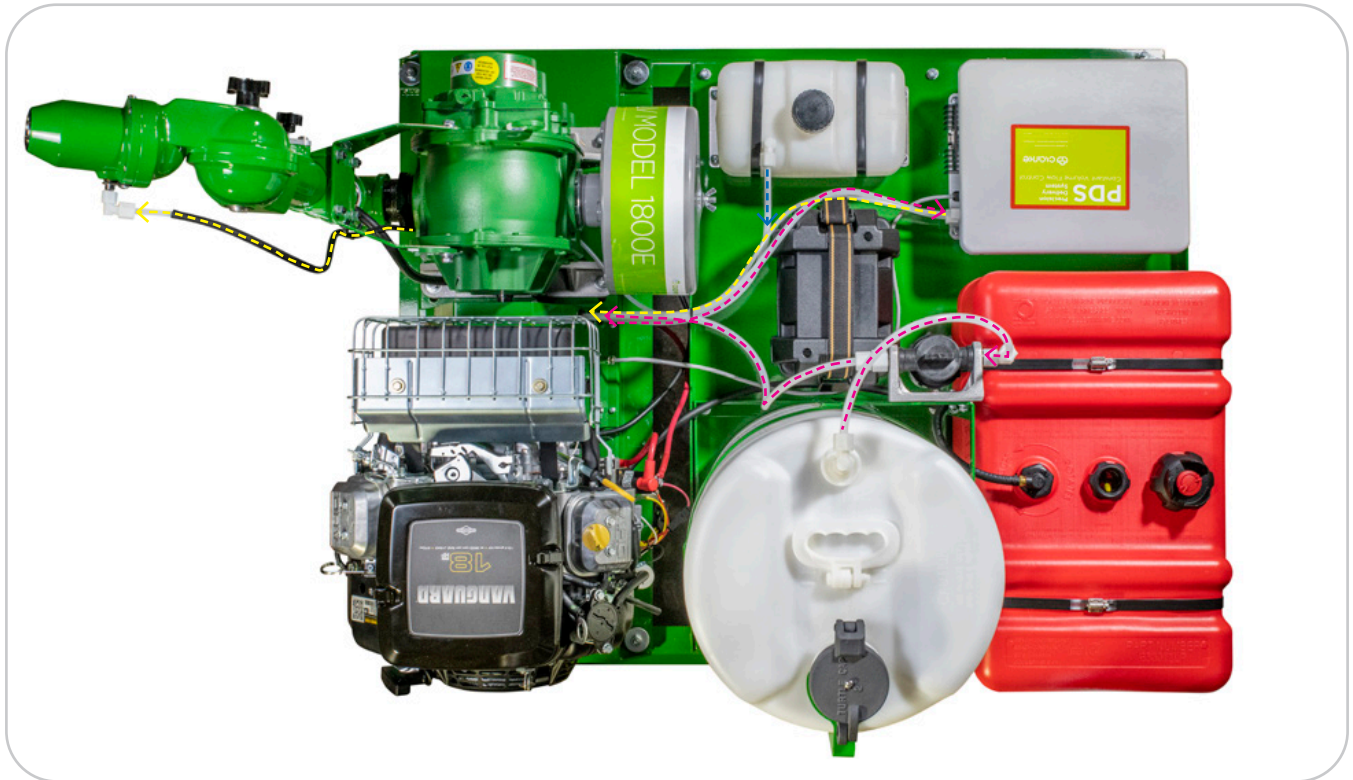
Back of 3-way valve switch

Back of 3-way valve switch

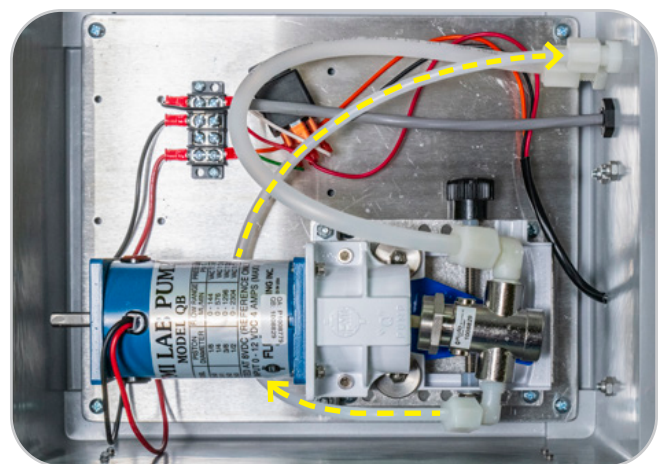


3. Insecticide travels into port 3 flows out of port 1 towards pump box.

### Formulation Tank



4. Insecticide enters in the pump box traveling through 3/8 in (9.5 mm) tubing into the pump.



5. Then leaves the pump box through a 1/4 in (6.35 mm) tubing to the 3-way valve and then into the nozzle where it is mixed with air to make droplets.



## CLARKE LECO 1800E ULV SPRAYER

### Flush Tank

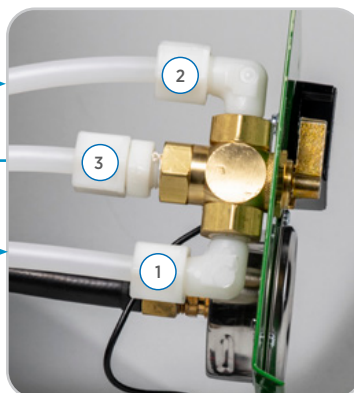
1. Flushing solution travels from flush tank to the 3-way valve entering into port 2 and out of port 3 then travels through pump into the nozzle.



3-way valve switch

On the pressure gauge, move the 3-way Valve Switch to FLUSH. Moving the valve to FLUSH connects the formulation tank to the nozzle. The 9.5 mm (3/8 in) tube coming from the 3-way spray/flush valve going to the pump is used for transporting both the Flush and the Insecticide depending on the position of the valve.

to formulation →  
to nozzle ← to pump ←  
to flush tank →



Back of 3-way valve switch



NOTES

A large rectangular area filled with a uniform grid of small, light blue dots, intended for handwritten notes.

## CLARKE LECO 1800E ULV SPRAYER

## Parts Book and Components

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## PARTS AND COMPONENTS

### CLARKE LECO 1800E ULV SPRAYER

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326604	10296.1	Formulation Tank Assembly	63
323569	12829	Filter Assembly	64
323618	13118	Pump Box Assembly	65
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321183	12313	Remote Control Box Assembly	67
323783	12790	Engine Assembly	59
321430	12645	6 Gauge Red Cable, 63.5 cm (25 in.)	59
321498	12769	6 Gauge Black Cable, 63.5 cm (25 in.)	59
332148	NA	Panel Gauge Assembly	60
321795	12894	Tachometer and Hour Meter with Signal Pickup Wire	60
320268	10550	Pressure Gauge (0-15 PSI)	60
320523	10969	3-Way Valve	60
319576	10181	Fitting 90°, 9.5 mm (3/8 in) tube, 1/4 NPT male	60
320359	10834	Fitting, 9.5 mm (3/8 in) tube, 1/4 NPT male	60
323733	13083	Connection Panel Assembly	61
320193	10421	Circuit Breaker, 50V, 10A	61
321373	12621	Rubber Grommet, 1.59 cm (5/8 in.)	61
323717	12898	Harness Assembly	61

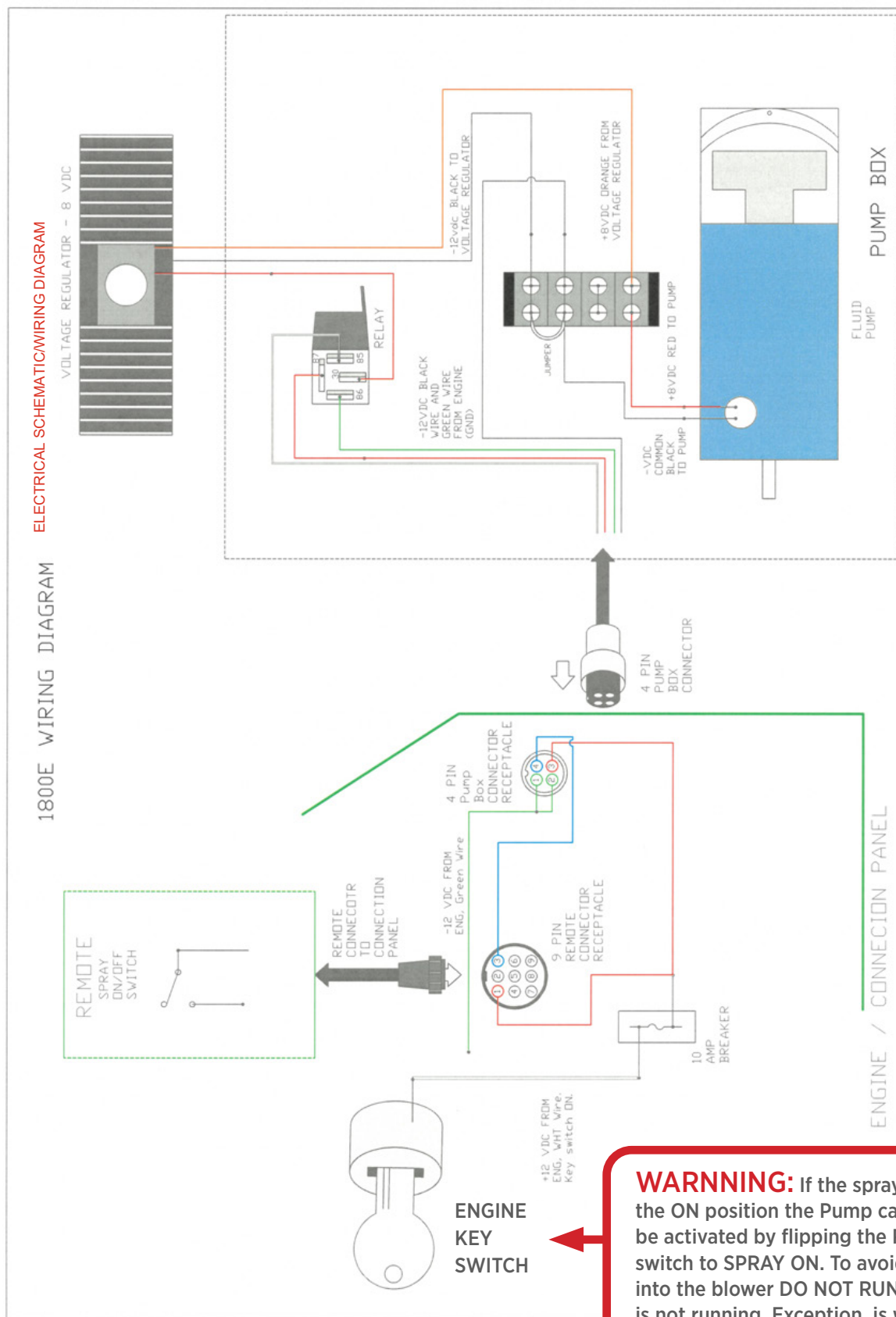
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323791	12763	Blower Assembly	62
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326604	10296	Formulation Tank Assembly	63
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319956	10306	Screw on Knobs	63
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319419	10118	Tank Cap Assembly	63
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## CLARKE LECO 1800E ULV SPRAYER

## Parts Numbers

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319568	10180	Bulkhead Union Jaco, 9.5 mm (3/8 in) Fitting with nut	65
319534	10177	Pump, Electric	65
319576	10181	90° Fitting, 9.5 mm (3/8 in) tube, 1/4 NPT Male	65
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323577	10336	Pickup Tube Assembly	66
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321183	12313	Remote Control Box Assembly includes 4.6 m/15 ft. cable	67
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319708	10209	45.4 Liter (12 Gallon) Gas Tank	68
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349341	NA	Remote Control Box Assembly with 9 m/30 ft. Cable	68
332669		<b>Spare Parts Kit</b>	<b>69</b>



**WARNING:** If the sprayer's KEY switch is in the ON position the Pump can INADVERTENTLY be activated by flipping the REMOTE CONTROL switch to SPRAY ON. To avoid flooding chemical into the blower DO NOT RUN PUMP if your engine is not running. Exception is when CALIBRATING; the FLUID LINE DISCONNECTED FROM NOZZLE AND YOU ARE INTENTIONALLY PUMPING FLUID INTO A CONTAINER.



## CLARKE LECO 1800E ULV SPRAYER

### 1800E Wiring and Connector Detail

#### ENGINE CONNECTIONS

CONNECTOR WIRE	DESTINATION / FUNCTION
Key Switch	<b>WHITE</b> wire brings +12vdc to 10 Amp Breaker, when Key is on
Engine Ground	<b>GREEN</b> wire brings -12VDC (gnd) to Pins 1, 2 of 4 Pin connector

#### REMOTE SPRAY ON/OFF (9 PIN REMOTE CONNECTOR TO 9 PIN RECEPTACLE ON CONNECTION PANEL)

PIN NUMBER	RECEPTACLE DESTINATION/FUNCTION
Pin 1	Pin 1, <b>RED</b> wire, "Fused" +12 vdc from 10 Amp Breaker
Pin 2	Not used
Pin 3	Pin 3, <b>BLUE</b> wire brings switched +12 vdc to Pin 4 of 4 Pin connector
Pin 4	Not used
Pin 5	Not used
Pin 6	Not used
Pin 7	Not used
Pin 8	Not used
Pin 9	Not used

#### PUMP BOX (4 PIN PUMP BOX CONNECTOR TO 4 PIN RECEPTACLE ON CONNECTION PANEL)

PIN NUMBER	RECEPTACLE DESTINATION/FUNCTION
Pin 1	Pin 1 <b>BLACK</b> wire brings -12VDC (gnd)
Pin 2	Pin 2 <b>GREEN</b> wire brings -12VDC (gnd)
Pin 3	Pin 3 <b>RED</b> wire brings "Fused" +12 vdc from 10 Amp Breaker
Pin 4	Pin 4 <b>WHITE</b> wire brings Remote switched +12 vdc from 10 Amp Breaker

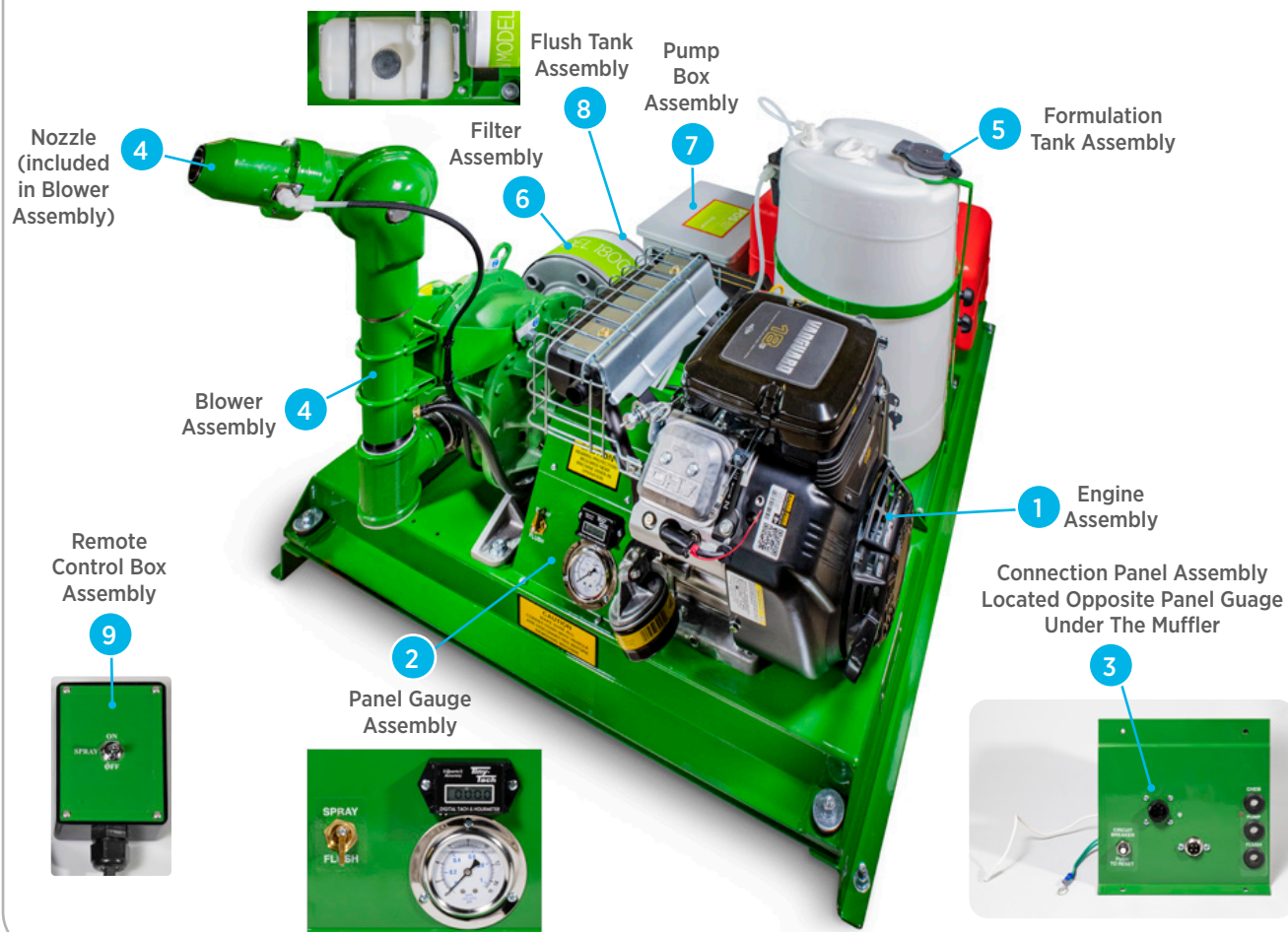
#### VOLTAGE REGULATOR (PUMP BOX)

WIRES	RECEPTACLE DESTINATION/FUNCTION
<b>RED</b>	<b>RED</b> wire supplies remote switched +12 vdc from 10 Amp Breaker
<b>BLACK</b>	DC common (gnd)
<b>ORANGE</b>	Regulated +8VDC

## Main Assembly No. 323535

POS	QTY	DESCRIPTION	PART NO.
1	1	Engine Assembly	323783
2	1	Panel Gauge Assembly	332148
3	1	Connection Panel Assembly	323733
4	1	Blower Assembly (includes Nozzle Assembly)	323791
5	1	Formulation Tank Assembly	326604
6	1	Filter Assembly	323569
7	1	Pump Box Assembly	323618
8	1	Flush Tank Assembly	323585
9	1	Remote Control Box Assembly	321183

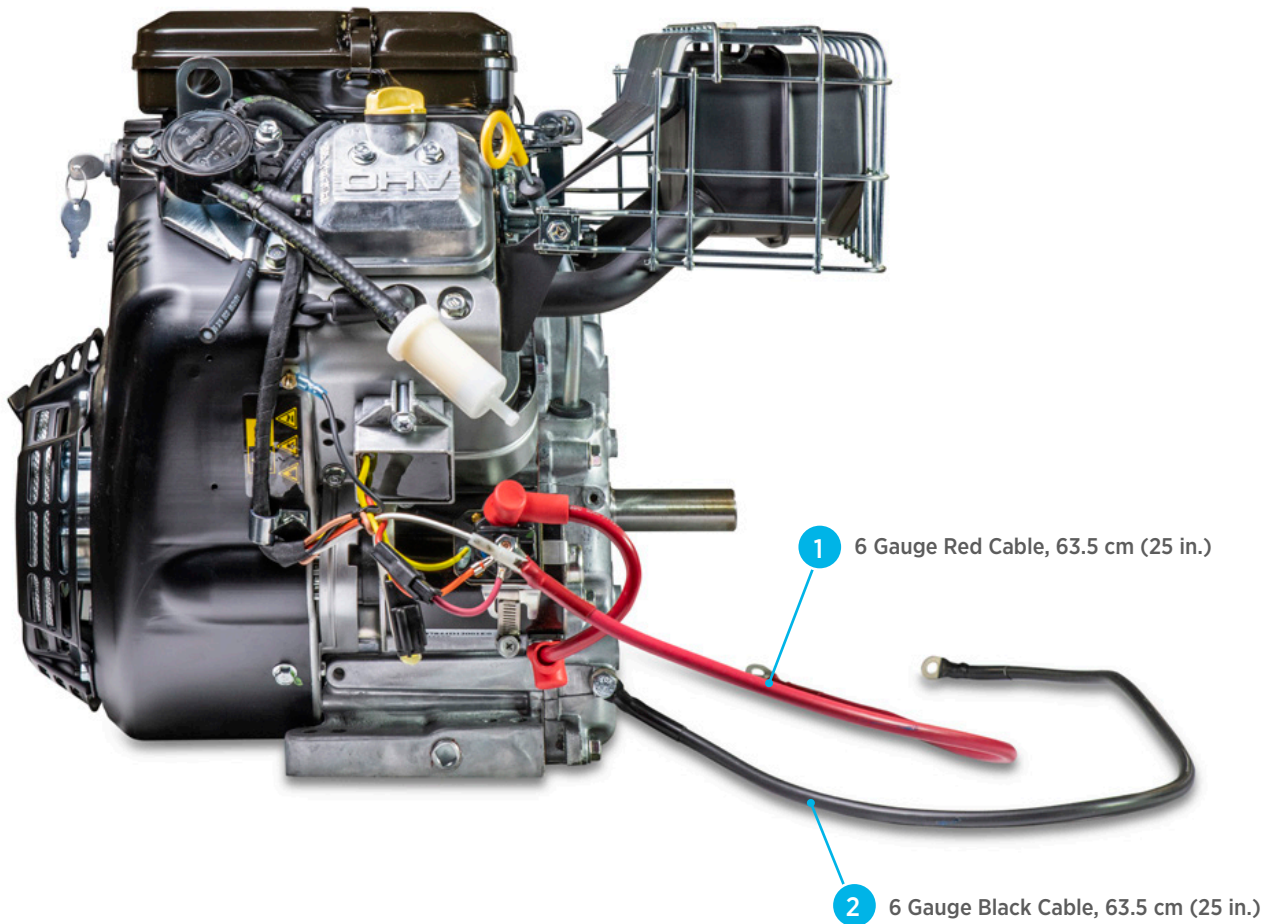
1800E ULV® MAIN ASSEMBLY No. 323535



## CLARKE LECO 1800E ULV SPRAYER

## Engine Assembly (No. 323783)

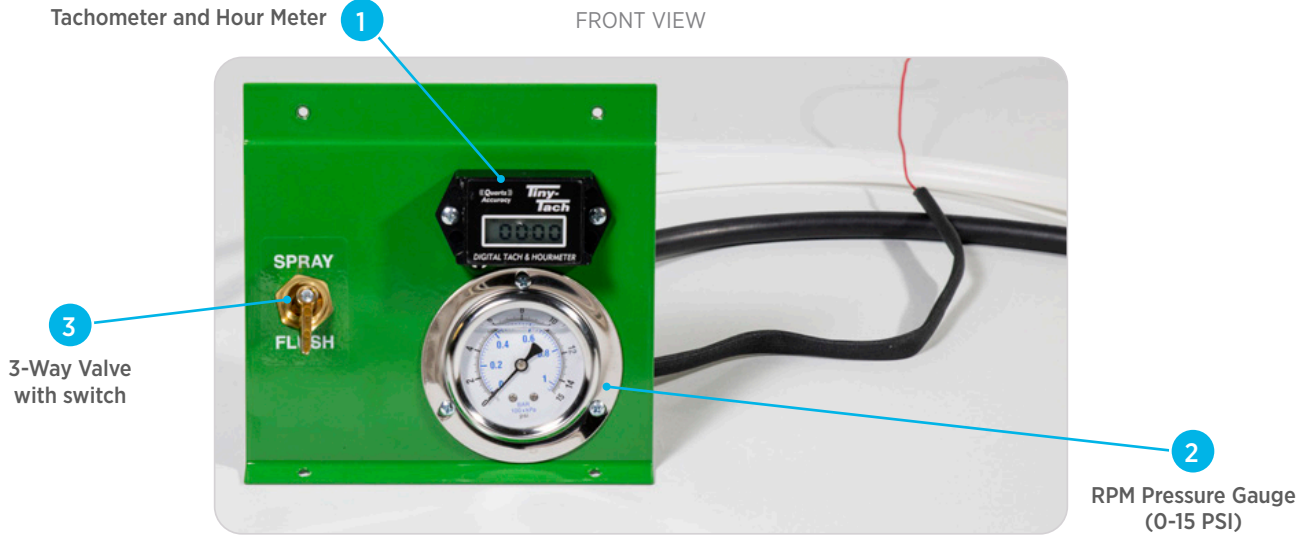
POS	QTY	DESCRIPTION	PART NO.
1	1	6 Gauge Red Cable, 63.5 cm (25 in.)	321430
2	1	6 Gauge Black Cable, 63.5 cm (25 in.)	321498



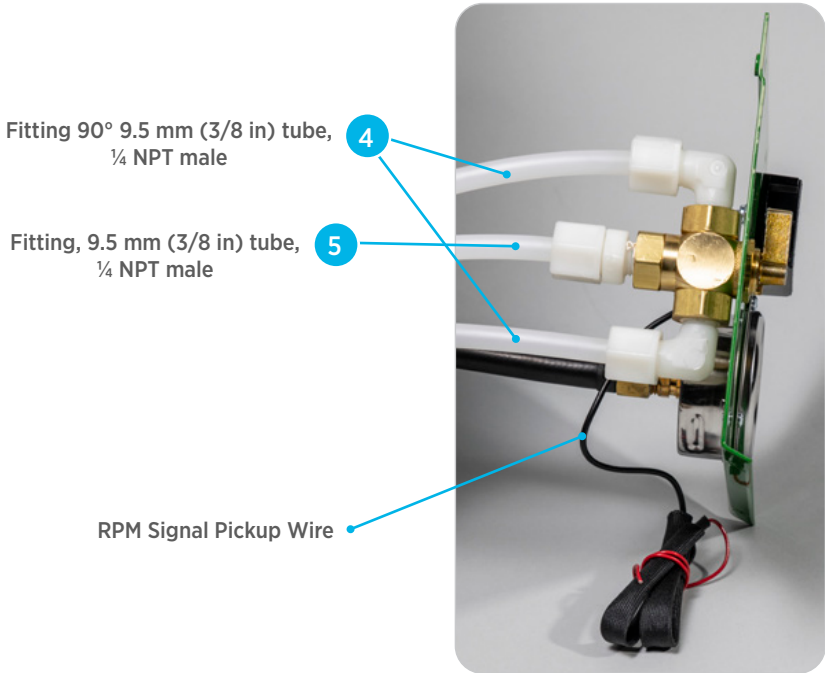
Panel Gauge Assembly (No. 332148)

POS	QTY	DESCRIPTION	PART NO.
1	1	Tachometer and Hour Meter with Signal Pickup Wire	321795
2	1	RPM Pressure Gauge (0-15 PSI)	320268
3	1	3-Way Valve	320523
4	2	Fitting 90° 9.5 mm (3/8 in) tube, 1/4 NPT male	319576
5	1	Fitting, 9.5 mm (3/8 in) tube, 1/4 NPT male	320359

Tachometer and Hour Meter 1 FRONT VIEW



BACK VIEW

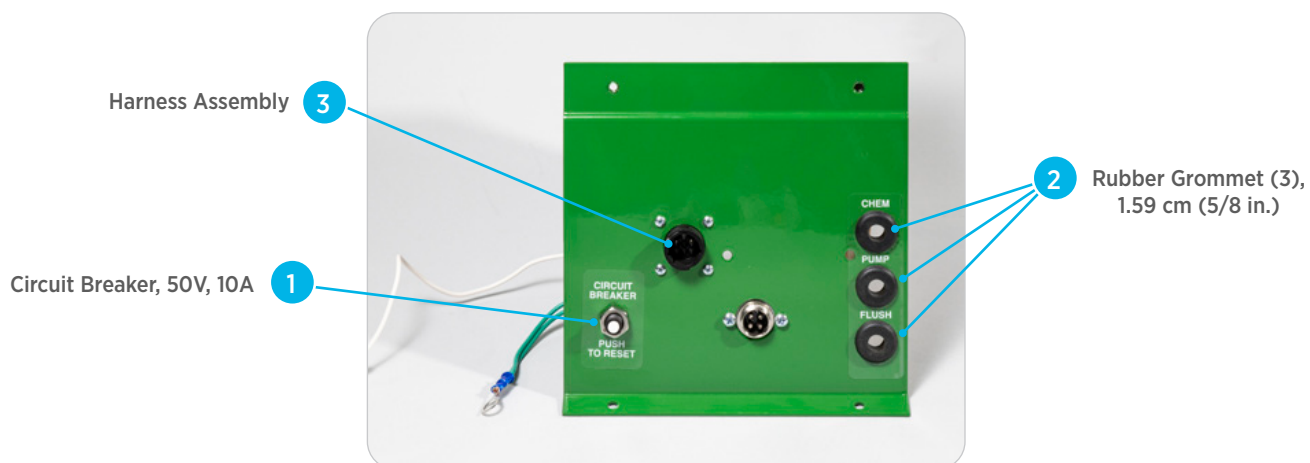


## CLARKE LECO 1800E ULV SPRAYER

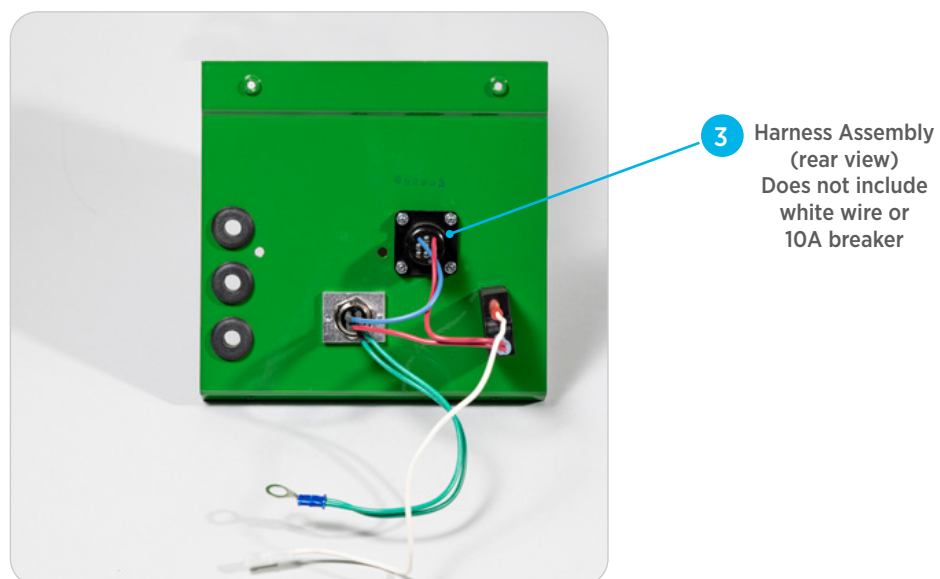
## Connection Panel Assembly (No. 323733)

POS	QTY	DESCRIPTION	PART NO.
1	1	Circuit Breaker, 50V, 10A	320193
2	3	Rubber Grommet, 1.59 cm (5/8 in.)	321373
3	1	Harness Assembly	323717

FRONT VIEW



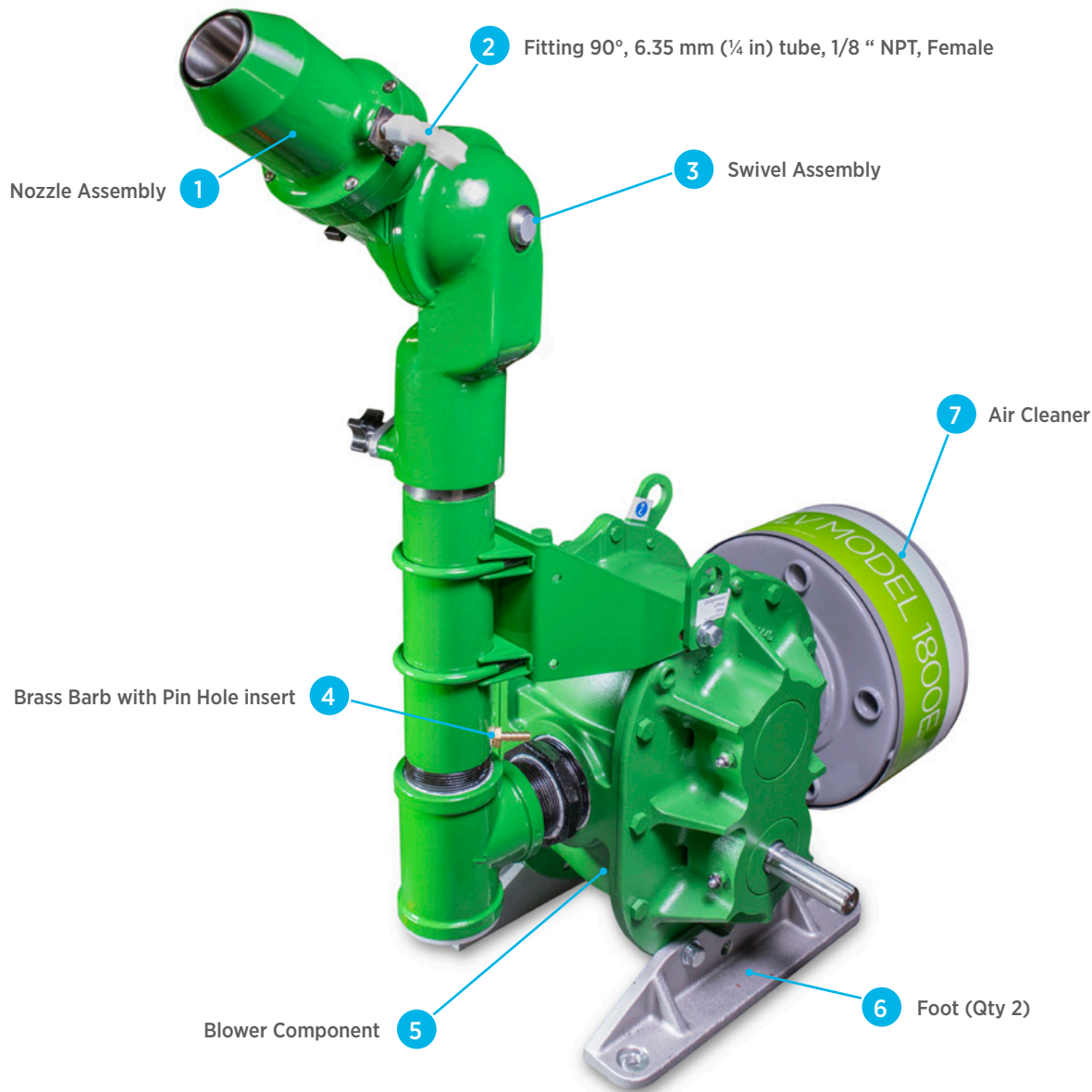
BACK VIEW





Blower Assembly (NO. 323791)

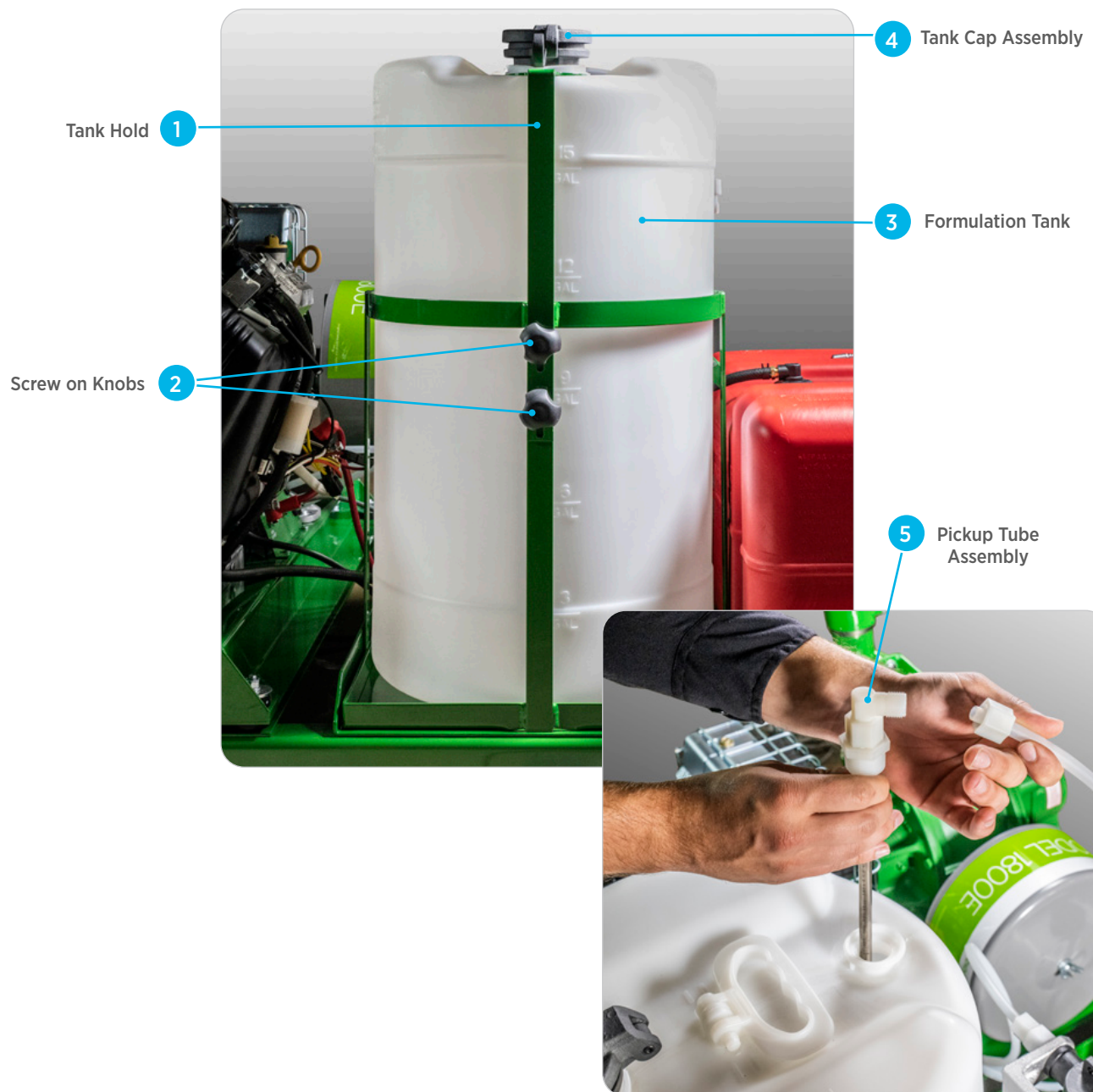
POS	QTY	DESCRIPTION	PART NO.
1	1	Nozzle Assembly	323816
2	1	Fitting 90°, 6.35 mm (1/4 in) tube, 1/8 NPT, Female	319790
3	1	Swivel Assembly	323808
4	1	Brass Barb with Pin Hole	323832
5	1	Blower Component	319691
6	2	Foot	321555
7	1	Air Cleaner	319401



## CLARKE LECO 1800E ULV SPRAYER

## Formulation Tank Assembly (No. 326604)

POS	QTY	DESCRIPTION	PART NO.
1	1	Tank Hold	323874
2	2	Screw on Knobs	319956
3	1	Formulation Tank 56.7 Liters (15 GAL)	332339
4	1	Tank Cap Assembly	319419
5	1	Pickup Tube Assembly	326597



Filter/Strainer Assembly (No. 323569)

POS	QTY	DESCRIPTION	PART NO.
1	1	Fitting, 3/8 NPT x 9.5 mm (3/8 in) tube	320367
2	2	Fitting, Nipple, 3/8 NPT, Short, SS	321662
3	1	Filter/Strainer	319485
4	1	Filter Element for Strainer, "Replacement"	326654
5	1	Strainer Seal, "Replacement"	326414
6	2	Fitting, 3/8 NPT x 9.5 mm (3/8 in) tube, 90°	320375

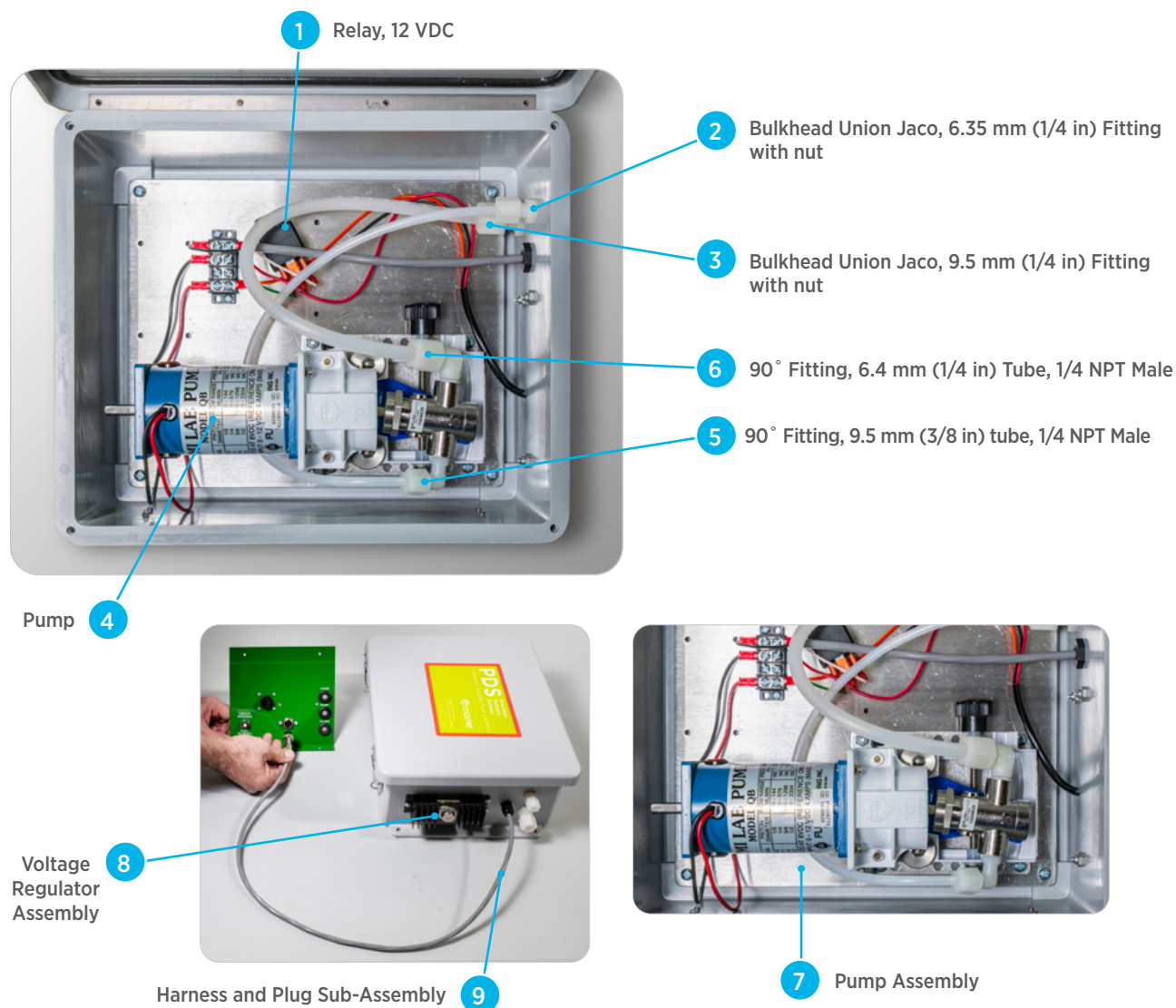




## CLARKE LECO 1800E ULV SPRAYER

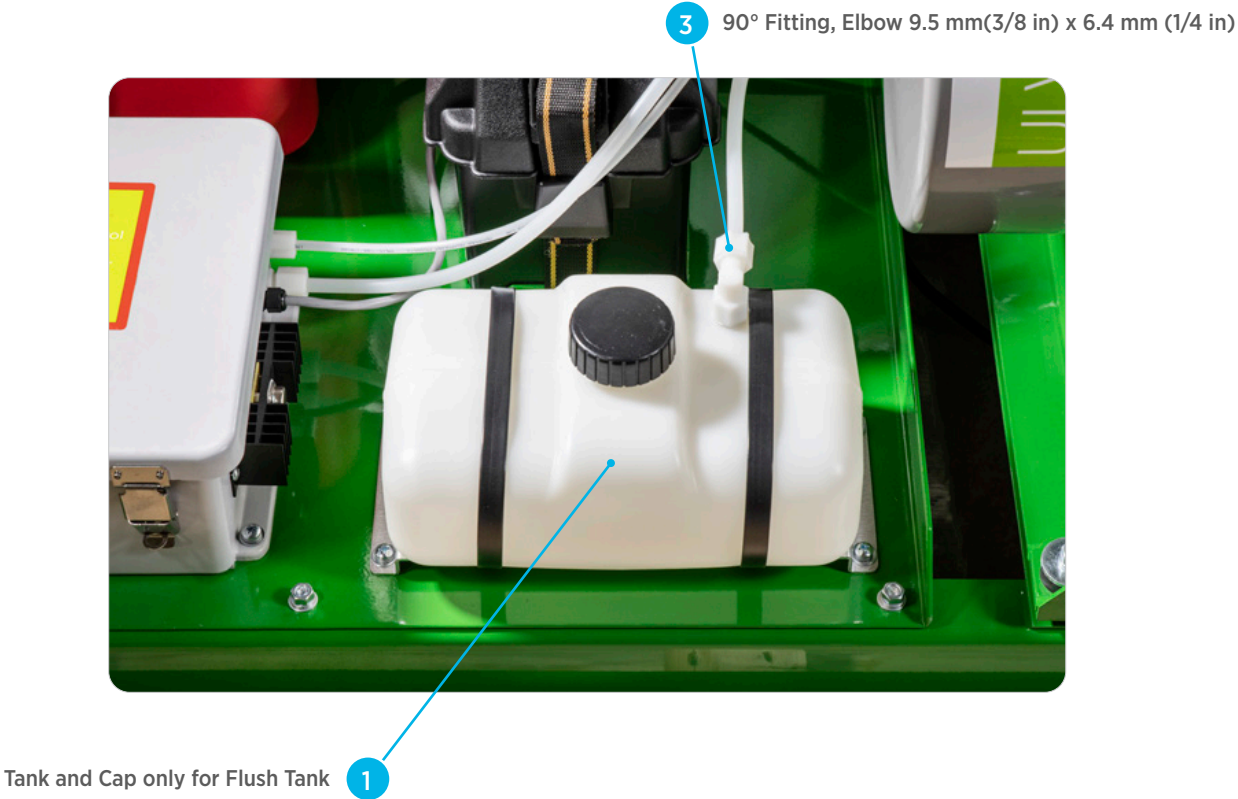
## Pump Box Assembly (No. 323618)

POS	QTY	DESCRIPTION	PART NO.
1	1	Relay, 12 VDC	323347
2	1	Bulkhead Union Jaco, 6.35 mm (1/4 in) Fitting with nut	319550
3	1	Bulkhead Union Jaco, 9.5 mm (3/8 in) Fitting with nut	319568
4	1	Pump, Electric	319534
5	1	90° Fitting, 9.5 mm (3/8 in) tube, 1/4 NPT Male	319576
6	1	90° Fitting, 6.4 mm (1/4 in) Tube, 1/4 NPT Male	319279
7	1	Pump Assembly	323626
8	1	Voltage Regulator Assembly	326563
9	1	Harness and Plug Sub-Assembly	320135



Flush Tank Assembly (No. 323585)

POS	QTY	DESCRIPTION	PART NO.
1	1	Tank and Cap only for Flush Tank	319716
2	1	Pickup Tube Assembly	323577
3	1	90° Fitting, Elbow 9.5 mm(3/8 in) x 6.4 mm (1/4 in)	319683





CLARKE LECO 1800E ULV SPRAYER

Remote Control Box (NO. 321183)

POS	QTY	DESCRIPTION	PART NO.
1	1	Remote Control Box Assembly includes 4.6 m/15 ft. cable	321183
2	1	Toggle Spray On/Off Switch	330506

Remote Control Box Assembly with 4.6 m/15 ft. cable



Toggle Spray On/Off Switch

Available Accessories



DESCRIPTION	PART NO.
45.4 Liter (12 Gallon) Gas Tank	319708



DESCRIPTION	PART NO.
Installation Kit Assembly, Gas Sprayer <i>This kit includes cables, vehicle circuit breaker and terminals. The quick connect plugs enable you to easily remove the sprayer from a truck. Will work with extended cab long bed trucks too.</i>	347741



DESCRIPTION	PART NO.
Remote Control Box Assembly with 9 m/30 ft. Cable	349341

## CLARKE LECO 1800E ULV SPRAYER

## Spare Parts Kit (No. 332669)

The Spare Parts Kit contains all relevant replacement O-rings, Fittings and Tubing for the 1800E and includes the following:

QTY	DESCRIPTION
1	Strainer
1	90° Fitting, 3/8"NPT x 9.5 mm (3/8in) Tube
1	Fitting, 3/8 NPT x 9.5 mm (3/8in) Tube
1	90° Fitting, Elbow, 9.5 mm (3/8in) x 6.4 mm (1/4 in)
1	90° Fitting, 6.4 mm (1/4 in) tube, 1/8 NPT, Female
1	Bulkhead Union Jaco, 6.4 mm (1/4 in) Fitting with nut
1	Bulkhead Union Jaco, 9.5 mm (3/8 in) Fitting with nut
1	Tee Jaco 6.4 mm (1/4 in) x 3.2 mm (1/8 in)
1	O-Ring, Viton, 70 Duro OD 10.64 cm (4.188 in)
1	O-Ring, Viton, 70 Duro OD 6.67 cm (2.625 in)
1	O-Ring, Viton, Brown, OD 2.22 cm (0.875 in)
1	O-Ring, Viton, 70 Duro OD 1.27 cm (0.50 in)
1	O-Ring, Viton, Brown, OD 1.11 cm (0.438 in)
1	Tube, PE, 6.4 mm (1/4 in)
1	Tube, PE, ID 6.4 mm (1/4 in) x OD 9.5mm (3/8in)
1	Airline 6.4mm ID (1/4 in) 300 PSI Max SE
1	Fuel Hose, 6.4 mm (1/4 in), Black
1	Cable Tie, 8, Black

NOTES

A large rectangular area filled with a uniform grid of small, light blue dots, intended for handwritten notes.

CLARKE LECO 1800E ULV SPRAYER

NOTES



## Troubleshooting

TROUBLE	POSSIBLE CAUSE	REMEDY
Air blast at nozzle but no pressure showing on pressure gauge.	Defective pressure gauge.	Replace.
	Air leaks in the air line between the nozzle and the pressure gauge.	Replace air line or reconnect if loose.
	Blockage in line.	Check for blockage, clear blockage.
Air blast insufficient or no air pressure at nozzle.	Air leakage around joints on nozzle elbow assembly.	Tighten T-bolt.
	Air leakage between flange ring and nozzle baffle.	Tighten bolts.
	Defective blower.	Repair at nearest blower service center.
	Defective o-ring in socket of nozzle elbow.	Replace.
	Engine speed too low.	Set to recommended speed.
	Filter-Silencer element clogged up.	Clean and service.
Air bubbles in chemical lines.	Fittings cross-threaded, loose or defective between insecticide tank and pump.	Retighten or replace.
	Line strainer gasket pinched.	Replace gasket.
	Pulsation Damper gasket pinched.	Replace gasket
Air pressure at nozzle but pressure gauge needle will not move when the engine speed is varied.	Defective pressure gauge.	Replace.
Blower trouble.	See blower instruction manual.	See blower manual.

## CLARKE LECO 1800E ULV SPRAYER

## Troubleshooting

TROUBLE	POSSIBLE CAUSE	REMEDY
Cannot calibrate to correct flow rate.	Air bubbles in chemical lines.	Eliminate by checking fittings and chemical lines for leaks.
	Voltage too low to pump.	Replace voltage regulator.
	Battery charge too low.	Charge battery.
	Leaks in insecticide line between pump and nozzle.	Tighten fittings or replace insecticide line.
	Pump gummed up.	Flush and if necessary, let pump sit for a few hours with flushing solution in cylinder.
Cannot calibrate to correct particle size.	Air pressure too low, which will produce large particles.	Increase engine speed.
	Air pressure too high, which will produce small particles.	Decrease engine speed.
	Flow rate too high.	Calibrate to correct flow rate.
	Flow rate too low.	Calibrate to correct flow rate.
	Nozzle damaged.	Replace damaged parts.
	Temperature too low.	Calibrate above 70° F.
Coupling sleeve damaged or thrown.	Misalignment between engine and blower shafts.	Carefully align engine and blower shafts.
Engine backfires.	Gasoline mixture too lean.	Check carburetor.
	Defective spark plugs.	Clean, adjust and/or replace.
	Inlet valves sticking.	Free, clean and adjust valve.

## Troubleshooting

TROUBLE	POSSIBLE CAUSE	REMEDY
Engine compression low.	Valve clearance improper.	Adjust valve.
	Defective cylinder head.	Consult nearest engine service center.
	Defective valves or piston rings.	Consult nearest engine service center.
	Cylinder head gasket leaks.	Tighten head bolts or replace gasket.
Engine does not deliver full power.	Carburetor choke valve partly closed.	Adjust choke.
	Air cleaner dirty.	Service air cleaner.
	Carburetor defective.	Clean, adjust or replace.
	Exhaust restricted.	Replace muffler.
Engine hard to start, will not start or fails.	Ignition switch located on engine defective.	Replace.
	Out of fuel or contaminated fuel.	Add fuel or clean tank and refuel.
	Clogged fuel filter.	Clean or replace fuel filter.
	Spark plugs faulty.	Clean or replace spark plugs.
	Fuel pump or carburetor defective.	Consult nearest engine service center.
	Defective fuel pump.	Repair or replace.
	Terminals loose or wiring defective.	Tighten loose terminals, replace defective wiring.
	Spark plug wire disconnected.	Connect spark plug wire.
	See engine instruction manual.	See engine manual.
	Pinched or shorted wiring in the control box.	Re-route wires and tape them.

## CLARKE LECO 1800E ULV SPRAYER

## Troubleshooting

TROUBLE	POSSIBLE CAUSE	REMEDY
Formulation drips from nozzle when not running.	Formulation tank filled completely to top.	Leave a 2" air space at the top of the tank when filling.
	Pump system running.	Turn spray off.
Formulation drips from the nozzle while running.	Engine RPM too low.	Set throttle for correct air pressure at nozzle.
	Excessive flow rate.	Set for correct flow rate.
	Formulation tank filled completely to top.	Leave a 2" air space at the top of the tank.
	If the spray is ON, defective nozzle.	Replace.
	If the spray is OFF, formulation in blower.	Run to clear blower and flush blower to remove the insecticide.
Formulation leaks at fittings.	Fittings cross-threaded or defective.	Retighten or replace.
Formulation pump not running when Spray switch is turned on.	Defective Spray switch or loose connectors.	Replace.

## Troubleshooting

TROUBLE	POSSIBLE CAUSE	REMEDY
Formulation pump runs but no chemical flow.	Leak in suction line.	Check lines, tighten.
	Out of chemical.	Check that both chemical tank and flush tank have solution in them.
	Three-way manual valve not opening.	Disassemble and clean.
	Three-way manual valve clogged up.	Replace gasket.
	Line strainer gasket pinched.	Clean or replace.
	Line strainer plugged.	Prime with motor oil.
	Pump is dry.	Visually check pump for rotation and piston movement.
	Pump defective.	Repair or replace.



CLARKE LECO 1800E ULV SPRAYER

NOTES

A large rectangular area filled with a uniform grid of small, light blue dots, intended for handwritten notes.

## NOTES

## NOTES



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