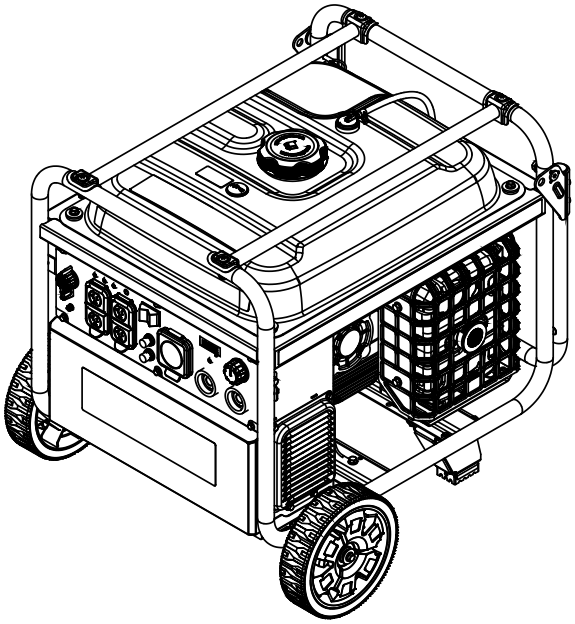
INSTRUCTION MANUAL

BULLDOG® 145



For use with Product/Code Numbers:

13922

Save for future reference

Date Purchased

Code: (ex: 10859)

Serial: (ex: U1060512345)

IM10741 | Issue Date JUN - 2026

THE LINCOLN ELECTRIC COMPANY
22801 St. Clair Avenue • Cleveland, OH • 44117-1199 • U.S.A.
www.lincolnelectric.com

Contents

APPENDIX

CUSTOMER ASSISTANCE POLICY

SAFETY INFORMATION

SAFETY DEPENDS ON YOU

Lincoln welding, cutting, and heating equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation and thoughtful operation on your part. DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT. And, most importantly, think before you act and be careful.

⚠ DANGER

This statement indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

This statement indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

This statement indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

Notice: This statement indicates the possibility of damage to equipment if the potential risk is not avoided.

PLEASE EXAMINE CARTON AND EQUIPMENT FOR DAMAGE IMMEDIATELY

When this equipment is shipped, title passes to the purchaser upon receipt by the carrier. Consequently, claims for material damaged in shipment must be made by the purchaser against the transportation company at the time the shipment is received.

KEEP YOUR HEAD OUT OF THE FUMES

- **DON'T** get too close to the weld. Use corrective lenses if necessary to stay a reasonable distance away from the weld.
- **USE ENOUGH VENTILATION** or exhaust at the weld, or both, to keep the fumes and gases from your breathing zone and the general area.
- **IN A LARGE ROOM OR OUTDOORS** , natural ventilation may be adequate if you keep your head out of the fumes.
- **USE NATURAL DRAFTS** or fans to keep the fumes away from your face.
- **READ** and obey the Safety Data Sheet (SDS) and the warning label that appears on all containers of welding materials.

If you develop unusual symptoms, see your supervisor. Perhaps the welding atmosphere and ventilation system should be checked.

WEAR CORRECT EYE, EAR AND BODY PROTECTION

- **PROTECT** your eyes and face with properly fitted and with proper grade of filter plate (See ANSI Z49.1).
- **PROTECT** your body from welding spatter and arc flash with protective clothing including woolen clothing, flame-proof apron and gloves, leather leggings, and high boots.
- **PROTECT** others from spatter, flash, and glare with protective screens or barriers.
- **PROTECT** your eyes and face with welding helmet
- **IN SOME AREAS**, protection from noise may be appropriate.
- **BE SURE** protective equipment is in good condition.

- **AT ALL TIMES**, wear safety glasses in work area.

- **DO NOT WELD, CUT, OR HEAT** containers or materials which previously had been in contact with hazardous substances unless they are properly cleaned. This is extremely dangerous.

- **DO NOT WELD, CUT, OR HEAT** painted or plated parts unless special precautions with ventilation have been taken. They can release highly toxic fumes or gases.
- **PROTECT** compressed gas cylinders from excessive heat, mechanical shocks, and arcs; fasten cylinders so they cannot fall.
- **BE SURE** cylinders are never grounded or part of an electrical circuit.
- **REMOVE** all potential fire hazards from welding area.

- **ALWAYS HAVE FIRE FIGHTING EQUIPMENT READY FOR IMMEDIATE USE AND KNOW HOW TO USE IT.**

CALIFORNIA PROPOSITION 65 WARNINGS

⚠ WARNING

Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects, or other reproductive harm.

Always start and operate the engine in a well-ventilated area.

If in an exposed area, vent the exhaust to the outside.

Do not modify or tamper with the exhaust system.

Do not idle the engine except as necessary.

⚠ WARNING

This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code § 25249.5 et seq.)

For more information go to https://www.p65warnings.ca.gov

ARC WELDING CAN BE HAZARDOUS

PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR DOCTOR BEFORE OPERATING.

Read and understand the following safety highlights. For additional safety information, it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting - ANSI Standard Z49.1" from the American Welding Society, P.O. Box 351040, Miami, Florida 33135 or CSA Standard W117.2. A Free copy of "Arc Welding Safety" booklet E205 is available from the Lincoln Electric Company, 22801 St. Clair Avenue, Cleveland, Ohio 44117-1199.

BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.

FOR ENGINE POWERED EQUIPMENT

- Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.

- Do not add the fuel near an open flame welding arc or when the engine is running. Stop the engine and allow it to cool before refueling to prevent spilled fuel from vaporizing on contact with hot engine parts and igniting. Do not spill fuel when filling tank. If fuel is spilled, wipe it up and do not start engine until fumes have been eliminated.

- Keep all equipment safety guards, covers and devices in position and in good repair. Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

- In some cases it may be necessary to remove safety guards to perform required maintenance. **REMOVE GUARDS ONLY** when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.
- **DO NOT** put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.
- To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.

- To avoid scalding, do not remove the radiator pressure cap when the engine is hot.

- Generator exhaust contains carbon monoxide. This is a poison you cannot see or smell.
- Using a generator indoors **CAN KILL YOU IN MINUTES**.
- **NEVER** use inside a home or garage, EVEN IF doors and windows are open.

- **ONLY** use **OUTSIDE** and far away from windows, doors and vents.
- Avoid other generator hazards. **READ MANUAL BEFORE USE**.

ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS

- Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding and heating current creates EMF fields around cables and equipment.
- EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.
- Exposure to EMF fields in welding may have other health effects which are now not known.

All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

- Route the electrode and work cables together - Secure them with tape when possible.
- Never coil the electrode lead around your body.
- Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.
- Connect the work cable to the workpiece as close as possible to the area being welded.
- Do not work next to welding power source.

ELECTRIC SHOCK CAN KILL

- The electrode and work (or ground) circuits are electrically “hot” when the welder is on. Do not touch these “hot” parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.
- Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:

- Semiautomatic DC Constant Voltage (Wire) Welder.
- DC Manual (Stick) Welder.
- AC Welder with Reduced Voltage Control.
- In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically “hot”.
- Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.
- Ground the work or metal to be welded to a good electrical (earth) ground.
- Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
- Never dip the electrode in water for cooling.

- Never simultaneously touch electrically “hot” parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.
- When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.
- **Also see** WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION **and** FOR ELECTRICALLY POWERED EQUIPMENT

ARC RAYS CAN BURN

- Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87.1 standards.
- Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.

FUMES AND GASES CAN BE DANGEROUS

Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone.

- **When welding hardfacing (see instructions on container or SDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and within applicable OSHA PEL and ACGIH TLV limits using local exhaust or mechanical ventilation unless exposure assessments indicate otherwise. In confined spaces or in some circumstances, outdoors, a respirator may also be required. Additional precautions are also required when welding on galvanized steel.**
- The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.
- Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.
- Shielding gases used for welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.
- Read and understand the manufacturer’s instructions for this equipment and the consumables to be used, including the Safety Data Sheet (SDS) and follow your employer’s safety practices. SDS forms are available from your welding distributor or from the manufacturer.
- Also see FOR ENGINE POWERED EQUIPMENT

WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION

- Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.
- Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to **“Safety in Welding and Cutting” (ANSI Standard Z49.1)** and the operating information for the equipment being used.

- When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.
- Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to ensure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been “cleaned”. For information, purchase “Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances”, **AWS F4.1** from the American Welding Society.
- Vent hollow castings or containers before heating, cutting or welding. They may explode.
- Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuff-less trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.
- Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.
- **Read and follow NFPA 51B** “Standard for Fire Prevention During Welding, Cutting and Other Hot Work”, available from NFPA, 1 Batterymarch Park, PO box 9101, Quincy, MA 022690-9101.
- **DO NOT** use a welding power source for pipe thawing.

CYLINDER MAY EXPLODE IF DAMAGED

- Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.
- Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.

Cylinders should be located:

- Away from areas where they may be struck or subjected to physical damage.
- A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.
- Never allow the electrode, electrode holder or any other electrically “hot” parts to touch a cylinder.
- Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.
- Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-l, “Precautions for Safe Handling of Compressed Gases in Cylinders,” available from the Compressed Gas Association, 14501 George Carter Way Chantilly, VA 20151.

FOR ELECTRICALLY POWERED EQUIPMENT

- Turn off input power using the disconnect switch at the fuse box before working on the equipment.
- Install equipment in accordance with the U.S. National Electrical Code, all local codes and the manufacturer’s recommendations.
- Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer’s recommendations.

BATTERY HANDLING, STORAGE, AND DISPOSAL

Batteries can be flammable substances such as lithium or other organic solvents, which may result in overheating, rupture, or combustion. Failure to follow the battery manufactures instructions may result in fire, personal injury, and damage to property if used improperly.

- DO NOT short circuit, disassemble, deform, or heat batteries.
- DO NOT attempt to recharge batteries unless they are specifically marked as "rechargeable".
- DO NOT use or charge the battery if it appears to be leaking, deformed or damaged in any way.
- Store in a cool location. Keep batteries away from direct sunlight, high temperature, and high humidity.
- Immediately discontinue use of the battery if, while using, charging, or storing the battery, the battery emits an unusual smell, feels hot, changes color, changes shape, or appears abnormal in any other way.
- Keep batteries out of reach of children, should a child swallow a battery, consult a physician immediately.
- Recycle or dispose of batteries in accordance with local and federal laws.

FOR LASER EMITTING EQUIPMENT

- Hazardous Class 4 (IV) laser products emit invisible, infrared laser radiation which can permanently damage the eye's retina and/or cornea, burn skin, and pose a fire risk. End users shall assign a qualified Laser Safety Officer (LSO) who has the certifications required by applicable law/standards, have a documented Laser Safety Program and have a Laser Controlled Area (LCA) that confirms to ANSI Z136.1 & Z136.9.
- Do not operate laser before end user's LSO has completed a risk assessment and all the prescribed Risk Mitigations measures have been fully implemented. Ensure the laser is operated/ demonstrated safely by trained personnel and that the environment surrounding the laser welding cell or laser-controlled area is safe for people nearby when the laser is in operation.
- Never point the laser at yourself or others. Never look directly into a laser aperture, even if wearing full eye protection.
- All persons inside LCA must wear proper PPE to avoid eye or skin exposure to laser radiation. The end user's LSO shall select proper PPE including, but not limited to, heat-resistant gloves, flame-resistant clothing, laser safety eye wear and laser-safe helmets that conform to ANSI Z136.1 Optical Density requirements for the wavelength and output power of the laser in use. Standard safety glasses and welding helmets DO NOT provide adequate protection from laser beam hazards. Always inspect PPE for damage or improper fit before use.
- Only qualified persons shall install, operate or service this unit per ANSI Z136.1 standards and your LSO's instruction. Read and follow all labels and manuals before installing, operating, or servicing hand held any laser welding equipment.
- Do not operate outside of a LCA, or if the laser protective housing is modified or damaged, or if safety interlocks have been bypassed or otherwise defeated. Inspect all equipment and LCA for damage or tampering prior to use.
- Reflected beams from the laser can damage eyes and skin and can pose a fire risk. Prior to use, the LCA should be assessed by the LSO to understand the surfaces where hazardous reflected beams can exist. Never position yourself or flammable material in the anticipated laser beam path and take extra precautions when working on reflective materials like aluminum and stainless steel.
- Follow all standards, individual facility or building regulations, and national, state, and local codes.

DEALER LOCATOR & PRODUCT REGISTRATION

Register your machine:

https://www.lincolnelectric.com/register

Authorized Service and Distributor Locator:

https://www.lincolnelectric.com/locator

ADDITIONAL SAFETY INFORMATION

Refer to http://www.lincolnelectric.com/safety for additional safety information

EPA EMISSION

EPA EMISSION CONTROL WARRANTY STATEMENT

New small off road engines (SOREs) must be designed, built, and equipped to meet the EPA's anti-smog standards. The Lincoln Electric Company must warrant the emission control system on your small off road engine for 2 years from the date of purchase to the ultimate purchaser, provided there has been no abuse, neglect, or improper maintenance of your small off road engine. The emission control system warranty is extended to the original owner and all subsequent owners.

Your emission control system may include parts such as:

1. Fuel Metering System
   - **a.** Carburetor and internal parts (and/or pressure regulator or fuel injection system).
   - **b.** Air-fuel ratio feedback and control system.
   - **c.** Cold start enrichment system.
2. Air Induction System
   - **a.** Controlled hot air intake system.
   - **b.** Intake manifold.
   - **c.** Air filter.
3. Ignition System
   - **a.** Spark plugs.
   - **b.** Magneto or electronic ignition system.
   - **c.** Spark advance/retard system.
4. Exhaust Gas Recirculation (EGR) System
   - **a.** EGR valve body, and carburetor spacer if applicable.
   - **b.** EGR rate feedback and control system.
5. Air Injection System
   - **a.** Air pump or pulse valve.
   - **b.** Valves affecting distribution of flow.
   - **c.** Distribution manifold.
6. Catalyst or Thermal Reactor System
   - **a.** Catalytic converter.
   - **b.** Thermal reactor.
   - **c.** Exhaust manifold.
7. Particulate Controls
   - **a.** Traps, filters, precipitators, and any other device used to capture particulate emissions.
8. Miscellaneous Items Used in Above Systems
   - **a.** Vacuum, temperature, and time sensitive valves and switches
   - **b.** Electronic controls.
   - **c.** Hoses, belts, connectors, and assemblies.

MANUFACTURER'S WARRANTY COVERAGE:

The engine is warrantied for 2 years for certain emission-related parts (defined below). Defective parts will be repaired or replaced by one our Lincoln Electric Authorized Repair Facilities.

OWNER'S WARRANTY RESPONSIBILITIES:

- As the small off road engine owner, you are responsible for the performance of the required maintenance listed in MAINTENANCE section within this manual. The Lincoln Electric Company recommends that you retain all receipts covering maintenance items listed in MAINTENANCE, however, The Lincoln Electric Company cannot deny warranty solely for the lack of receipts or failure to ensure the performance of all scheduled maintenance.
- As the small off road engine owner, you should be aware that The Lincoln Electric Company may deny you warranty coverage if your small off road engine or a part has failed due to abuse, neglect, improper maintenance, or unapproved modifications.
- You are responsible for presenting your small off road engine to a Lincoln Electric Authorized Service Facility as soon as a problem exists. For owners located more than 100 miles from an authorized service center, Lincoln Electric, at its sole choice and discretion, will either pay for shipping costs to and from an authorized service center, provide for a service technician to come to the owner to make the warranty repair, or pay for the repair to be made at a local non-authorized service center. The provision only applies to owners located in the contiguous United States, excluding the states with high-altitude areas identified in 40 CFR part 1068, Appendix III. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days. Should you need assistance or have questions concerning The Lincoln Electric Company's Warranty Statement, you can contact our Customer Service Department at 1-888-935-3877 or online at http://www.lincolnelectric.com..

EPA EMISSIONS DEFECT WARRANTY EXPLANATION

WHAT DOES THIS WARRANTY COVER?

The Lincoln Electric Company warrants that your small off the road engine was designed and manufactured to conform with applicable EPA (exhaust) emissions standards and that your small off road engine will be free from defects in material and workmanship that would cause it to fail within the first 2 years of ownership.

HOW WILL A COVERED PART BE CORRECTED?

If there is a defect in a part covered by this warranty, a Lincoln Electric Authorized Service Facility will correct the defect free of charge.

WHAT PARTS ARE COVERED BY THE EPA EMISSIONS DEFECT WARRANTY?

- Any emission related part (defined below) not scheduled for "required maintenance" (See MAINTENANCE section) will be repaired or replaced within the warranty period.
- Any emission related part scheduled for replacement during "required maintenance" (See MAINTENANCE section) is warrantied for the period of time prior to the first scheduled replacement for that part. Any such part repaired or replaced under warranty shall be warranted for the remainder of the period prior to the first scheduled replacement for that part.
- Any manufacturer-approved replacement part may be used in the performance of any warranty maintenance or repairs on emission related parts, and must be must be provided without charge if the part is still under warranty.
- Any replacement part that is equivalent in performance and durability may be used in non-warranty maintenance or repairs, and shall not reduce the warranty obligations of the manufacturer.
- The Owner is responsible for the performance of the required maintenance described in Section E.

EMISSION RELATED WARRANTIED PARTS:

- Choke

- Carburetor
- Air Filter
- Electronic Ignition System
- Catalytic Converter/Muffler Assembly
- Spark Plug

WHAT IS NOT COVERED BY THE EPA ENGINE EMISSIONS DEFECT WARRANTY?

- Any failure caused by abuse, neglect, or improper maintenance.
- Any failure caused by unapproved modification or use of unapproved accessories.

FEDERAL EXHAUST AND EVAPORATIVE EMISSIONS CONTROL WARRANTY STATEMENT

Your Warranty Rights And Obligations

The United States Environmental Protection Agency (EPA) and The Lincoln Electric Company (hereinafter referred to as “Lincoln”) are pleased to explain the exhaust and evaporative emissions (“emissions”) control system’s warranty on your 2025 small off-road engine or equipment (SORE). New equipment that use small off-road engines must be designed, built, and equipped to meet the State’s stringent anti-smog standards. Lincoln must warrant the emissions control system on your SORE for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your small off-road engine or equipment leading to the failure of the emissions control system.

Your emissions control system may include parts such as the carburetor or fuel-injection system, the ignition system, catalytic converter, fuel tanks, fuel lines (for liquid fuel and fuel vapors), fuel caps, valves, canisters, filters, clamps and other associated components. Also included may be hoses, belts, connectors, and other emission-related assemblies.

Where a warrantable condition exists, Lincoln will repair your SORE at no cost to you including diagnosis, parts and labor.

Manufacturer's Warranty Coverage

This exhaust and evaporative emissions control system on your SORE is warranted for two years. If any emissions related part on your SORE is defective, the part will be repaired or replaced by Lincoln.

Owner's Warranty Responsibilities

As the SORE owner, you are responsible for performance of the required maintenance listed in your owner’s manual. Lincoln recommends that you retain all receipts covering maintenance on your SORE, but Lincoln cannot deny warranty coverage solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

As the SORE owner, you should however be aware that Lincoln may deny your warranty coverage if your SORE or a part has failed due to abuse, neglect, or improper maintenance or unapproved modifications.

You are responsible for presenting your SORE to a Lincoln distribution center or service center as soon as the problem exists. The warranty repairs shall be completed in a reasonable amount of time, not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities, you should contact the Lincoln Service Department at 888-935-3877 or email to service@lincolnelectric.com.

Defects Warranty Requirements

(a) Applicability - This section applies to emissions control systems on small off-road engines or equipment that use small off-road engines subject to the emission standards in this Article. The warranty period begins on the date the engine or equipment is delivered to an ultimate purchaser.

(b) General Emissions Warranty Coverage - The engine or equipment must be warranted to the ultimate purchaser and any subsequent owner that the emissions control system when installed was:

(1) Designed, built, and equipped so as to conform with all applicable regulations; and

(2) Free from defects in materials and workmanship that causes the failure of a warranted part for a period of two years.

(c) The warranty on emissions-related parts will be interpreted as follows -

(1) Any warranted part that is not scheduled for replacement as required maintenance in the written instructions furnished with each new engine or equipment must be warranted for the warranty period

defined in subsection (b)(2). If any such part fails during the period of warranty coverage, it must be repaired or replaced by Lincoln according to subsection (4) below. Any such part repaired or replaced under the warranty must be warranted for a time not less than the remaining warranty period.

(2) Any warranted part that is scheduled only for regular inspection in the written instructions furnished with each new engine or equipment must be warranted for the warranty period defined in subsection (b)(2). A statement in such written instructions to the effect of “repair or replace as necessary” shall advise owners of the warranty coverage for emissions related parts. Replacement within the warranty period is covered by the warranty and will not reduce the period of warranty coverage. Any such part repaired or replaced under warranty must be warranted for a time not less than the remaining warranty period.

(3) Any warranted part that is scheduled for replacement as required maintenance in the written instructions furnished with each new engine or equipment must be warranted for the period of time prior to the first scheduled replacement point for that part. If the part fails prior to the first scheduled replacement, the part must be repaired or replaced by the manufacturer according to subsection (4) below. Any such part repaired or replaced under warranty must be warranted for a time not less than the remainder of the period prior to the first scheduled replacement point for the part.

(4) Repair or replacement of any warranted part under the warranty provisions of this article must be performed at no charge to the owner at a warranty station.

(5) Notwithstanding the provisions of subsection (4) above, warranty services or repairs must be provided at distribution centers that are franchised to service the subject engines or equipment.

(6) The owner must not be charged for diagnostic labor that leads to the determination that a warranted part is in fact defective, provided that such diagnostic work is performed at a warranty station.

(7) Throughout the emissions control system's warranty period set out in subsection (b)(2), Lincoln must maintain a supply of warranted parts sufficient to meet the expected demand for such parts and must obtain additional parts if that supply is exhausted.

(8) Manufacturer-approved replacement parts that do not increase the exhaust or evaporative emissions of the engine or evaporative emission system must be used in the performance of any warranty maintenance or repairs and must be provided without charge to the owner. Such use will not reduce the warranty obligations of Lincoln.

(9) The use of add-on or modified parts may be grounds for disallowing a warranty claim made in accordance with this Article. Lincoln will not be liable under this Article to warrant failures of warranted parts caused by the use of an add-on or modified part.

(10) Lincoln shall provide any documents that describe Lincoln’s warranty procedures or policies within five working days of request by the Executive Officer.

(d) A list of all emissions warranty parts must be included with each new engine or equipment subject to this Article. The emissions warranty parts list shall include all parts whose failure would increase exhaust or evaporative emissions, and contains the following parts (if applicable) -

(1) Fuel Metering System

- Carburetor and internal parts (and/or pressure regulator or fuel injection system).
- Air/fuel ratio feedback and control system.
- Cold start enrichment system.

(2) Air Induction System

- Controlled hot air intake system.
- Intake manifold.
- Air filter.

(3) Ignition System

- Spark Plugs.
- Magneto or electronic ignition system.

- Spark advance/retard system.

(4) Exhaust Gas Recirculation (EGR) System

- EGR valve body, and carburetor spacer if applicable.
- EGR rate feedback and control system.

(5) Air injection System

- Air pump or pulse valve.
- Valves affecting distribution of flow.
- Distribution manifold.

(6) Catalyst or Thermal Reactor System

- Catalytic converter.
- Thermal reactor.
- Exhaust manifold.

(7) Particulate Controls

- Traps, filters, precipitators, and any other device used to capture particulate emissions.

(8) Miscellaneous items Used in Above Systems

- Vacuum, temperature, and time sensitive valves and switches.
- Electronic controls.
- Hoses, belts, connectors, and assemblies.

(9) Evaporative Controls

- Fuel Tank
- Fuel Cap
- Fuel Lines (for liquid fuel and fuel vapors)
- Fuel Line Fittings
- Clamps**
- Pressure Relief Valves**
- Control Valves**
- Control Solenoids**
- Electronic Controls**
- Vacuum Control Diaphragms**
- Control Cables**
- Control Linkages**
- Purge Valves
- Gaskets
- Liquid/Vapor Separator
- Carbon Canister
- Canister Mounting Brackets
- Carburetor Purge Port Connector

**Note: As they relate to the evaporative emission control system.

Note: Any other warranty statements apply to engines or equipment units shall not limit the emissions warranty period (two years) or its applicability to subsequent owners after the ultimate purchaser.

INSTALLATION

GENERAL DESCRIPTION

The BULLDOG® 145 is a generator/welder designed for home use and other non-commercial applications. As a welder, it offers DC welding up to a 5/32" electrode. A single dial provides control of up to 145 amps of output. As a generator, it can supply up to 4,000 peak watts of 120/240 volt, single-phase AC power. The machine is lightweight and portable.

The BULLDOG® 145 runs on both gasoline and propane gas. The machine's CO sensor helps protect users from harmful carbon monoxide if the machine is in an area with low air flow. With both electric and manual recoil start, the machine can run with a dead battery.

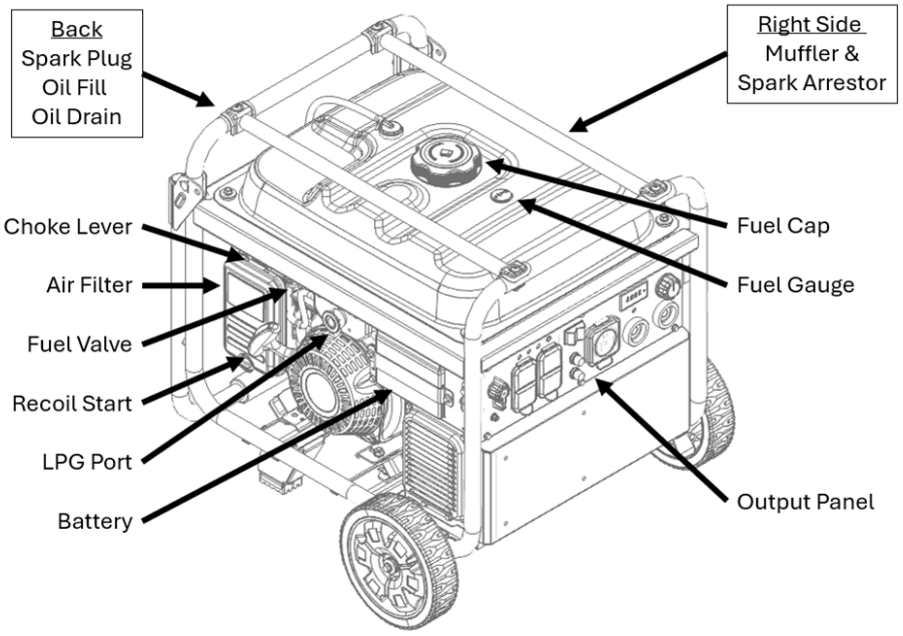


Figure 1 : GENERAL MACHINE ORIENTATION

TECHNICAL SPECIFICATIONS - BULLDOG® 145 (K5792-1)

INPUT - GASOLINE AND PROPANE ENGINE				
MAKE/MODEL	**SPEED**	**DISPLACEMENT**	**IGNITION**	**CAPACITIES**
Carbureted 7 hp GB225VEM-2	3700 rpm @ full load 2800 rpm @ low idle	13.7 cu. in. (224 cc)	Electric and Manual Recoil Start	Fuel: 4.0 gal. (15 L) Oil: 0.58 qts. (0.55 L)

WELDING RATED OUTPUT @ 104°F (40°C)			
Welding Process	**Welding Output - IEC Rating**	**Welding Ranges**	**Weld OCV**
DC Stick Welding, Constant Current	125 A / 25 V / 100 % duty cycle 131A / 25.2 V / 60% duty cycle	15-150 Amps DC	76 Volts

AUXILIARY OUTPUT @ 104 °F (40°C)			
Continuous	**Peak**	**Receptacle**	**Circuit Breaker**
3,600 Watts Single Phase 60Hz	4,000 Watts Single Phase 60Hz	120 VAC Duplex (5-20R), GFCI Protected	20 Amps
		120 VAC Duplex (5-20R), GFCI Protected	20 Amps
		240 VAC (6-50R)	N/A

ENGINE SPECIFICATIONS	
EPA Emission	Evaporative
Warranty (USA)	2 Year Complete (Parts and Labor) 3 Year Major Components (Parts and Labor)
Battery	12V 7Ah Battery
Fuel System	Gravity Feed
Air Cleaner	Foam Element
Lubrication	Splash
Engine Protection	Low Oil Level Alarm
IEC Rating	cETLus; IEC 60974-1; IP23S, PGMA G300
Temperature Range	-10°C to +40°C Operating Range

PHYSICAL DIMENSIONS					
	HEIGHT	**WIDTH**	**DEPTH**	**WEIGHT**	**SOUND**
MACHINE ONLY	19.8 in.	20.9 in.	24.2 in.	128 lbs. (58 kg.)	79.6 dB at 23 ft. (7 m.) under full load
WITH WHEELS AND HANDLES	24.3 in.	25.1 in.	25.8 in.	134 lbs. (61 kg.)	

SAFETY PRECAUTIONS

⚠ WARNING

Hazards of Electric Shock, Engine Exhaust & Moving Parts

• Do not attempt to use this equipment until you have thoroughly read all operating and maintenance manuals supplied with your machine. They include important safety precautions, detailed engine starting, operating and maintenance instructions, and parts lists.

• Save these instructions.

⚠ WARNING

ELECTRICAL SHOCK CAN KILL

- Do not touch electrically live parts or electrode with skin or wet clothing.
- Insulate yourself from work and ground.
- Always wear dry insulating gloves.

⚠ WARNING

ENGINE EXHAUST can kill.

- Use in open, well ventilated areas or vent exhaust outside.
- Do not stack anything on or near the engine.

⚠ WARNING

MOVING PARTS can injure.

- Do not operate with doors open or guards off.
- Stop engine before servicing.
- Keep away from moving parts.

Only qualified personnel should install, use, or service this equipment.

LOCATION AND VENTILATION

Position the BULLDOG® 145 to ensure proper ventilation of engine exhaust, at least 20 feet away from windows, doors and vents. Keep all objects at least 5 feet (1.5 m) away from the muffler and engine exhaust. Ensure an unrestricted flow of clean, cool air to the air inlets; locate the Bulldog to avoid heated air coming out of the welder recirculating back into the air inlet.

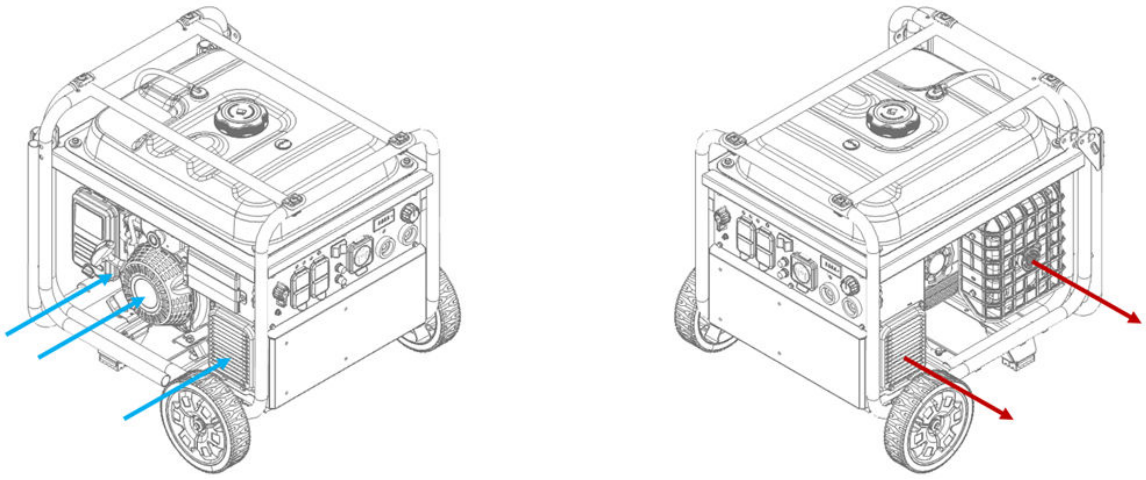


Figure 2 : BULLDOG® 145 Airflow

Lincoln Electric does not recommend operating the Bulldog in an enclosed or partially enclosed space, such as a trailer, vehicle, compartment or room.

Notice: Loading the BULLDOG® 145 creates vibration from the engine. Chock the wheels or clamp the frame as necessary to prevent movement of the machine.

⚠ CAUTION

DO NOT MOUNT OVER COMBUSTIBLE SURFACES

• Where there is a combustible surface directly under stationary or fixed electrical equipment, that surface should be covered with a steel plate at least .06”(1.6mm) thick, which should extend not less than 5.90”(150mm) beyond the equipment on all sides.

TILTING

Place the machine directly on a secure, level surface. The machine may topple over if this procedure is not followed. The maximum angle of continuous operation is 15°. Engine oil must be at FULL capacity. When operating at an angle, the effective fuel capacity will be reduced.

ENVIRONMENTAL LIMITATIONS

⚠ WARNING

ELECTRIC SHOCK CAN KILL.

- Do not operate the BULLDOG® 145 in rain or snow or where wet conditions are present.

The BULLDOG® 145 is IP23S rated for use in an outdoor environment. It should not be subjected to falling water during use nor should any parts of it be submerged in water. Doing so may cause improper operation as well as pose a safety hazard. The best practice is to keep the machine in a dry, sheltered area. Use Nylon Cover K5981-1 when not in use.

WHEEL KIT INSTALLATION

Tools needed:

- 10 mm socket
- 13 mm socket

1. Put the BULLDOG® 145 in a secure, stable position with access to the frame bottom.
   a. For an empty machine (no fuel or oil): Place the machine on a flat, solid surface. Slowly and gently rotate the machine onto the output end. To prevent scratches, clean or cover the surface first.
   b. For a machine with fluids: Lift with two people and place on supports of appropriate weight capacity. Secure machine to prevent falling.
2. Locate the threaded holes in the frame. Align and secure each leg and wheel axle with four M6×14 bolts.

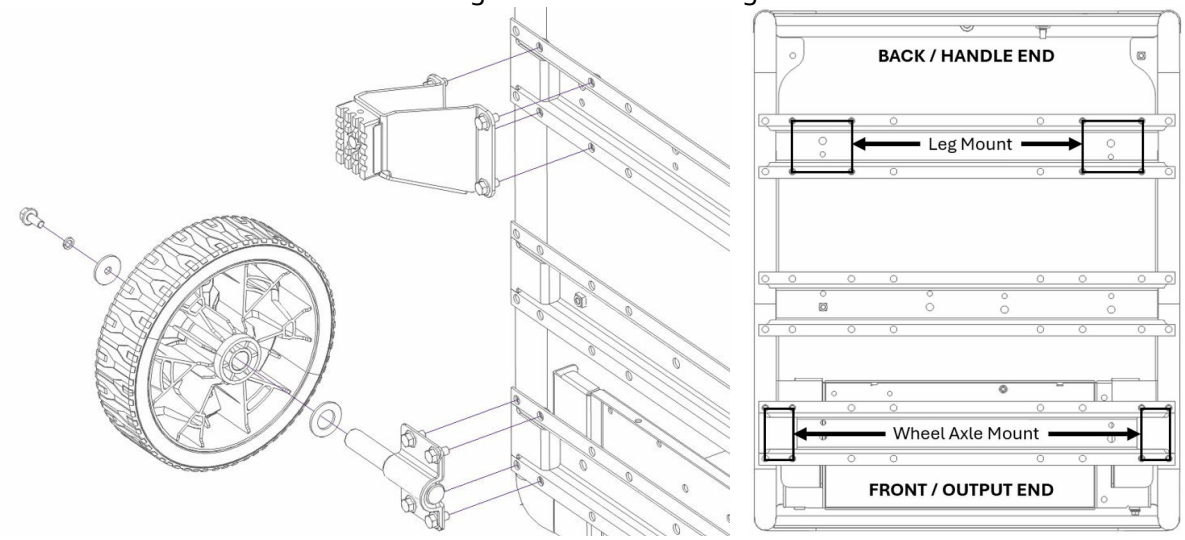


Figure 3 : LEG AND WHEEL INSTALLATION

3. Place a 16 mm flat washer and then a wheel onto the axle. Place the spring washer and then the 6 mm flat washer onto a M6x14 bolt. Secure a bolt to the end of each axle.

4. Pull back the spring-loaded pin and align the holes in the handle and the frame. On each side, insert a M8×45 bolt from the outside of the frame and secure a nut on the inside.

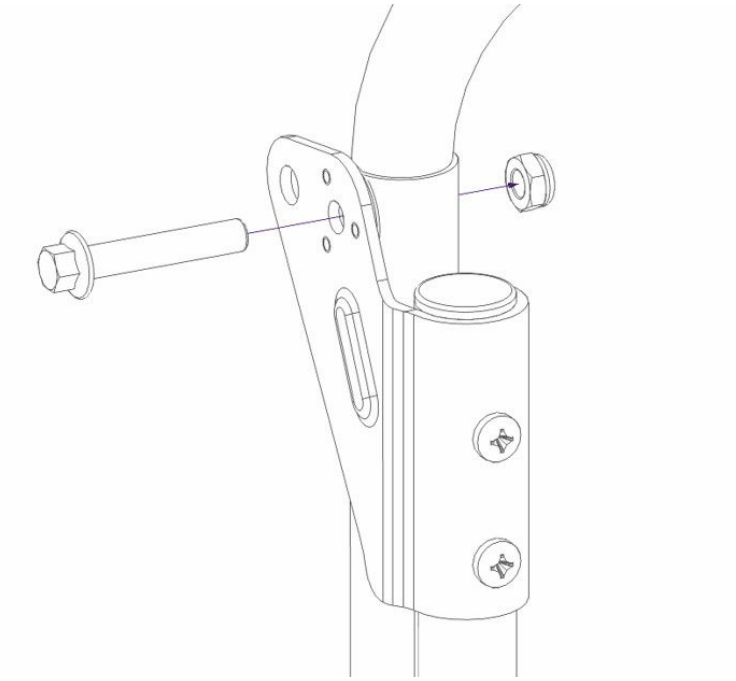


Figure 4 : HANDLE INSTALLATION

SERVICE TRUCK INSTALLATION

⚠ WARNING

- Improperly mounted concentrated loads may cause unstable vehicle handling and tires or other components to fail.
- Only transport this welding equipment on serviceable vehicles which are rated and designed for such loads.
- Distribute, balance and secure loads so vehicle is stable under conditions of use.
- Do not exceed maximum rated loads for components such as suspension, axles and tires.
- Mount equipment base to metal bed or frame of vehicle. Do not mount the welder using rubber mounts.
- Follow vehicle manufacturer's instructions.
- Do not install equipment where air flow is restricted. Equipment or the engine may overheat.
- Do not weld on the base. Welding on the base may cause fuel tank explosion or fire.
- Always ground the equipment frame to the vehicle frame to prevent electric shock and static electricity hazards.
- Do not place propane or shielding gas tanks near hot air or exhaust.

To securely fasten the BULLDOG® 145 to a truck bed or trailer, do not install the wheel kit and use the mounting holes marked in Figure 5 : MOUNTING HOLES on page A-7 instead. Connect a ground cable from the welder to the metal frame of the vehicle. Use insulated AWG #8 cable or larger (not supplied with the Bulldog).

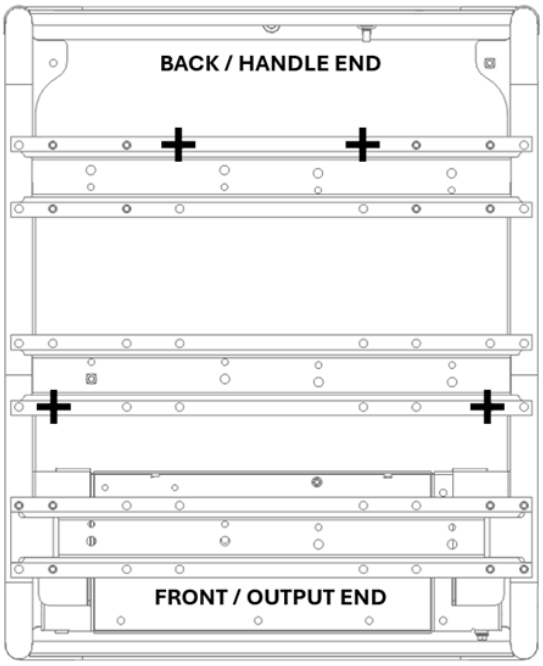


Figure 5 : MOUNTING HOLES

MACHINE GROUNDING

⚠ WARNING

ELECTRIC SHOCK can kill.

- Always properly ground the BULLDOG® 145.

Ground the BULLDOG® 145 using the dedicated stud on the output panel (see Figure 6 : GROUND STUD LOCATION on page A-8). Use 8 AWG copper wire or larger. DO NOT connect anything to the engine ground on the frame.

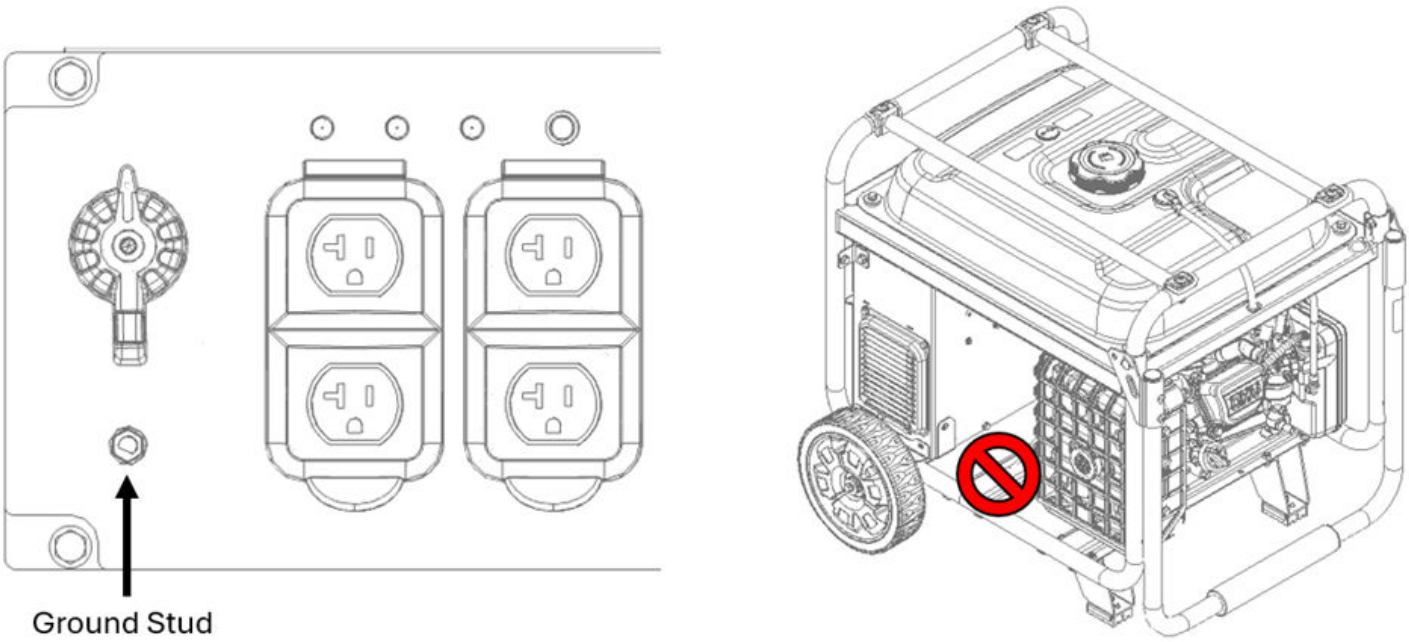


Figure 6 : GROUND STUD LOCATION

The neutral circuit is connected to the frame of the Bulldog. The system ground is connected to the AC neutral wire. Refer to a qualified electrician for proper compliance with local electrical codes.

LIFTING

⚠ WARNING

FALLING EQUIPMENT can cause injury.

- Lift only with two people or equipment of adequate lifting capacity.
- Be sure machine is stable when lifting.
- Do not operate machine while suspended.
- Never lift the BULLDOG® 145 off of the ground by the fold out handle. Lift only by the rigid tube frame.

⚠ WARNING

FUEL AND VAPORS are extremely flammable.

- Always close the fuel shut-off valve before moving or transporting.

The BULLDOG® 145 should be lifted by two people (See TECHNICAL SPECIFICATIONS - BULLDOG® 145 (K5792-1) on page A-2 for weight).

STACKING

The BULLDOG® 145 CANNOT be stacked.

MOVING

To move the BULLDOG® 145 with the wheel kit:

1. Turn off the engine.
2. Close the fuel shut-off valve. If running on propane, close the LPG tank and disconnect the hose from the machine.
3. Unplug any cables or cords.
4. Raise the fold out handle; the locking pin will spring into place.
5. Lift up on the handle until the rear end is off the ground and the BULLDOG® 145 is balanced on the wheels.
6. While maintaining balance, roll the machine to the desired location. Improper balancing on the wheels may damage the handle, locking pin, or frame.

Notice: Wheels are not intended for over the road use. Do not tow the BULLDOG® 145.

⚠ CAUTION

FOLDING HANDLE may create pinch points.

- Keep hands away from the handle pivot and latch mechanism when moving the fold out handle.
- Confirm that the handle is secured by the pin prior to moving.

STORING

Store the BULLDOG® 145 in a cool, dry place when it is not in use. Protect it from dust and dirt. Keep it where it can not be accidentally damaged from construction activities, moving vehicles and other hazards. Run for 20 minutes at least once every two weeks.

Long Term Storage

If storing for over 30 days, take additional steps to protect the fuel system and carburetor parts from gum deposits. Choose one of the following options:

- Drain the fuel - Close the gasoline tank valve and wait for the engine to use up the remaining fuel and stall. Empty the tank of all fuel.
- Add fuel stabilizer to store with fuel for up to 24 months - Shut the machine off and mix the additive with the fuel in the tank. Allow the engine to run for a short time to circulate the additive through the carburetor.

Once the fuel has been either drained or stabilized, complete the following:

- While the engine is still warm, change the oil.
- Remove the spark plug and pour approximately ½ ounce (15ml) of engine oil into the cylinder. Replace the spark plug and crank the engine slowly to distribute the oil.
- Clean any dirt and debris from the vents, cylinder, and muffler areas.

- Store in a clean, dry area.

OIL

Notice: Do not crank or start the engine before it has been filled with the correct amount of proper oil. Damage to the engine may occur and void the warranty.

Use 4-stroke motor oil that meets or exceeds the requirements for APIO service classification SJ. SAE 10W-30 is recommended for general, all temperature use. Temperature range is 10°F to 115°F (-12°C to 46°C). Follow the instructions in SERVICE INTERVALS on page D-1 to fill.

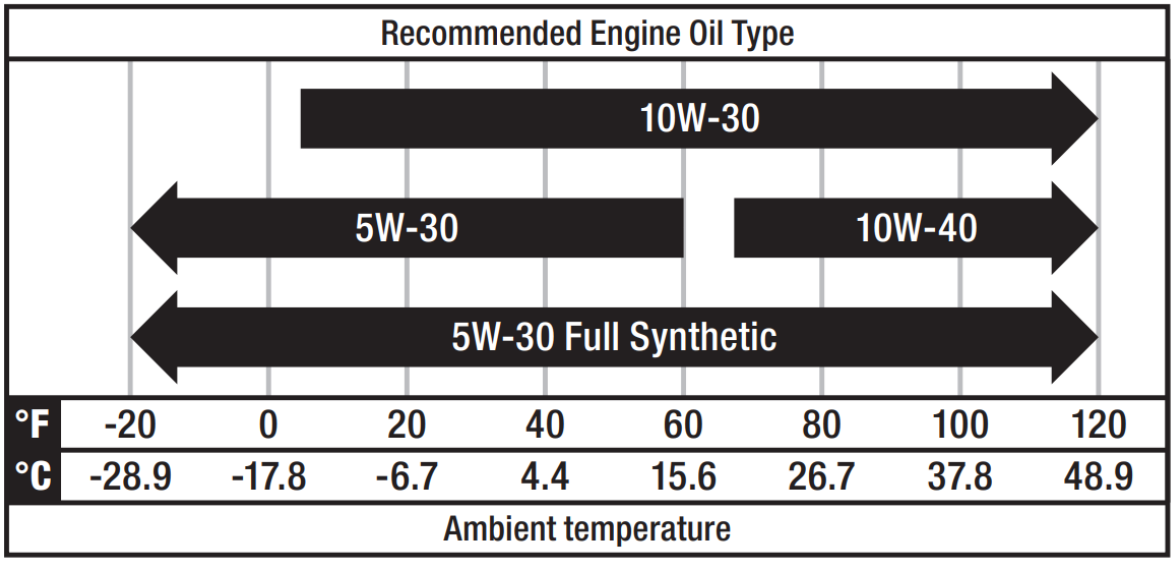


Figure 7 : Engine Oil Types

Use the included bottle of engine oil to fill the machine the first time. Insert the dipstick (but do not screw it in) and verify the oil level is filled to the upper mark. Make certain that the oil filler cap is tightened securely before starting the engine.

The low oil sensor will prevent the engine from starting if the oil level is below a safe limit. To avoid an inconvenient shutdown, check oil levels regularly.

FUEL

Gasoline

⚠ WARNING

GASOLINE can cause fire or explosion.

- Stop engine before and during fueling.
- Do not smoke when fueling.
- Keep sparks and flame away from tank.
- Do not leave unattended while fueling.
- Wipe up spilled fuel and allow fumes to clear before starting engine.
- Replace the fuel cap only with the proper cap from Lincoln Electric.
- Do not pump gasoline directly into the BULLDOG® 145 at the pump. Use an approved fuel container to transfer fuel to the Bulldog.

The fuel gauge on top of the tank shows the approximate amount of gasoline in the tank. Fill with clean, fresh, lead-free gasoline with a maximum 10% ethanol and a minimum octane rating of 87.

To refuel with gasoline:

1. Turn the machine OFF. Allow to cool.
2. Remove the gasoline cap, loosening slowly to relieve any pressure in the tank.
3. Slowly add fuel to the tank until it reaches the “Fuel Level” marking in the debris filter. DO NOT OVERFILL.
4. Screw on the gasoline cap and wipe away any spilled fuel.

Notice: Overfilling the tank will damage the engine and void your warranty.

Propane (LPG)

⚠ WARNING

PROPANE can cause fire or explosion.

- Keep sparks and flame away.
- Do not smoke near the LPG supply tank.
- Never place the LPG hose or cylinder tank near the muffler or exhaust gases.
- Always keep the cylinder in a vertical position.
- Turn off the cylinder valve and disconnect the LPG hose when moving or transporting.
- Avoid sharp bends or kinks in the hose. Keep away from sharp edges.
- All leak testing must be done in a well ventilated area free from all potential ignition sources. Replace a leaking tank or connector immediately.

The propane regulator and adapter are designed to fit 20 lb liquefied petroleum gas (LPG) tanks commonly used for outdoor grills. The maximum output when using LPG will be less than when using gasoline.

To fuel with propane (LPG):

1. Turn the machine OFF.

2. Attach the LPG hose assembly to the propane cylinder valve and hand tighten. New propane cylinders may require the removal of a plastic cap protecting the valve. DO NOT OVERTIGHTEN.
3. Remove the rubber boot covering the propane connection port on the BULLDOG® 145.
4. Remove the rubber cap from the connector of the LPG hose.
5. Insert the LPG hose connector into the quick connect coupling on the machine. Push in until there is a click and the ring of the quick connect coupling springs outward.
6. Fully open the valve on the LPG tank.

Once connected, the BULLDOG® 145 will automatically switch to running on propane rather than gasoline. To switch back to running on gasoline, simply disconnect the propane hose from the machine (push the ring of the quick connect coupling and the hose will eject).

SPARK ARRESTER

Some federal, state or local laws may require gasoline engines to be equipped with exhaust spark arresters when they are operated in certain locations where unarrested sparks may present a fire hazard. The standard muffler included with this machine comes equipped with a spark arrester.

Notice: An incorrect additional arrester may lead to damage to the engine or adversely affect performance.

BATTERY CONNECTION

The BULLDOG® 145 is shipped with the battery cable disconnected. To use electric start, ensure the engine is OFF and plug in the connector. See Figure 8 : Battery Connection on page A-12 .

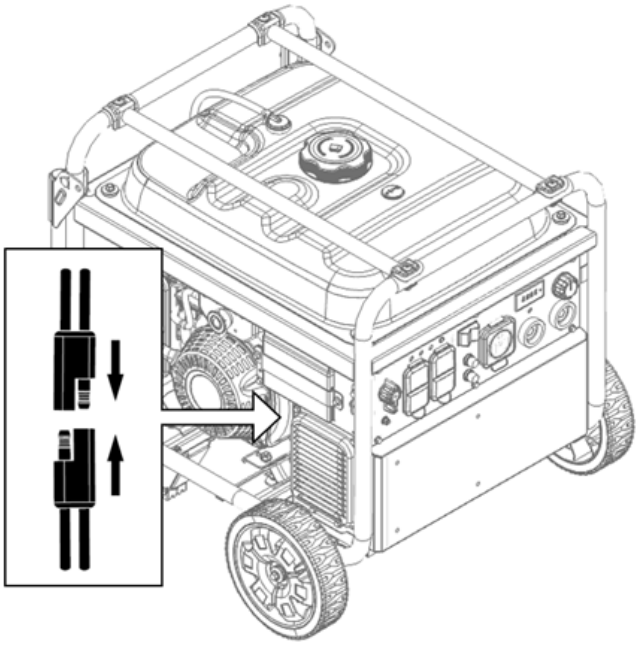


Figure 8 : Battery Connection

This machine is furnished with a wet charged battery; if unused for several months, the battery may require a booster charge.

- Always disconnect the battery cable before charging the battery.
- See BATTERY MAINTENANCE on page D-4 .

WELDING SETUP

Welding Cable Selection

Ensure welding cables are large enough for operation. The correct size and length becomes especially important when you are welding at a distance from the welder.

In the table below, the lengths stipulated describe distance from the welder to work and back to the welder. Cable sizes are increased for greater lengths to minimize cable drop.

Table 1 :Recommended Cable Gauge

RECOMMENDED CABLE SIZES (RUBBER COVERED COPPER - RATED 75° C)**				
Amperes	Duty Cycle	Cable Sizes For Combined Lengths Of Electrode And Work Cables		
		0 To 50 Ft.	51 To 100 Ft.	101 To 150 Ft.
125	100%	#4	#2	#2
150	60%	#2	#2	#2

** Listed values are for operation at ambient temperatures of 40°C and below. Applications above 40°C may require cables larger than recommended, or cables rated higher than 75°C.

Stick Welding

For most stick welding procedures, use DC+ polarity: connect the electrode to the Positive (+) terminal and the work lead to the Negative (-) terminal. See Figure 9 : DC+ SETUP on page A-14 .

1. Turn the machine OFF.
2. Insert the connector with the key lining up with the keyway. Rotate the connector approximately 1/4turn clockwise to snugly lock in place. Do not over tighten.
   a. Do not allow bare weld cable to touch the machine.
   b. Do not cross welding cables at output stud connection. Keep isolated and separate from one another.
3. Ensure the metal piece you are welding (the “work”) is securely connected to the work clamp and cable.

Notice: Loose connections will cause the output terminals to overheat. The terminals may eventually melt.

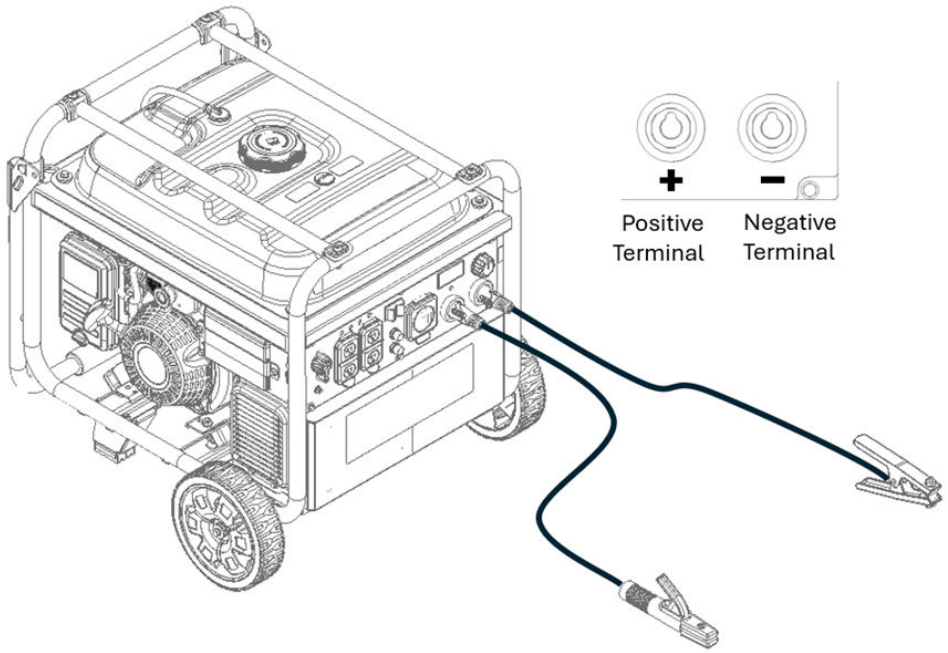


Figure 9 : DC+ SETUP

For more information on welding , see WELDING OPERATION on page B-14 section of this manual.

OPERATION

SAFETY PRECAUTIONS

⚠ WARNING

• To reduce the risks to yourself and others, read and understand all markings.

• Before operating, read and understand the manufacturer's instruction manual and instructions for the consumable to be used, including the Safety Data Sheet (SDS).

• Follow your employer's safety practices. Only qualified persons are to install, use, or service this equipment.

• Read ANSI Z49.1, Safety in Welding, Cutting and Allied Processes (you can download a copy from the American Welding Society web site at https://www.aws.org or call 1-800-443-9353). OSHA Safety and Health Standards, 29 CFR 1910, is available as a free download from https://www.osha.gov or phone 1-202-512-0000.

⚠ WARNING

ELECTRIC SHOCK can kill.

• Do not touch electrically live parts or electrode with skin or wet clothing.

• Insulate yourself from work and ground.

• Always wear dry insulating gloves.

• Do not operate with panels removed.

• Stop engine before servicing.

⚠ WARNING

WELDING SPARKS can cause fire or explosion.

• Keep flammable material away.

• Do not weld on containers that have held combustibles.

⚠ WARNING

ARC RAYS can burn.

Wear eye, ear and body protection.

⚠ WARNING

ENGINE EXHAUST, FUMES, AND GASES can kill.

- Use in open, well ventilated areas or vent exhaust outside.
- Do not stack anything on or near the engine.
- Keep your head out of welding fumes.
- Use ventilation or exhaust extraction to remove fumes from breathing zone.
- Do not inhale LPG fumes.

⚠ WARNING

FUEL can cause fire or explosion.

For gasoline:

- Stop engine when fueling.
- Do not smoke when fueling.
- Keep sparks and flame away from tank.
- Do not leave unattended while fueling.
- Wipe up spilled fuel before starting engine.
- Do not overfill tank; fuel expansion may cause overflow.
- Do not fill when engine is hot.

For liquefied petroleum gas (LPG):

- Keep sparks and flame away from machine and LPG supply tank.
- Do not smoke or allow any potential ignition sources near the LPG supply tank.
- Do not expose the LPG supply cylinder to temperatures exceeding 120°F (49°C).
- Always be certain that the LPG supply tank is NOT in the welding circuit. Do not allow either welding cable to come in contact with the supply tank.
- Do not weld on or near the LPG supply tank.
- Replace the fuel supply hose if there is excessive abrasion, cracks or wear or if the hose is cut.

⚠ WARNING

MOVING PARTS can injure.

- Do not operate with doors open or guards off.
- Stop engine before servicing.
- Keep away from moving parts.

⚠ CAUTION

FOLDING HANDLE may create pinch points.

- Keep hands away from the handle pivot and latch mechanism when moving the fold out handle.
- Confirm that the handle is secured by the pin prior to moving.

⚠ WARNING

FALLING EQUIPMENT can cause injury.

- Lift only with equipment of adequate lifting capacity.
- Be sure machine is stable when lifting.
- Do not operate machine while suspended.

⚠ WARNING

HOT AIR AND SURFACES can burn.

- Do not touch hot surfaces.
- Keep away from hot exhaust and exit air.
- Do not place fuel or shielding gas tanks near hot air or exhaust.

⚠ WARNING

GASES FROM BATTERY can explode.

- Keep sparks, flame, and cigarettes away from battery.
- Wear gloves and eye protection and be careful when boosting, charging, or working near battery.
- Follow these instructions and those marked on the battery.

⚠ WARNING

BATTERY ACID can burn eyes and skin.

⚠ WARNING

WATER increases risk of electric shock.

- Do not subject to falling water during use or in damp locations.
- Do not place machine in puddles or otherwise submerge in water.

⚠ WARNING

DO NOT REMOVE OR COVER this safety marking.

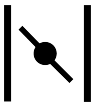
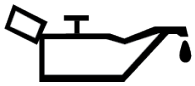
⚠ WARNING

ALL OBJECTS must be kept at least 5 ft. away from the muffler and engine exhaust.

Only qualified personnel should install, use, or service this equipment.

Observe additional Safety Guidelines detailed throughout this manual.

GRAPHIC SYMBOLS

	WARNING / CAUTION		CHOKE		INSTRUCTIONS
	OIL		HOT SURFACE		THREE PHASE ALTERNATOR
	FUEL		FIRE		SMAW WELDING
	EXPLOSION		GROUND (AUXILIARY POWER)	U_0	OPEN CIRCUIT VOLTAGE
	HIGH IDLE		POSITIVE OUTPUT		NEGATIVE OUTPUT
	LOW IDLE		STOP	I_2	OUTPUT CURRENT
	AUTO IDLE		START	X	DUTY CYCLE
	DIRECT CURRENT		ELECTRIC SHOCK	U_2	OUTPUT VOLTAGE
	ARC RAYS		FUMES AND GASES	n	RATED LOAD SPEED
	FALLING EQUIPMENT		MOVING PARTS	n_0	RATED NO-LOAD SPEED
	DO NOT COVER OR REMOVE LABEL		HOT SURFACES	n_i	RATED IDLE SPEED
	BATTERY		BATTERY EXPLOSION		BATTERY ACID

QUICK START INSTRUCTIONS

The quick start instructions are a convenient reference, to be used IN ADDITION to the instruction manual. Thoroughly read the instruction manual before attempting to use this equipment, it includes important safety precautions, detailed operating information, and a troubleshooting guide.

Running The BULLDOG® 145

1. Check oil. Engine must have sufficient oil of the correct type.
2. Check fuel. Verify the gasoline tank is filled properly or an LPG tank is connected.
3. Connect battery for electric start.
4. Open fuel valve.
5. Move choke (yellow lever) to CHOKE position.
6. Start the engine: For electric start, turn the switch to START position. For manual start, set switch to HIGH IDLE and pull the recoil start cord.
7. Once the engine has started, move choke lever to RUN position.
8. Once the engine has warmed up, connect loads.

Stopping The BULLDOG® 145

1. Turn off and remove loads.
2. Let engine run with no load to stabilize, then turn off engine.
3. Close fuel valve for storage or transportation.

CONTROLS

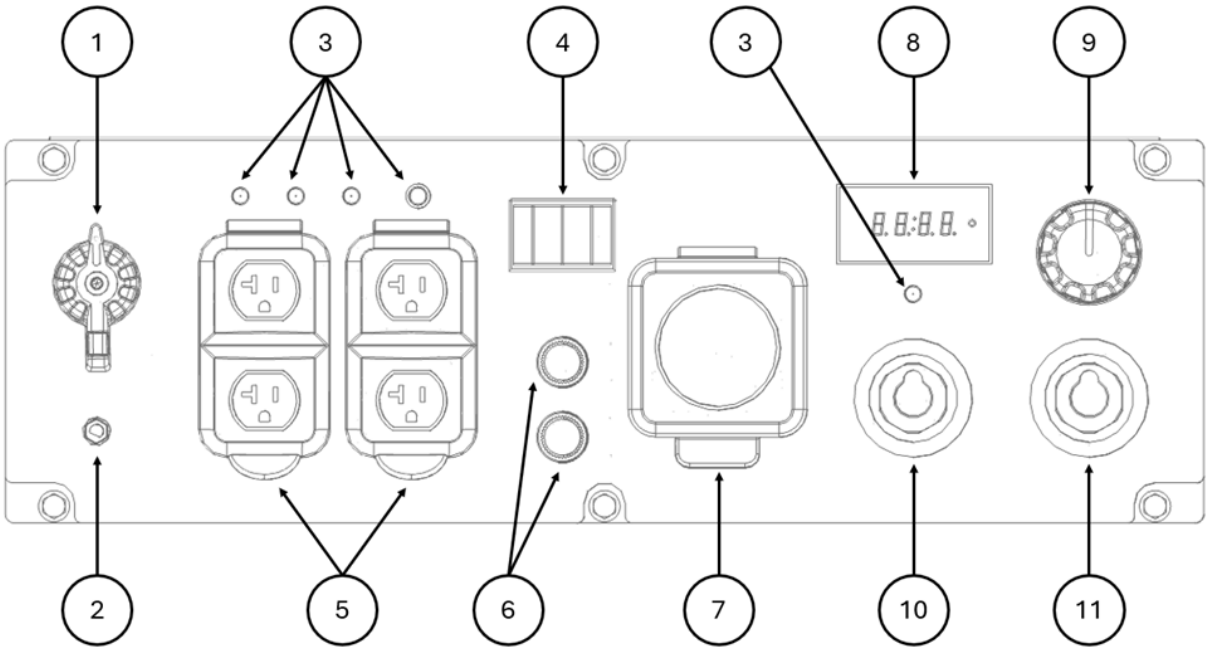


Figure 10 : Output Panel Controls

Basic Operation

1. **Ignition Switch**: Stop, start, and idle the engine.
2. **Ground Stud**: Connection point for earth ground. See MACHINE GROUNDING on page A-7 .
3. **Indicator Lights**: Communicates machine status such as low oil, CO protection, overload, and overheating. See Indicator Lights on page B-8 .

Generator

4. **AC Output Selector**: Set generator output to either the 120V duplexes or 240V receptacle.
5. **120 Volt Duplex Receptacles**: Supply 120VAC power through four 5-20R receptacles, and 5VDC power through two USB-A and two USB-C receptacles.
6. **Circuit Breakers**: 20 Amp overload protection for the 120V duplexes.
7. **240 Volt Receptacle**: Supply 240VAC power through one 6-50R receptacle.
8. **Meter**: Display AC output voltage and frequency, runtime, and engine hours. See Table 3 :Meter Reading Descriptions on page B-10 .

Welder

9. **Welding Amp Control**: Adjust continuous current output, with markings for amperage value and recommended ranges for various electrode sizes
10. **Welding Positive Output Terminal**: Connection point for the electrode holder when welding DC+, or for the work cable when welding DC-.
11. **Welding Negative Output Terminal**: Connection point for the work cable when welding DC+, or for the electrode holder when welding DC-.

Indicator Lights

The front panel of the Bulldog® 145 has four indicator lights and a lighted button (for Overload/Reset) to communicate machine status.

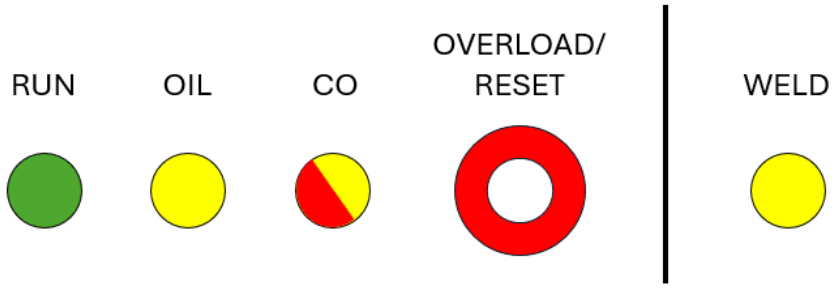
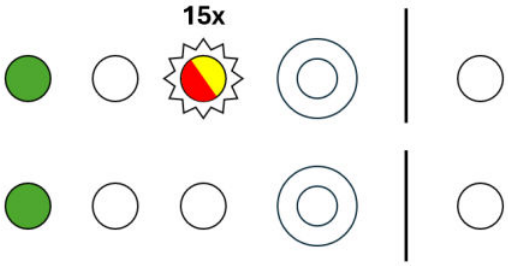
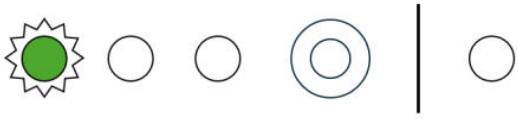
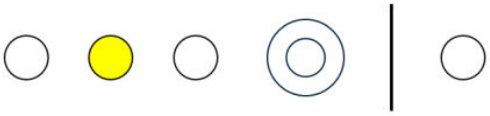
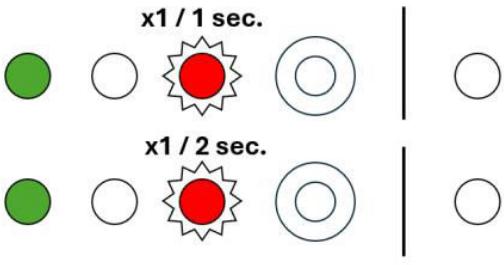
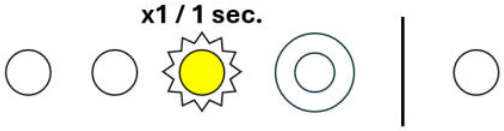
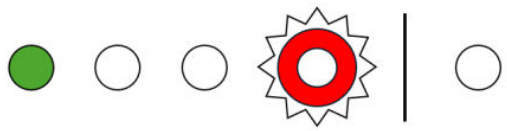
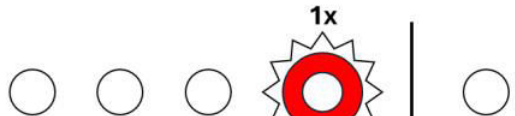
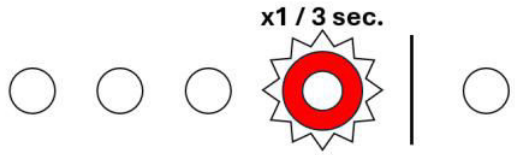
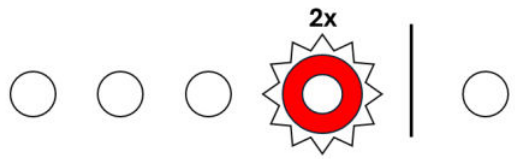
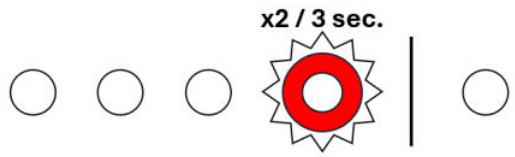
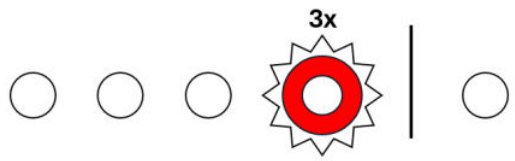
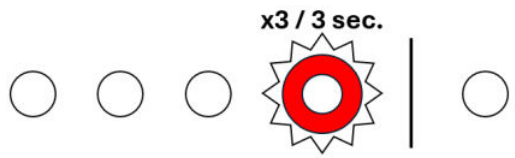
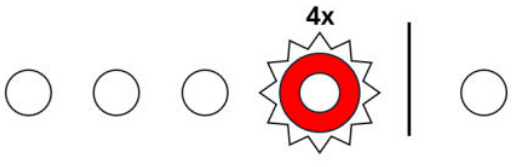
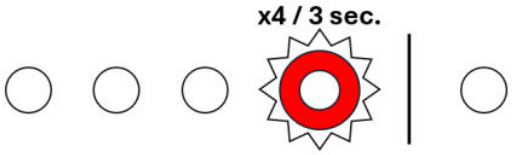
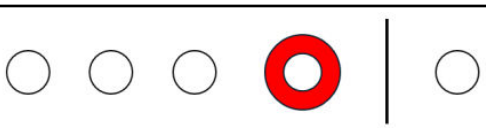


Figure 11 : Indicator Lights

Table 2 :Indicator Light Statuses

	**RUN** light solid green **CO** light flashes yellow or red 15 times (2x per second) when the engine is started, then turns off.
	Normal operation: The CO level is below 70ppm.
	**RUN** light flashes green
	Delayed output: No auxiliary power output.
	**OIL** light solid yellow
	Low oil: The engine will not start. If Bulldog is running, the engine will turn off.
	**CO** light flashes red once per second (15 times), then flashes red once every two seconds.
	High CO levels detected: The Bulldog engine will turn off and will not start. Immediately move to fresh air.
	REMINDER: Only operate the Bulldog outside, far away from windows and doors. Do not run the Bulldog in an enclosed space, like a trailer, vehicle, compartment or room, even if the doors and windows are open.
	**CO** light flashes yellow once per second.
	CO sensor fault: The CO sensor has lost sensitivity and must be replaced. The Bulldog will not start until a good CO sensor is installed.

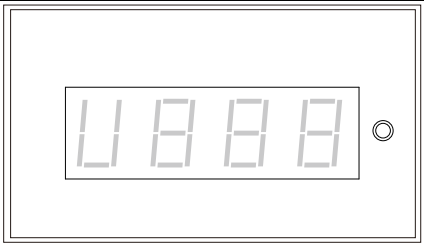
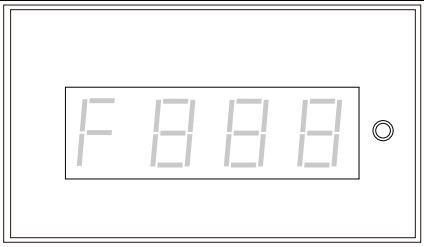
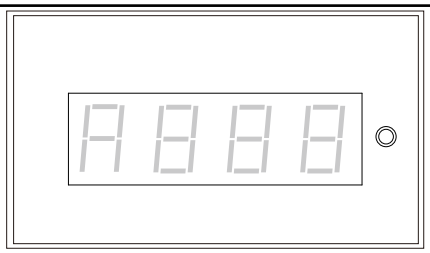
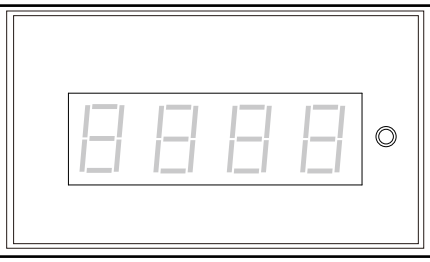
	**WELD** light solid yellow.
	Weld overheating: Weld output disabled. Make sure there is at least 5 feet of clearance around the Bulldog and the vents are not blocked. Move the Bulldog to a cooler location. Once the welding unit temperature returns to normal, the light will turn off and weld output will resume.
	**RUN** light solid green **OVERLOAD** button flashes red.
	Overload warning: AC output available. Turn off devices plugged into the Bulldog or otherwise reduce the load.
	**OVERLOAD** button flashes red once, and flashes again once every three seconds.
	**Overload protection**: AC output is disabled to protect the inverter. Turn off devices plugged into the Bulldog, then press the button to reset the inverter.
	If the Bulldog shut off, restart the machine.
	**OVERLOAD** button flashes red twice, and flashes again twice every three 3 seconds.
	**Output short circuit**: AC output is disabled. Turn off the Bulldog. Remove all loads and inspect them for a short circuit. Once the short circuit is resolved, press the button to reset the inverter.
	**OVERLOAD** button flashes red three times, and flashes again three times every three seconds.
	**Inverter overheating**: AC output is disabled. Make sure there is at least 5 feet of clearance around the Bulldog and the vents are not blocked. Move the Bulldog to a cooler location. Once the fault is cleared, press the button to reset the inverter.

	**OVERLOAD** button flashes red four times, and flashes again four times every three seconds.
	**Low engine speed**: AC output disabled. Turn off devices plugged into the Bulldog or otherwise reduce the load. Once the fault is cleared, press the button to reset the inverter.
	**OVERLOAD** button solid red.
	Fault: AC output is disabled. Overload, low engine power, or other faults present. Take the Bulldog to an authorized service shop for repair.

Meter

The meter displays useful information about how the Bulldog is running. Press the small button on the right of the meter to toggle through details on the AC output and machine hours.

Table 3 :Meter Reading Descriptions

1	Voltage (V)	Voltage of the generator output, in volts	
2	Frequency (F)	Frequency of the generator output, in Hertz	
3	Run Time (R)	Run time since the machine was started, in hours	
4	Engine Hours	Total run time since first operation, in hours. Use this reading for service intervals	

CARBON MONOXIDE (CO) PROTECTION

⚠ WARNING

Using a generator indoors CAN KILL YOU IN MINUTES.

• Always use the BULLDOG® 145 outdoors and at least 20 feet away from windows, doors and vents.

• Tampering with the CO sensor will result in a hazardous condition and will void your warranty.

• Removing the CO sensor module will not allow the Bulldog to start.

• The CO sensor is not a substitute for an indoor carbon monoxide alarm or for indoor operation.

• Operating the BULLDOG® 145 with propane (LPG) may still create CO.

The CO sensor monitors the accumulation of carbon monoxide (CO) produced by the engine exhaust. It is an odorless poisonous gas that can cause nausea, fainting, or death.

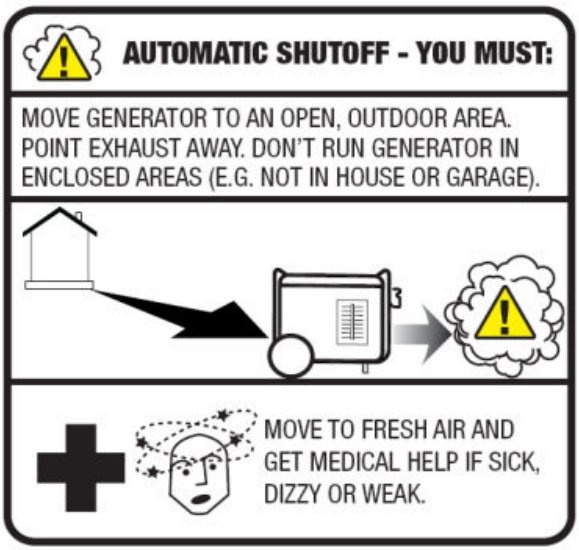
When started in clean air, the CO indicator light will flash 15 times (twice per second) indicating the CO module has powered on.

If the BULLDOG® 145 is misused and operated in an unsafe or inappropriate location where a buildup of poisonous CO gas occurs (for example in a house, garage, or garage with a door partially opened), it will automatically shut off.

- The indicator light will flash red once per second for 15 seconds. Then it will continue to blink once every two seconds for at least 5 minutes to communicate the cause of shutoff.
- Introduce fresh air and ventilate the location.
- Move the machine far away to an outdoor location at least 20 feet away from windows, doors, and vents.

If the CO sensor has a fault, the indicator light will flash yellow once per second. The BULLDOG® 145 will shut off automatically and the engine will not operate until a good sensor is installed.

Notice: CO sensors have an approximate life of 5 years, which may be significantly less in wet, humid or dusty environments.


AUTOMATIC SHUTOFF - YOU MUST:
MOVE GENERATOR TO AN OPEN, OUTDOOR AREA. POINT EXHAUST AWAY. DON'T RUN GENERATOR IN ENCLOSED AREAS (E.G. NOT IN HOUSE OR GARAGE).
MOVE TO FRESH AIR AND GET MEDICAL HELP IF SICK, DIZZY OR WEAK.

ENGINE OPERATION

Before Starting The Engine

- Verify the engine oil level by checking the dip stick.
- Verify there is sufficient fuel in the fuel tank.
- Ensure the BULLDOG® 145 is located outdoors, at least 20 feet away from any windows or doors and the exhaust is pointed away from people and buildings.
- Make sure the machine is on dry, stable and level ground with proper clearance (a minimum of 5 ft.) from other objects.
- Inspect the machine for any leaks or damage. Do not use if repairs are required.
- Disconnect all electrical loads.

Notice:

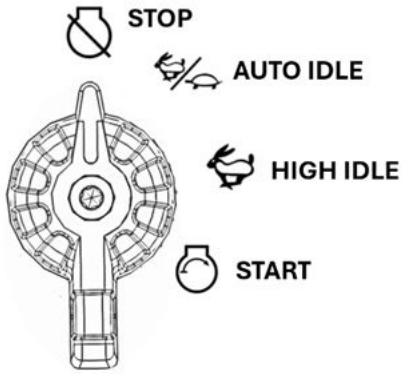
The BULLDOG® 145 is shipped without oil in the engine! Fill with oil prior to starting according to OIL CHANGE on page D-2 . Any attempt to crank or start the engine before it has been properly filled may result in engine damage and void your warranty.

Starting The Engine

1. Disconnect all electrical loads.
2. Turn on the fuel supply.

a. For gasoline, open the fuel tank valve.
b. For propane, open the valve on the LPG tank.

3. If the engine is cold, move the choke lever to the CHOKE position.



For Electric Start:

4. Rotate the engine control switch to the START position and hold for up to 5 seconds. Once the engine starts, release it to HIGH IDLE.
5. If the engine does not start within 5 seconds, move the switch back to OFF and wait 10 seconds. If it fails three times in a row, wait 1 minute before trying again.

Notice: Cranking the engine longer than 5 seconds may flood the engine or damage the starter motor.

For Manual Start:

4. Rotate the engine control switch to the HIGH IDLE position.
5. Slowly pull the recoil cord until resistance is felt, and then pull rapidly.

6. Once the engine has started (in cold temperatures this may take a few seconds), move the choke lever to the RUN position
7. Allow the engine to warm up for a few minutes before applying large electrical loads.

Engine Idle

Set the ignition switch to AUTO IDLE to save fuel and reduce noise. When no welding or generator power has been used for 10 to 15 seconds, the engine will drop to LOW IDLE. When a load is applied the engine will automatically return to HIGH IDLE.

Stopping The Engine

1. Turn off all electrical loads and disconnect them.
2. Allow the engine to run at no-load for several minutes to stabilize the internal temperature of the engine.
3. Rotate the engine control switch to the OFF position.
4. Turn off the fuel supply.
   a. For gasoline, close the fuel tank valve on the machine.
   b. For propane, close the valve on the LPG tank. Then, disconnect the hose from the machine (push the ring of the quick connect coupling and the hose will eject).

FUEL CONSUMPTION

Gasoline

Condition	Gals / Hr	Liters / Hr	Run Time For 3.96 Gallons (Hours)
Low idle, no load	.22	.82	18.3
High idle, no load	.25	.93	16.1
DC Weld Output, 125 Amps @ 25 Volts	.61	2.31	6.5
Max. Generator Output, 3600 Watts	.57	2.16	6.9

Propane (LPG)

Condition	lbs / hr	kg / hr	Run Time For 20 lbs. (Hours)
Low idle, no load	.97	.44	20.5
High idle, no load	1.31	.60	15.2
DC Weld Output, 125 Amps @ 25 Volts	3.41	1.55	5.9
Max. Generator Output, 3240 Watts	3.34	1.51	6.0

WELDING OPERATION

The BULLDOG® 145 has a welding range suitable for 3/32”, 1/8” and 5/32” diameter Lincoln DC electrodes. Adjust the welding amperage knob to set the output based on electrode type and size.

Electrode	Application	Polarity
Steel E6013	Shallower penetrating electrode that can be used in all positions. Commonly used for wide root openings, or conditions of poor fit up.	DC+
Steel E7018	Low hydrogen electrode used for joints involving high-strength (structural), high carbon, or low alloy steels. Smooth arc with medium arc penetration. Can be used in all positions.	DC+

Duty Cycle

The duty cycle specifies the amount of welding time per ten-minute basis. For an output of 131 amps and 25.2VDC the duty cycle is 60%, which means welding can be performed for six minutes out of every ten minute period. At lower outputs, the duty cycle will be higher.

Limitations

- Not recommended for any processes besides those that are normally performed using stick welding (SMAW) procedures.
- Do not use for pipe thawing.
- Overloading the welder will disrupt output. Depending on the cause, the engine may decrease speed or shut down.

GENERATOR OPERATION

⚠ WARNING

ELECTRIC SHOCK can result in serious injury or death.

• Always perform the GFCI test before using the generator. If the GFCI system fails the test, the machine must be repaired by an authorized service center.

• If the GFCI fails to trip when the test button is pressed (GFCI light does not turn red) or fails to reset (GFCI light does not turn green) the device is inoperative and should be replaced immediately.

• If the GFCI tests properly without any appliance connected to it but trips each time an appliance is connected to it, the appliance has a ground fault and needs to be repaired or replaced. DO NOT USE THE APPLIANCE IF THIS CONDITION OCCURS. A REAL SHOCK HAZARD MAY EXIST.

• If the LED turns red and will not reset, or turns off (while output is set to 120VAC), stop using the GFCI receptacle and have it replaced by an authorized service center.

• Long extension cords or cords with poor insulation may allow enough leakage current to trip the GFCI.

⚠ WARNING

Risk of POWER INTERRUPTION.

• Do not power life support equipment from this machine.

Output

- The generator uses an inverter to provide clean power with ≤3% THD-F, making it suitable for powering sensitive electronics.
- The output frequency is controlled to 60Hz ±1 under steady state conditions.
- For equipment with large start-up power demand, turn the engine control switch to HIGH IDLE. Most motors require more than their rated wattage for start-up and may not allow the engine to reach normal operating speed if the machine is set to AUTO IDLE.
- The output voltage is within ±3% at all loads up to rated capacity under steady state conditions. For equipment affected by momentary voltage fluctuations, install a plug-in surge suppressor on the receptacles feeding the equipment.
- Plug in and turn on equipment from largest to smallest wattage.
- To achieve rated output using the 120V receptacles, share multiple loads between both duplexes. (Example: for two pieces of equipment, plug one into each duplex).

Notice: Do not switch between 120V and 240V output while the machine is loaded.

Notice: The Lincoln Electric Company is not responsible for any damage to electrical components improperly connected to this product.

Receptacles and Protection

120 Volt Duplex Receptacles	Each duplex is GFCI protected. A green light illuminates when the receptacle is receiving power. The light turns red when the GFCI has tripped. **Notice:** Use only three wire grounded type plugs or approved doubled insulated tools with two wire plugs.
Circuit Breakers	One 20 amp circuit breaker protects each of the 120V duplexes from overload. If the circuit breaker opens, the receptacles will not output power. Press the circuit breaker to reset.
240 Volt Receptacle	The 240V receptacle is protected by the maximum generator output, which cannot exceed the receptacle's 50A rating.

The current rating of any plug used with a receptacle must be at least equal to the rating of the receptacle. The 120V receptacles are rated for 20A, the USB ports are rated for 2.4A, and the 240V receptacle is rated for 50A.

Overloading the generator will disrupt output. Depending on the cause, it may trip the circuit breaker, initiate inverter protection, or decrease engine speed. See LOAD CALCULATION in the Appendix section for more information.

SIMULTANEOUS POWER & OVERLOAD

Welding reduces the amount of power available to the generator. Use the welding amperage to determine the power available from the generator. The maximum output when using LPG is less than when using gasoline. Operating at altitudes above 5,000 feet (1,500 meters) will also reduce output.

Table 4 :Simultaneous Power, Gasoline

Welding Output (Amps)	Permissible Generator Power (Watts)**	Permissible Generator Current (Amps)	
		120VAC*	240VAC
0	3600	30*	15
25	3000	25*	12
50	2500	20*	10
75	1800	14	7
100	1000	8	4
125	200	1	0
131	0	0	0

Table 5 :Simultaneous Power, LPG

Welding Output (Amps)	Permissible Generator Power (Watts)**	Permissible Generator Current (Amps)	
		120VAC*	240VAC
0	3200	27*	13
25	2600	22*	11
50	2000	17	8

75	1300	11	5
100	600	5	2
125	0	0	0
131	Welding Output Not Applicable		

*120VAC receptacles limited to 20 amps.

**Unity Power Factor.

Overload Condition

Attempting to draw more power from the Bulldog 145 than it is rated for will cause an overload. This will disrupt output and can damage the machine and/or devices connected to it.

In the case of an overload, remove the loads (stop welding, turn off and remove devices plugged into the generator). If the engine is still running, reset circuit breakers and press the overload button to restore output. If the engine shut off, address any indicator lights* and then restart.

Process	Overload Effect	Machine Response
Welding	Engine speed drops	If the engine speed becomes too low, the engine will shut off
	Overheating	The weld circuit will shut off and the weld indicator light* will turn on
Generator	Circuit breaker trips	Output from the duplex is disabled until the circuit breaker is reset
	Engine speed drops	If the engine speed becomes too low, the engine will shut off
	Inverter protection trips	Output is disabled and the overload light flashes the relevant code*
Both Welding and Generator	Engine speed drops	Weld output will be reduced. Generator output will continue. Engine will shut off if the speed gets too low.
	Circuit breaker trips	Weld output will continue. Duplex output will be disabled.
	Inverter protection trips	Weld output will continue. Generator output will be disabled.*

*See Indicator Lights on page B-8 .

ACCESSORIES AND OPTIONS

OPTIONS/ACCESSORIES

The following options/accessories are available for your BULLDOG 145 from your local Lincoln Distributor:

K5981-1 Bulldog Nylon Cover
K5982-1 Bulldog 100 Hour Engine Service Kit
K2394-1 Stick Electrode Holder and Cable Assembly (Twist Mate™)

MAINTENANCE

SAFETY PRECAUTIONS

⚠ WARNING

MOVING PARTS can injure.

- Have qualified personnel do all maintenance and troubleshooting work.
- Before servicing: Stop engine. Disconnect the battery. Disconnect and ground the spark plug wire.
- Remove guards only when necessary to perform maintenance and replace them when the maintenance requiring their removal is complete.

⚠ CAUTION

Running the engine produces HOT SURFACES.

- Do not touch engine or muffler during operation or immediately after stopping the engine.

Read the Safety Precautions in the front of this manual before working on the BULLDOG® 145. Keep all equipment safety guards, covers, and devices in position and in good repair. Keep your hands, hair, clothing, and tools away from the recoil housing, fans, and all other moving parts when starting, operating, or repairing this machine.

SERVICE INTERVALS

At minimum, complete inspections and replacements at the specified intervals or annually. If used under heavy duty or dirty conditions, inspect more frequently. Clean or replace any parts that become dirty or defective.

For general cleaning, use a damp cloth on exterior surfaces and use 25 psi compressed air to clear dirt or debris.

Item	Service Interval	Replacement Part Number	Included With K5982-1 Kit
Engine Oil	Check each time before use. Replace after 20 hr engine break-in*. After break-in, replace every 125 hours.	G12415-K	Y

Item	Service Interval	Replacement Part Number	Included With K5982-1 Kit
Air Filter	Check every 50 hours. Replace every 125 hours.	G12415-A11	Y
Spark Arrestor	Clean or replace every 100 hours.	G12415-A8	Y
Spark Plug	Inspect every 125 hours. Replace every 250 hours.	G12415-A12	Y
Fuel Filter	Replace every 100 hours, or if found with excessive water accumulation or sediment.	G12415-C6	Y
Fuel Lines & Clamps	Inspect every 2 years. Replace if damaged.	-	N

*When the engine is first used, there is a “break-in” period of accelerated oil consumption and deterioration. At 20 hours following first use, complete the first oil change.

Combustion chamber cleaning is not necessary for the entire engine service life in most applications. If the BULLDOG® 145 will be used long-term in heavy duty and dirty conditions, have the combustion chamber cleaned by an authorized service center every 250 hours or annually.

OIL CHANGE

Drain the oil while the engine is warm to assure rapid and complete draining.

1. Turn off machine and place on a level surface.
2. Remove the oil dipstick.
3. Remove the oil drain bolt and washer. Drain the used oil into a suitable container.
4. Replace and fully tighten the washer and oil drain bolt.
5. Add 550 ml of 10W-30 oil to the upper limit mark on the dipstick.
   a. When inspecting the dipstick, wipe clean and insert into the filler neck; do not screw it in.
   b. See OIL on page A-10 for more details on oil type.
6. Replace and fully tighten the oil dipstick.
7. Start the engine and check for leaks.
8. Stop the engine and check the oil level. If necessary, add oil.

Notice: Insufficient oil may cause engine damage.

Wash hands with soap and water after handling oil. Dispose of used oil in a manner compatible with the environment. Do not throw used oil into the trash, pour it on the ground or down a drain.

AIR FILTER

⚠ WARNING

Risk of FIRE or EXPLOSION.

Never use gasoline or low flash point solvents for cleaning the air cleaner element.

To service:

1. Turn off machine.
2. Loosen the cover retaining knob and remove the cover.
3. Remove the foam element from the air filter.
4. Clean any dust from inside the air filter cover. Use carburetor cleaner to remove oil stains and wipe dry with a clean cloth.
5. Replace or clean the foam element.
   a. If replacing, skip to step 6.
   b. To clean: Wash in warm water with detergent. Rinse the pre-cleaner thoroughly until all traces of detergent are removed. Squeeze out excess water; do not wring. Allow to dry completely.
6. Immerse foam element in clean engine oil. Soak briefly, then remove and squeeze out excess oil. Do not wring.
7. Reinstall foam element to base. Replace and secure the air cleaner cover.

Notice: Never run the engine without the air cleaner. Rapid engine wear will result from contaminants such as dust and dirt being draw into the engine.

SPARK PLUG

To ensure proper engine operation, the spark plug must be properly gapped and free of deposits.

1. Turn off engine. The engine and muffler will be hot after operation, allow all surfaces to cool before starting maintenance.
2. Remove the spark plug cap.
3. Clean any dirt from around the spark plug base.
4. Use a plug wrench to remove the spark plug.
5. Visually inspect the spark plug.
   a. Discard if the insulator is cracked or chipped.
   b. Clean the spark plug with a wire brush if it is to be reused.
6. Measure the plug gap with a feeler gauge. The spark plug gap should be 0.024" – 0.031" (0.6 – 0.8 mm). Correct as necessary by bending the side electrode.
7. Check that the spark plug washer is in good condition.
8. Thread the spark plug in by hand to prevent cross-threading.
9. After the spark plug is seated, tighten with a spark plug wrench to compress the washer. Recommended torque is 133 – 177 in-lbs (15 – 20 Nm).

Notice:

- Use only the recommended spark plug or equivalent. An improper spark plug may cause engine damage.
- The spark plug must be securely tightened. An improperly tightened spark plug can become very hot and may cause engine damage.

ENGINE SPEED

⚠ WARNING

OVERSPEED IS HAZARDOUS to user and machine.

Do NOT tamper with governor components or setting or make any other adjustments to increase the maximum speed.

The maximum allowable high idle speed for this machine is 4000 RPM, no load. This has been set at the factory and should not require adjustment. Severe personal injury and damage to the machine can result if operated at speeds above maximum.

Take the BULLDOG® 145 to an authorized Lincoln Electric service center for any maintenance involving engine speed adjustments.

BATTERY MAINTENANCE

⚠ WARNING

To prevent EXPLOSION when:

• INSTALLING A NEW BATTERY - disconnect negative cable from old battery first and connect to new battery last.

• Connecting to a battery charger - Disconnect negative cable first, then positive cable. When reinstalling, connect negative cable last. Keep well ventilated.

• USING A BOOSTER - connect positive lead to battery first then connect negative lead to negative battery lead to engine base.

⚠ CAUTION

To prevent ELECTRICAL DAMAGE

• Use correct polarity (negative ground).

⚠ CAUTION

To prevent BATTERY DISCHARGE

• Turn ignition switch off when engine is not running.

⚠ CAUTION

To prevent BATTERY BUCKLING

• Tighten nuts on battery clamp until snug.

Removing The Battery

1. Turn the machine OFF.
2. Unplug the battery connector.
3. Remove the screws holding the battery strap.
4. Slide the battery out and remove completely from compartment.
5. If battery will be replaced, charged, or boosted, pull back the rubber boots to access terminals. Disconnect the negative cable first in all cases.

Reverse steps to reinstall. When reinstalling, battery cables must be tightly assembled. Connect the negative cable to the battery last. Position rubber boots to completely cover and insulate battery terminals. Do not pinch battery leads between battery, cover, or welder frame.

Charging the Battery

- Always disconnect the battery cable before charging the battery.
- Guidelines for charging:
  - Recommended voltage range of 14.4V and 114.7V; DO NOT exceed 15V.
  - Standard charging current: 0.1C (0.7 amps).
  - Fast charging: DO NOT exceed 0.3C (2.1 amps).
- Read instructions in the charger owner's guide before using.
- Never charge a frozen battery.
- Never place the charger directly above or below the battery being charged. Gases or fluids from the battery can corrode and damage the charger. Located the charger as far away from the battery as cables permit.
- Do not operate charger in a closed-in area or restrict ventilation in any way.

Boosting The Battery

- Due to the high starting current, during the jump start, the negative jump cable should be connected to the engine. DO NOT connect the cable to the panel grounding bolt or frame.
- Recommended connection points (electronics panel hidden for clarity):
  - For terminal connection: Loosen the bolt marked "A" and then fasten it.
  - For clamp connection: Attach to metal bracket at position marked "B".

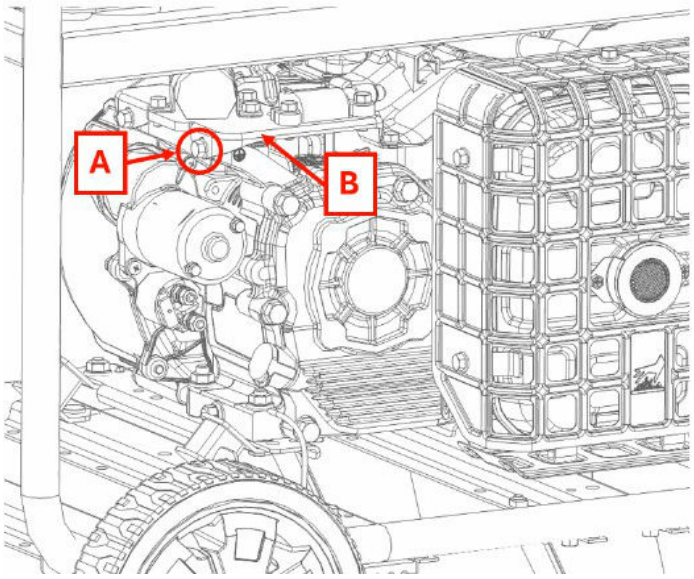


Figure 12 : NEGATIVE JUMP CABLE CONNECTION

Notice: Avoid short circuits during jump starting. All metal components (engine, frame, panel, etc.) are at negative potential.

Replacing The Battery

Use a battery that fits in the compartment and meets the following specifications:

- Type - 6-FM-7
- Rated Capacity - 7 Ah / 20 Hr
- Rated Voltage - 12V

If a battery meeting the original equipment specification is not available, a Yuasa YTZ7S (12V, 6.3Ah) battery may be used as an alternative.

TROUBLESHOOTING

HOW TO USE TROUBLESHOOTING GUIDE

⚠ WARNING

Service and Repair should only be performed by Lincoln Electric Factory Trained Personnel. Unauthorized repairs performed on this equipment may result in danger to the technician and machine operator and will invalidate your factory warranty. For your safety and to avoid Electrical Shock, please observe all safety notes and precautions detailed throughout this manual.

This Troubleshooting Guide is provided to help you locate and repair possible machine malfunctions. Simply follow the three-step procedure listed below.

1. **LOCATE PROBLEM (SYMPTOM)**

   Look under the column labeled “PROBLEM (SYMPTOMS)”. This column describes possible symptoms that the machine may exhibit. Find the listing that best describes the symptom that the machine is exhibiting.

2. **POSSIBLE CAUSE**

   The second column labeled “POSSIBLE CAUSE” lists the obvious external possibilities that may contribute to the machine symptom.

3. **RECOMMENDED COURSE OF ACTION**

   This column provides a course of action for the Possible Cause, generally it states to contact your local Lincoln Authorized Field Service Facility.

⚠ CAUTION

If you do not understand or are unable to perform the Recommended Course of Action safely, contact your local Lincoln Authorized Field Service Facility.

Observe all additional safety guidelines detailed throughout this manual.

TROUBLESHOOTING GUIDE

Contact your local Lincoln Authorized Field Service Facility if you do not understand the test procedures, if you are unable to perform the tests/repairs safely, or if all recommended possible areas of misadjustment have been checked and the problem persists.

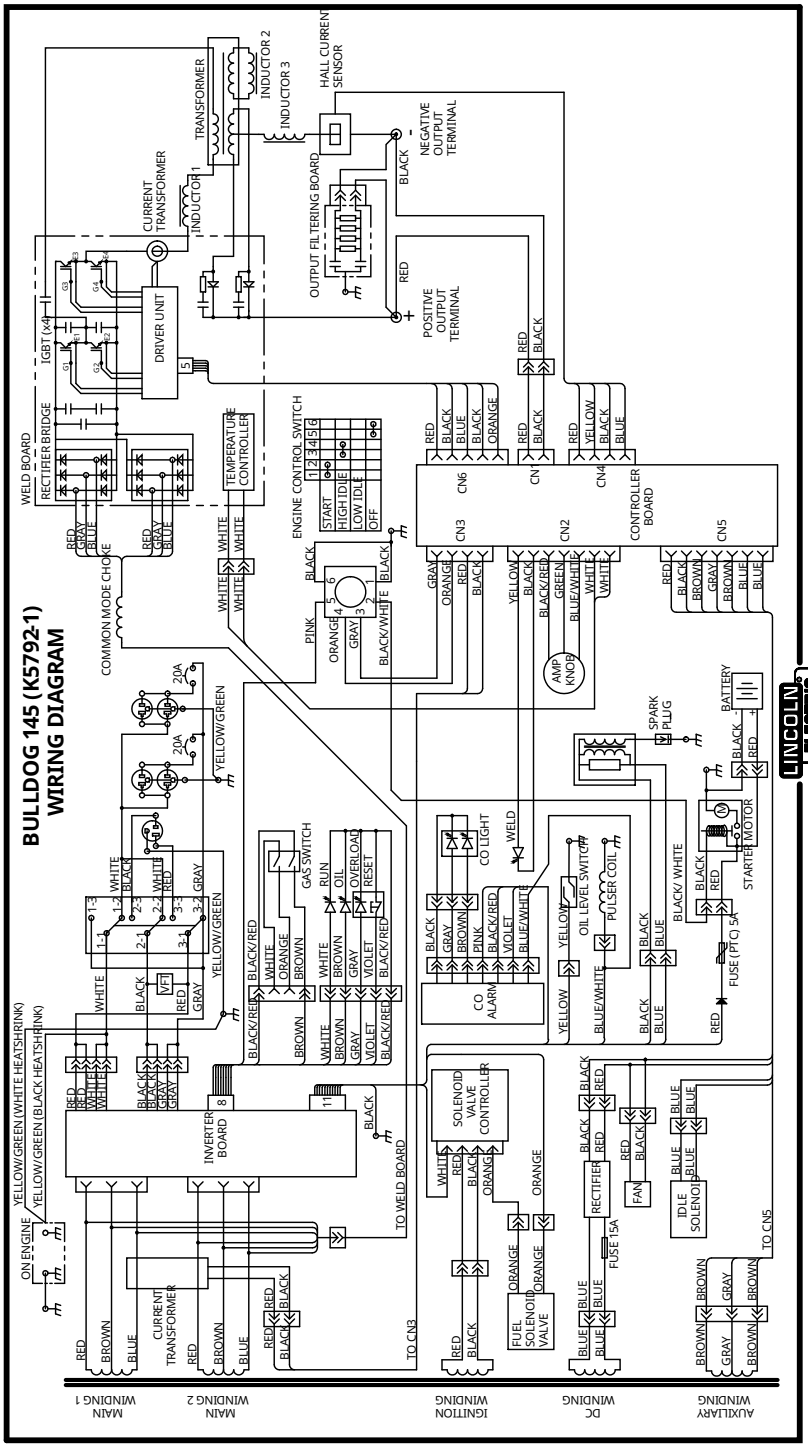
SYMPTOM	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Generator Output		
No 120 VAC output.	**1.** The AC output selector is set to 240V. **2.** The GFCI tripped (indicated by a green light on the receptacle). **3.** Tripped circuit breaker.	**1.** Switch to 120V output. Only one type of AC output can be used at a time. **2.** Reset GFCI by pressing RESET on the receptacle. **3.** Reset circuit breaker by pushing button.
No 240 VAC output.	**1.** The AC output selector is set to 120V.	**1.** Switch to 240V output. Only one type of AC output can be used at a time.
No 120 VAC AND no 240 VAC output.	**1.** Generator overload. **2.** Faulty PC board.	**1.** If Overload indicator is lit, remove all loads and press to reset. **2.** Contact your local Lincoln Authorized Field Service Facility.
SYMPTOM	**POSSIBLE CAUSE**	**RECOMMENDED COURSE OF ACTION**
Engine		
Engine will not crank.	**1.** Battery disconnected (it is shipped unplugged). **2.** Low or weak battery. **3.** Loose or corroded battery terminals. **4.** Faulty starter motor.	**1.** Plug in battery. **2.** Charge battery. **3.** Clean battery terminals. **4.** Contact your local Lincoln Authorized Field Service Facility.
Engine will crank but not start.	**1.** No gasoline. **2.** No LPG. **3.** Fouled spark plug.	**1.** Check the tank is filled and the fuel valve is open. **2.** Check the propane tank is connected and open. **3.** Clean, adjust, or replace spark plug.
Engine shuts down shortly after starting.	**1.** CO sensor tripped. **2.** Low fuel level. **3.** Low oil level. **4.** Clogged fuel filter.	**1.** Turn off and move to fresh air. **2.** Refill fuel and verify fuel valves are open. **3.** Check oil dipstick and refill if low. **4.** Clean or replace fuel filter.

SYMPTOM	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Engine shuts down unexpectedly.	**1.** CO sensor tripped. **2.** Generator overload. **3.** Weld fault.	**1.** Turn off and move to fresh air. **2.** If Overload indicator is lit, remove loads and press reset button. **3.** Turn off and allow machine to cool; assure adequate ventilation.
Engine has low output or runs rough.	**1.** Low fuel or bad fuel (if stored for a long time). **2.** Clogged fuel filter. **3.** Clogged air filter. **4.** Fouled spark plug. **5.** Machine overload. **6.** Choke is stuck.	**1.** Drain any bad gasoline and refuel. **2.** Clean or replace filter. **3.** Clean or replace filter. **4.** Clean, adjust, or replace spark plug. **5.** Reduce loads. **6.** Contact your local Lincoln Authorized Field Service Facility.
Engine will not go to low idle.	**1.** Switch set to High Idle. **2.** Low idle solenoid issue. **3.** Faulty PC board.	**1.** Set the start switch to Auto Idle. **2.** Contact your local Lincoln Authorized Field Service Facility. **3.** Contact your local Lincoln Authorized Field Service Facility.
SYMPTOM	**POSSIBLE CAUSE**	**RECOMMENDED COURSE OF ACTION**
Welding		
No weld output.	**1.** Weld fault. **2.** Faulty PC board.	**1.** Run the machine with no load and allow to cool; assure adequate ventilation. **2.** Contact your local Lincoln Authorized Field Service Facility.
No amperage control at the front panel.	**1.** Faulty PC board.	**1.** Contact your local Lincoln Authorized Field Service Facility.
The arc is not stable.	**1.** Incorrect polarity. **2.** Incorrect cables. **3.** Incorrect setting.	**1.** Verify the polarity of the electrode and work cables. **2.** Verify cables are not excessively long, undersized or damaged. **3.** Verify the amperage setting matches the electrode.

APPENDIX

WIRING DIAGRAM M31438

For an online copy of this diagram please visit https://ch-delivery.lincolnelectric.com/api/public/content/142ea80c236645c28222fb2b5ee80dcf?v=5d534462.



LOAD CALCULATION

To determine the running and start-up watts:

- Electrical power ratings are usually found on equipment nameplates.
- Running watts can be calculated from the amps drawn
  - Watts = Voltage x Amps Drawn.
  - Example: A device plugged into a 120V receptacle which is rated on its nameplate to draw 2 amps will need (120 V) x (2A) = 240 Watts of power.
- To determine additional start-up watts, if not listed
  - If possible, measure the actual wattage used by your equipment.
  - For equipment with a motor, use a minimum of 2x the rated watts amount.
  - Most lights or heaters have zero start-up watts.

Wattage Estimates

Notice: Listed values are approximate. Please refer to your specific equipment's operators manual for actual wattage guidance.

EQUIPMENT	RUNNING / RATED WATTS	START-UP / SURGE WATTS
EMERGENCY		
AM/FM Radio	100	100
Deep Freezer	500	1500
Refrigerator/ Freezer	700	2200
Sump Pump, 1/2 HP	1000	2100
Well Pump, 1/2 HP	1000	2100
HEATING & COOLING		
Box Fan, 20"	200	400
Central AC (10,000 BTU)	1500	3000
Space Heater	1800	1800
Window AC (10,000 BTU)HP	1200	3600
HOME		
Coffee Maker	1000	1000
Computer w/ Monitor	800	800
Electric Can Opener	170	170
Electric Range	2100	2100
Electric Water Heater	2100	2100
Furnace Fan Blower, 1/2 HP	800	2350
Humidifier, 13 Gal	175	175
Light Bulb, 60 Watts	60	60
Microwave, 1000 Watts	1000	1200
Television, 27"	500	500
Washing Machine	1150	2250
Wi-fi Router	15	15
TOOLS		
Air compressor, 1/2 HP	1000	2000
Belt Sander, 3"	1200	2400
Circular Saw, 7 1/4"	1400	2300

TOOLS		
Edger	1000	2000
Electric Drill, 1/2"	600	1200
Halogen Work Light	500	500
Inflator Pump	50	150
Reciprocating Saw	900	1800
Table Saw, 10"	1700	3000

CUSTOMER ASSISTANCE POLICY

CUSTOMER ASSISTANCE POLICY

The business of Lincoln Electric is manufacturing and selling high quality welding equipment, automated welding systems, consumables, and cutting equipment. Our challenge is to meet the needs of our customers, who are experts in their fields, and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or technical information about their use of our products. Our employees respond to inquiries to the best of their ability based on information and specifications provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment, or to provide engineering advice in relation to a specific situation or application. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or communications. Moreover, the provision of such information or technical information does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or technical information, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose or any other equivalent or similar warranty is specifically disclaimed.

Lincoln Electric is a responsive manufacturer, but the definition of specifications, and the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

WELD FUME CONTROL EQUIPMENT

The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.

PARTS LIST

Content/Details may be changed or updated without notice. For most current Instruction Manuals, go to PARTS.LINCOLNELECTRIC.COM.