

**PROPANE POWERED ENGINE FOR INDOOR APPLICATIONS
SUPPLEMENTAL OPERATOR MANUAL**

INTRODUCTION

This Operator's Manual provides important information about safety, operation, transportation, storage maintenance, and warranty of your propane engine and propane cylinders.

SAFETY HAZARD INTENSITY LEVEL

The following terms and symbols are used to identify statements of potential hazards which affect safety of yourself and others. Read and observe all safety statements found on this Operator Manual and on your engine.

 **DANGER**

The signal word **DANGER** indicates a hazardous situation which, if not avoided according to the instruction found in this Operator Manual or on your engine, will result in death or serious bodily injury.

 **WARNING**

The signal word **WARNING** indicates a hazardous situation which, if not avoided according to the instruction found in this Operator Manual or on your engine, could result in death or serious bodily injury.

 **CAUTION**

The signal word **CAUTION** indicates a hazardous situation which, if not avoided according to the instruction found in this Operator Manual or on your engine, could result in minor or moderate injury or damage to your engine or property.

IMPORTANT SAFETY INSTRUCTIONS

DANGER:

- Propane is a highly flammable fuel. Cigarette lighters, pilot lights, and any other sources of ignition can create an explosion when in contact with propane. All sources of ignition should be extinguished or removed entirely from the work area. **DO NOT SMOKE** in the vicinity of a propane powered engine or propane cylinder. If you smell propane gas, shut off the engine. Determine the source of the leak before using it again. **NEVER** vent propane gas inside a building. It is **UNLAWFUL** to store a propane cylinder inside a building.
- Severe burn or injury could occur if you touch the hot muffler or exhaust pipe. **DO NOT TOUCH THE HOT MUFFLER OR EXHAUST PIPE.**
- The combustion of propane by this engine produces carbon monoxide, a deadly, colorless, odorless, poisonous gas. This engine is specifically calibrated to operate at a very "lean" air/fuel ratio which minimizes the production of carbon monoxide. Additionally, a catalyst muffler is provided with this engine which specifically targets and eliminates any remaining carbon monoxide, making it safe to operate indoors.
 - **DO NOT OPERATE THIS ENGINE WITHOUT THE CATALYST MUFFLER.**
 - **DO NOT TAMPER WITH REGULATOR OR OTHER SETTINGS WHICH WOULD ALTER AIR/FUEL RATIO.**
 - **INSURE ANY INDOOR SITE OF USE HAS ADEQUATE VENTILATION WHICH MEETS INDUSTRY STANDARDS.**

WARNING:

- Failure to read the Operator Manual prior to operating or attempting any service or maintenance procedure to your engine could result in injury to you or others, or damage to the engine or to other property. You must have training in the operation of this engine before using it. If you or your operator/operators cannot read English, have this manual explained fully before attempting to operate this engine.
- Any alterations or modifications of this engine could result in damage to the engine or injury to the operator or other bystanders. Alterations or modifications not authorized by the manufacturer voids any and all warranties and liabilities.
- To avoid injury or property damage, DO NOT leave the engine where it can be tampered with or started by persons untrained in its operation.
- DO NOT leave the engine running unattended.
- Operating an engine that has loose parts could result in injury or property damage. DO NOT operate this engine if there are loose parts. Inspect the engine for loose parts frequently. This will promote safe operation and a long engine life.
- Keep bystanders away from the engine while it is in operation.
- Injury to the eyes and/or body can occur if protective clothing and/or equipment is not worn while using this engine. Always wear safety goggles and safety clothing while using this engine.
- Long or continuous exposure to high noise levels may cause permanent hearing loss. Always wear hearing protection while using this engine.
- Injury to the operator or bystanders could occur if the engine is running. Never attempt to make engine adjustments while the engine is running.
- Dangerous carbon monoxide emissions from this engine will increase greatly due to a dirty air cleaner. Follow the engine manufacturer's air cleaner service instructions.

CAUTION:

- Overfilling propane cylinders is the number one cause of damage to the propane fuel system. This fuel system is designed to run off vapor propane, not liquid propane. When the cylinder is overfilled, liquid propane will enter the fuel system and can damage lock-off and regulator, in addition to causing the engine to run poorly or not at all. This voids the warranty on affected parts of the engine. To avoid problems, read and understand fully, the section "FILLING PROPANE CYLINDERS".
- OVERHEATING is a major cause of engine failure. Keep the engine clean and free of debris build up.
- Low oil levels and dirty oil account for most of the other failures. Follow the engine manual's recommended oil change schedule.

ABOUT PROPANE

- Propane is flammable and commonly used as a fuel.
- The molecular formula of propane is C_3H_8 , and it is in the family of liquefied petroleum gases (LP gases). The other LP gases include butane, propylene, butadiene, butylene, isobutylene and mixtures thereof.
- Propane is commonly available and has proven to be a dependable, safe, economical, and clean burning fuel. It can be used as a household fuel, industrial fuel, and fuel for internal combustion engines. Propane has been used as a fuel since 1910.
- At atmospheric pressure, propane boils at -44 degrees Fahrenheit, meaning it typically exists as a vapor. However, when contained under pressure, such as in a propane cylinder, it can exist as a liquid.
- Propane is naturally odorless, but includes an additive odorant, usually mercaptan, which gives it a distinct odor similar to rotten eggs or skunk.
- Vapor propane is heavier than air, meaning it will settle in low areas such as along the ground or in drains.

PROPANE CYLINDERS (TANKS)

WARNING: NEVER use a cylinder not intended engine fuel applications. DO NOT substitute cylinders that are used with a barbecue grill, etc.

Propane cylinders are constructed according to ASME and Federal DOT #4ET20 pressure safety codes. All valves and fittings are UL Listed. Propane gas is noncorrosive and will not rust the inside of a cylinder. It is recommended to have propane cylinders inspected regularly during re-fill by an authorized National LP Gas Association propane dealer. The fuel cylinder is supplied directly from the manufacturer and is void of propane.

Propane Cylinder Configurations

Propane cylinders are constructed to function in specific configurations. The primary configuration options are:

- Propane Withdrawal: Vapor or Liquid
- Cylinder Orientation: Horizontal or Vertical

IMPORTANT: Different cylinder configurations are not interchangeable.

All LEHR engines use **Vapor cylinders**, and the orientation can be either Horizontal or Vertical.

CAUTION:

- Do not use propane cylinders that are liquid withdrawal cylinders, such as cylinders for fork lift trucks or other liquid withdrawal applications.
- Always install the propane cylinder in the proper orientation, which is identified by a label that say "THIS SIDE UP" or equivalent.
- Failure to use a proper cylinder or failure to install cylinder in proper orientation will result in liquid propane withdrawal and cause damage the regulator.

FILLING PROPANE CYLINDERS

WARNING:

- Propane cylinders should only be filled by your propane provider or by individuals who have been properly trained and certified.
- Escaping propane can freeze skin and cause frostbite and damage eyesight. Always wear safety gloves and safety glasses when filling propane cylinders.
- DO NOT overfill cylinders.
- DO NOT tamper with cylinder gauges or safety relief valves.
- At time of fill, ensure tank is in operable condition and meets all certification requirements. Discontinue use of any cylinder that is damaged or rusted or does not comply with certification requirements. Your propane service company will assist with compliance.

The maximum fill volume of a propane cylinder is ALWAYS considered 80% of the total cylinder volume to allow for expansion and to ensure proper vapor withdrawal from the cylinder.

For example, if your propane cylinder is referred to as a "20 lb cylinder", this means that when the propane cylinder is 80% full, the weight of the propane is 20 lb.

Cylinders should be filled in the vertical position.

When filling a propane cylinder, the fixed liquid level gauge should be opened (unscrewed counterclockwise) so it can be used to determine when propane has reached 80% full. As propane is added during filling, vapor will escape the small hole in this gauge. When the cylinder reaches 80% full, the escaping propane will turn to liquid propane. When this happens, the filling should be immediately stopped and the gauge should be closed (turned clockwise).

CAUTION: Always use HD-5 grade propane to operate this engine.

CAUTION: Propane cylinders must be purged at the time of the first fill. Your propane suppliers should be familiar with this operation and will provide this service.

Symptoms of a non-purged cylinder:

- Relief valve opens due to over pressurized cylinder creating hazardous situation.
- Moisture in the cylinder.
- Powered engine operates initially but shuts down when propane mixture becomes too lean.

STORING & TRANSPORTING PROPANE CYLINDERS

The NFPA Technical Committee prohibits the storage of propane cylinders in buildings. Propane cylinders should NOT be stored in buildings used by the public or frequented by anyone passing through or who is working in the building. Full or empty, never leave cylinders in small enclosed areas. Cylinders must be stored in a secure, tamper-proof storage enclosure that provides safety from accident or vandalism.

Propane cylinders should always be transported either secured to the machine using cylinder straps, or secured in an upright position during transportation.

ENGINE OPERATION

This section details specific instructions for operating your engine with a propane fuel system. For general engine operation instructions and procedures, refer to the Engine Operator Manual and/or OEM Equipment Manual.

Preparing the Engine for Use

1. Check engine oil level according to Engine Operator Manual
2. Ensure propane cylinder has been properly filled according to section "Filling Propane Cylinders"
3. Ensure that propane fuel system has been correctly and completely installed according to Installation Instructions included with your propane fuel system.
4. Check for any sign of wear or damage such as cracks, corrosion, punctures, etc. to the fuel system including propane cylinder, fuel hoses, fittings, regulator, carburetor, and electrical components.
5. Ensure main service valve on propane cylinder is closed (turned clockwise).
6. Screw the REGO fitting of the high-pressure propane hose onto the cylinder service valve and hand tighten. This connection **MUST** be tight and secure and fully seated to function.

Starting the Engine (Hot or Cold)

1. Slowly open the main service valve on propane cylinder to the fully open position.
2. Set throttle to Idle position.
3. Engage starter for a maximum of 6 seconds or until the engine fires. **CAUTION:** Serious starter damage will result if starter is engaged for more than 6 seconds, and will void warranty.
4. Once engine has started, operate at half throttle for a warm-up period for 3-5 minutes before applying load to the engine.

NOTE: If the engine fails to start, see the Troubleshooting Guide.

Stopping the Engine

Follow these stopping procedures under normal use, including when the engine will be stored or transported:

1. Make sure engine is disengaged from blade or other load, if applicable.
2. Set throttle to Idle position.
3. Close the service valve on propane cylinder (turn clockwise fully).
4. Allow the remaining propane in the regulator and fuel hose to be consumed by engine, until engine stops.
5. Turn engine key switch to off.
6. Disconnect fuel line from propane cylinder.
7. If storing or transporting the machine, follow instructions in section "STORING & TRANSPORTING PROPANE CYLINDERS"

Immediately Stopping the Engine

WARNING: Follow these stopping procedures **ONLY** when an immediate stop is required for any reason.

1. Turn engine key switch to off.
2. Close the service valve on propane cylinder (turn clockwise fully).

ENGINE MAINTENANCE / ADJUSTMENTS

WARNING: To ensure personal safety, adjustments should ONLY be made by a qualified LPG system technician or an authorized service center.

General Engine Maintenance

For general engine maintenance instructions and service intervals, refer to Engine Operator Manual.

Propane Fuel System Maintenance

The following service procedures should be conducted at every 300 hour interval:

- Inspect all fuel lines, fittings, and clamps

Spark Plug Gap

Using propane fuel typically requires the spark plug gap to be set to 0.025". This is less than engines running gasoline fuel, due to different voltage requirements.

TROUBLESHOOTING GUIDE

These troubleshooting steps are specific for propane fuel system issues. For other engine issues, refer to the Engine Operator Manual and/or OEM Equipment Manual.

When troubleshooting, always first check for simple causes which may at first seem too obvious. For example, an engine unable to start may be caused by an empty propane cylinder or an unopened service valve.

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Engine does not turn over	Weak or dead battery	Recharge or replace battery.
	Ignition switch faulty	Check or replace switch.
	Safety interlock switch (operator presence control) not engaged	Engage safety interlock switch (operator presence control) prior to engaging starter.
	Faulty safety interlock switch (operator presence control)	Check or replace safety interlock switch (operator presence control).
	Numerous other causes	See engine manual or dealer.
Engine turns over, but does not start or run	Propane cylinder is empty	Refill cylinder or replace with full cylinder.
	Main fuel service valve on propane cylinder is closed	Manually open main fuel service valve on propane cylinder.
	REGO fitting (fuel hose to cylinder connector) is not fully seated	Manually close main fuel service valve. Disconnect REGO fitting. Reconnect and hand tighten to ensure secure connector is fully seated. Slowly open main fuel service valve.
	Propane cylinder OPD (overflow protection device) has been triggered.	Manually close main fuel service valve. Disconnect REGO fitting. Wait 5 seconds. Reconnect and hand tighten to ensure secure connector is fully seated. Slowly open main fuel service valve.
	Propane regulator out of adjustment or faulty	Have certified dealer inspect regulator and adjust or replace.
	Poor quality propane causes deposits of particles in regulator or valves	Have certified dealer inspect regulator and clean or replace. Service engine valves according to engine manual instructions. Contact propane supplier to provide clean HD5 propane.
	Spark plug not firing	Replace spark plug.
	Faulty vacuum switch	Check or replace vacuum switch.
	Faulty oil pressure switch	Check or replace oil pressure switch.
	Numerous other causes	See engine manual or dealer.
Propane regulator freezes and prevents flow of propane	Liquid propane is entering regulator	<ul style="list-style-type: none"> • Ensure cylinder is designed for VAPOR withdrawal and the correct orientation (horizontal or vertical). • Ensure cylinder is installed in correct orientation. Make sure locator pin is inserted into positioning slot on cylinder collar, and follow orientation arrow indications/labels on cylinder. • Ensure propane cylinder is not overfilled. • Ensure use of application does not allow operating angles to exceed equipment OEM instructions.
	Low ambient temperature	It is normal condition for propane regulator to operate at colder temperature than ambient, which may cause condensation or frost formation depending on ambient temperature and humidity levels.

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SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Propane cylinder forms condensation or ice	Propane fuel is leaking	Close propane main fuel service valve. Check fuel lines, REGO fitting, and regulator for any leaks.
	Propane consumption is abnormally high	Refer to section "Inconsistent or short cylinder run time" below.
	Low ambient temperature	It is normal condition for propane cylinder to operate at colder temperature than ambient, which may cause condensation or ice formation depending on ambient temperature and humidity levels.
Inconsistent or short cylinder run time	Propane cylinders not filled consistently	Use cylinders that are properly and consistently filled to the 80% maximum level.
	Propane regulator out of adjustment or faulty	Have certified dealer inspect regulator and adjust.
	Dirty air filter	Service air filter.
	Excessive engine load	See engine manual or dealer.
	Excessive engine RPM	See engine manual or dealer.
Engine backfires, difficult to start, reduced power, over-heating, or other poor performance	Propane regulator out of adjustment or faulty	Have certified dealer inspect regulator and adjust.
	Propane flow restricted	Refer to section "Engine turns over, but does not start or run", above.
	Dirty air filter	Service air filter.
	Ignition system faulty	Check or replace ignition coils.
	Poor compression	See engine manual or dealer.
	Engine timing issue	See engine manual or dealer.
	Cooling Fins Clogged	See engine manual or dealer.
Numerous causes	See engine manual or dealer.	

ADDITIONAL SUPPORT

For additional questions or support, contact LEHR directly at:

LEHR, LLC
7781 S. Little Egypt Rd., Stanley, NC 28164
Telephone: 1-(704) 827-9895
support@golehr.com

EMISSION CONTROL SYSTEM

To protect the environment the manufacturer has incorporated (1) crankcase emission and (2) exhaust emission control systems (EM) in compliance with applicable regulations of the United States Environmental Protection Agency and California Air Resources Board.

1. **Crankcase Emission Control System.** A sealed-type crankcase emission control system is used to eliminate blow-by gases. The blow-by gases are led to the breather chamber through the crankcase where it is led to the air cleaner. Oil is then separated from the gases while passing through the inside of the breather chamber from the crankcase, and then returned back to the bottom of crankcase.
2. **Exhaust Emission Control System.** The exhaust emission control system applied to this engine consists of a carburetor and an ignition system having optimum ignition timing characteristics. The carburetor has been calibrated to provide lean air/propane mixture characteristics and optimum propane economy with a suitable air cleaner and exhaust system.

TAMPERING WITH EMISSION CONTROL SYSTEM PROHIBITED

Federal law and California State law prohibits the following acts or the causing thereof: (1) the removal or rendering inoperative by any person other than for purposes of maintenance, repair, or replacement, of any device or element at design incorporated into any new engine for the purpose of emission control prior to its sale or delivery to the ultimate purchaser or while it is in use, or (2) the use of the engine after such device or element of design has been removed or rendered inoperative by any person.

Among acts presumed to constitute tampering involve the parts/systems listed below:

- Carburetor and internal parts
- Spark plugs
- Magneto or electronic ignition system
- Propane filter element
- Air cleaner elements
- Crankcase
- Cylinder heads
- Breather chamber and internal parts
- Intake pipe and tube

EMISSION CONTROL WARRANTY STATEMENT

EPA & CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT

Your Warranty Rights and Obligations

The California Air Resources Board (CARB), the U.S. Environmental Protection Agency (EPA), and LEHR, LLC (herein "LEHR") are pleased to explain the emissions control system warranty on your 2015 small off-road engine (SORE). In California, new SORE must be designed, built and equipped to meet the State's stringent anti-smog standards. LEHR must warrant the emission control system on your SORE for the period of time listed below provided there has been no abuse, neglect or improper maintenance of your SORE.

Your emission control system may include parts such as the carburetor, fuel-injection system, the ignition system, catalytic converter, fuel tanks, fuel lines, fuel caps, valves, canisters, filters, vapor hoses, clamps, connectors, and other associated emission-related components.

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

Manufacturer's Warranty Coverage

The emission control system is warranted for 1000 hours (JLHRS.9992EM family) and 500 hours (JLHRS.6032EM family). If any emission-related part on your equipment is defective, the part will be repaired or replaced by LEHR.

Owner's Warranty Responsibilities

As the small off-road engine (SORE) owner, you are responsible for the performance of the required maintenance listed in your owner's manual. LEHR recommends that you retain all receipts covering maintenance of your SORE engine, but LEHR cannot deny warranty 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 LEHR may deny your warranty if your SORE or its part has failed due to abuse, neglect, improper maintenance or unapproved modification.

You are responsible for presenting your utility equipment engine to a LEHR distribution center as soon as the problem exists. The warranty repairs should be completed within a reasonable amount of time, not to exceed 30 days. If you have any questions regarding your warranty rights and responsibilities, you should contact LEHR at 1-(704) 827-9895 or via e-mail at support@golehr.com.

LEHR, LLC
7781 South Little Egypt Road
Stanley, NC 28164
USA

General Emissions Warranty Coverage

LEHR warrants to the ultimate purchaser and each subsequent purchaser that the equipment is:

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

Free from defects in materials and workmanship that cause the failure of a warranted part to be identical in all material respects to that part as described in the application for certification.

The warranty period begins on the date the equipment is delivered to an ultimate purchaser or first placed into service. The warranty period is 1000 hours (FNYXS.9992EM family) and 500 hours (FNYXS.6032EM family).

Subject to certain conditions and exclusions as stated below, the warranty on emission-related parts is as follows:

(1) Any warranted part that is not scheduled for replacement as required maintenance in the written instructions supplied, is warranted for the warranty period stated above. If the part fails during the period of warranty coverage, the part will be repaired or replaced by LEHR according to subsection (4) below. Any such part repaired or replaced under warranty will be warranted for the remainder of the period.

(2) Any warranted part that is scheduled only for regular inspection in the written instructions supplied is warranted for the warranty period stated above. Any such part repaired or replaced under warranty will be warranted for the remaining warranty period.

(3) Any warranted part that is scheduled for replacement as required maintenance in the written instructions supplied is warranted for the period of time before the first scheduled replacement date for that part. If the part fails before the first scheduled replacement, the part will be repaired or replaced by LEHR according to subsection (4) below. Any such part repaired or replaced under warranty will be warranted for 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 herein must be performed at a warranty station at no charge to the owner.

(5) Notwithstanding the provisions herein, warranty services or repairs will be provided at all of our distribution centers that are franchised to service the subject engines or equipment.

(6) The SORE owner will not be charged for diagnostic labor that is directly associated with diagnosis of a defective, emission-related warranted part, provided that such diagnostic work is performed at a warranty station.

(7) LEHR is liable for damages to other engine or equipment components proximately caused by a failure under warranty of any warranted part.

(8) Throughout the SORE warranty period stated above, LEHR will maintain a supply of warranted parts sufficient to meet the expected demand for such parts.

(9) Any replacement part may 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 LEHR.

(10) Add-on or modified parts that are not exempted by the Air Resources Board may not be used. The use of any non-exempted add-on or modified parts by the ultimate purchaser will be grounds for disallowing a warranty claims. LEHR will not be liable to warrant failures of warranted parts caused by the use of a nonexempted add-on or modified part.

Warranted Parts

The repair or replacement of any warranted part otherwise eligible for warranty coverage may be excluded from such warranty coverage if LEHR demonstrates that the SORE has been abused, neglected, or improperly maintained, and that such abuse, neglect, or improper maintenance was the direct cause of the need for repair or replacement of the part. That notwithstanding, any adjustment of a component that has a factory installed, and properly operating, adjustment limiting device is still eligible for warranty coverage. The following emission warranty parts are covered:

- (1) Catalytic converter
- (2) Fuel system: Carburetor, pressure regulator and fuel lock off
- (3) Ignition system
- (4) Intake system including pre-filter
- (5) Exhaust manifold and muffler