

14420

PROPANE BURNISHER INSTRUCTION MANUAL



Read Manual Before Operating Machine

402573 Rev B

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Instructions for Use

INSTRUCTIONS FOR USE

Failure to read and understand this manual before operating or performing service on this machine may result in injury to the operator or nearby personnel, or result in damage to the machine or nearby property. Each operator must be trained in the operation of this machine before being allowed to use it. If this manual is lost or damaged, contact Discount-Equipment to request a replacement manual.

In this instruction manual, you will find three types of safety callouts that you must read and observe to ensure safe operation of the machine. Check for any additional warnings on the machine as well prior to use.

DANGER indicates that severe bodily injury or death can occur if warnings are ignored.

WARNING indicates that bodily injury to the operator and other people can occur if warnings are ignored.

CAUTION indicates that damage to the machine or other property can occur if warnings are ignored.

NOTICE

Proper maintenance is necessary with all propane-powered floor machines. Following the scheduled maintenance procedures found in this manual will provide a long life for the machine. In addition, it is recommended to have your machine serviced by certified service personnel every three months. This service should include an emissions check.



DANGER: IF YOU SMELL PROPANE, IMMEDIATELY EXTINGUISH ANY OPEN FLAME, OPEN A WINDOW, AND CALL YOUR PROPANE SUPPLIER. DO NOT TOUCH ANY ELECTRICAL SWITCHES UNTIL THE ISSUE HAS BEEN RESOLVED. DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.

Features and Specifications

ROUTINE MAINTENANCE PARTS

Engine Dust Filter: MP371300

Engine Oil Filter: 92450-KA490657007

Spark Plug: 92450-KA920702112

Battery: 92420-MP362200

Drive Belt: MP272900 (28")

Fuse: 20A

LP Cylinder: MP105900 (Steel)

SPECIFICATIONS

Starting: 12VDC Battery

Deck: Cast Aluminum

Sound Level: < 89 dB(A)

Vibration: < 2.5 m/s²

Engine: Kawasaki FS481V, 603cc Air Cooled

Engine Speed: Idle 1800-2000 RPM; High Idle 3400-3500 RPM

Engine Oil: SAE 30 with API Service SH or SJ

Engine Oil Capacity: Filter replaced - 1.8 qt (1.7 L); filter not replaced - 1.6 qt (1.5 L)

Spark Plug Gap: .025" (.635 mm)

LP Cylinder Type: 20 lb (9.1 kg) Vapor Withdraw

Pad Size: 28" (71.1 cm)

Pad Speed: 1500 RPM

Width: 31.5" (80 cm)

Length: 61.5" (156.2 cm)

Height: 41" (104 cm)

Weight (Without Tank): 234 lb (106 kg) - includes clutch and dust collection

Safety

GENERAL GUIDELINES FOR SAFE OPERATION

READ AND SAVE ALL INSTRUCTIONS FOR FUTURE USE. Before use, ensure operators read and understand this manual, as well as the labeling on machine and its components. Extra copies of the manual are available by contacting Discount-Equipment.

- **KNOW YOUR EQUIPMENT.** Read this manual carefully to learn equipment applications and limitations, potential hazards associated with this type of equipment. Keep this manual with the equipment it is associated with.
- **DISARM MACHINE.** Remove cutting head or lower cutting head to the floor when machine is not in use.
- **DO NOT “SIDE HILL” MACHINE.**
- **AVOID DANGEROUS ENVIRONMENTS.** Do not use in rain, damp or wet locations, or in the presence of explosive atmospheres (gaseous fumes, dust or flammable materials). Remove materials or debris that may be ignited by sparks.
- **KEEP WORK AREA CLEAN AND WELL-LIT.** Cluttered, dark work areas invite accidents.
- **DRESS PROPERLY.** Do not wear loose clothing. These may be caught in moving parts. When working wear gloves and insulated non-skid footwear. Keep hands and gloves away from moving parts.
- **USE SAFETY EQUIPMENT.** Proper eye and hearing protection should be worn at all times. Wear a dust mask for dusty operations. Hard hats, face shields, safety shoes, gloves, etc. should be worn when specified or necessary.
- **KEEP BYSTANDERS AWAY.** Children and other bystanders should be kept at a safe distance from the work area to avoid distracting the operator and contacting the equipment or extension cord. Operator should be aware of the proximity of bystanders. This machine is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities or lack of experience and knowledge.
- **PROTECT OTHERS IN THE WORK AREA.** Provide barriers or shields as needed to protect others from debris.
- **USE PROPER ACCESSORIES.** Using accessories that are not recommended may be hazardous. Be sure accessories are properly installed and maintained. Do not delete a guard or other safety device when installing an accessory or attachment.
- **CHECK FOR DAMAGED PARTS.** Inspect guards and other parts before use. Check for misalignment, binding of moving parts, improper mounting, broken parts and other conditions that may affect operation. If abnormal noise or vibration occurs, turn off immediately and have the problem corrected before further use. Do not use damaged equipment. Tag damaged equipment “DO NOT USE” until repaired. Missing or damaged parts should be properly repaired or replaced immediately. For all repairs, use only identical National replacement parts.
- **REMOVE ALL ADJUSTING KEYS AND WRENCHES.** Make a habit of checking that the adjusting keys, wrenches, etc. are removed from the tool before turning it on.
- **GUARD AGAINST ELECTRIC SHOCK.** Prevent body contact with grounded objects such as pipes, radiators, ranges and any other related surfaces. When making cuts, always check the work area for hidden wires or pipes. Hold your equipment by insulated nonmetal grasping surfaces. Use a Ground Fault Circuit Interrupter (GFCI) to reduce shock hazards.
- **AVOID ACCIDENTAL STARTING.** Be sure equipment is turned off before plugging in. Do not use equipment if the power switch does not turn the equipment on and off.
- **DO NOT FORCE EQUIPMENT.** Equipment will perform best at the rate for which it was designed. Excessive force only causes operator fatigue, increased wear and reduced control.
- **KEEP HANDS AWAY FROM ALL CUTTING EDGES AND MOVING PARTS.**
- **WEAR GLOVES WHEN CHANGING ACCESSORIES.**
- **DO NOT OVERREACH; MAINTAIN CONTROL.** Keep proper footing and balance at all times. Maintain a firm grip.
- **STAY ALERT.** Watch what you are doing and use common sense. Do not use when you are tired, distracted or under the influence of drugs, alcohol or any medication causing decreased control.
- **DISCONNECT FUEL LINE.** When not in use and before changing accessories or performing recommended maintenance, disconnect fuel line.
- **MAINTAIN EQUIPMENT CAREFULLY.** Keep handles dry, clean and free from oil and grease. Keep cutting edges sharp and clean. Follow instructions for lubricating and changing accessories. Inspect equipment cords and extension cords for damage. Replace damaged parts. Use only identical National replacement parts.
- **STORE IDLE EQUIPMENT.** When not in use, store in a dry, secured place. Keep away from children.
- **MAINTAIN LABELS AND NAMEPLATES.** These carry important information. If unreadable or missing, contact Discount-Equipment for a replacement.
- **MACHINE IS HEAVY, DO NOT DROP.** Ensure proper lifting procedures are followed when transporting.

- **DO NOT OPERATE ON STEPS.**
- **PERIODICALLY INSPECT BATTERY.** Only the manufacturer or an authorized servicing agent should replace the battery. Do not open or tamper with battery. Doing so voids all warranties and could cause injury due to electrical shock.

SPECIFIC GUIDELINES FOR SAFE OPERATION

Anyone operating the machine must read the following carefully in order to be informed of potentially dangerous operating conditions. Operators should be familiar with the location and use of all safety devices on the machine. Do not use the machine if it is not in proper operating condition, and report any damage or operation faults immediately.

- **OPERATE THIS MACHINE IN A WELL-VENTILATED AREA.** It is the responsibility of the machine operator, machine owner, and the site manager to ensure that the air exchange system where the machine is to be used is in compliance with local building codes and is operating properly. Failure to operate this machine in a well-ventilated area could lead to sickness, injury, or death from carbon monoxide (CO) exposure.
- **THIS MACHINE EMITS CO.** CO is a colorless, odorless, non-irritating gas. The first symptoms of CO exposure include headache, drowsiness, dizziness, and nausea. If you should experience any of these symptoms while operating the machine, shut off the machine and go outside to get fresh air. Have the machine tested for CO emissions by a qualified service technician before using it again.
- **PROPANE IS A HIGHLY FLAMMABLE FUEL.** If you smell propane, shut off the machine immediately and take it outside the building. Do not use the machine again until a qualified service technician has corrected the issue.
- **DO NOT USE OR ALLOW ANOTHER PERSON TO USE AN IGNITION SOURCE NEAR THE MACHINE.** Do not use cigarette lighters or smoke near the machine.
- **DO NOT STORE OR VENT PROPANE CYLINDERS INSIDE A BUILDING.**
- **THIS MACHINE HAS PARTS THAT CAN CAUSE SEVERE INJURY IF TOUCHED WHILE MOVING.** Do not allow any part of the body or clothing to come in contact with these parts while they are moving. Do not try to change attachments while the machine is running. Do not allow other people to come near the machine while it is in operation. Do not allow the machine to run unattended. Do not leave the machine in a place where unauthorized or untrained personnel could use the machine. Do not run the machine with the pad off-center, damaged, or missing. Do not run the machine with unsecured guards and shields. Do not operate the machine if the machine has loose parts.



DANGER: PROLONGED OR HIGH EXPOSURE TO CO MAY RESULT IN VOMITING, CONFUSION, AND COLLAPSE IN ADDITION TO LOSS OF CONSCIOUSNESS AND MUSCLE WEAKNESS. IF SUCH SYMPTOMS OCCUR, CALL 911 FOR EMERGENCY MEDICAL ATTENTION. IF YOU HAVE EXPERIENCED THESE SYMPTOMS, DO NOT OPERATE THIS MACHINE OR ANY OTHER PROPANE MACHINE AGAIN UNTIL CLEARED BY A PHYSICIAN. EXCESSIVE EXPOSURE TO CO CAN RESULT IN DEATH.

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 of 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.

- **DO NOT TAMPER WITH THE ORIGINAL EMISSION-RELATED PART:** throttle body and internal parts, spark plugs, magneto or electronic ignition system, air cleaner elements, crankcase, cylinder heads, breather chamber and internal parts, intake pipe and tube, regulator, fuel lock-off.
- **OVERFILLED OR LIQUID WITHDRAW CYLINDERS CAN DAMAGE THE FUEL SYSTEM AND CREATE A FIRE HAZARD.** Do not overfill the cylinder or use a liquid withdraw cylinder on the machine. If the regulator freezes, stop the burnisher and take the cylinder outside. Inspect cylinder; if it is a vapor withdraw cylinder, use gloves or pliers to open bleeder valve and purge cylinder until only vapor is escaping. If it is a liquid withdraw cylinder, replace with a vapor withdraw cylinder.
- **DO NOT MAKE UNAUTHORIZED MODIFICATIONS OR ALTERATIONS TO THIS MACHINE.** Modifications or alterations to this machine can lead to personal injury or damage to the machine. NFE assumes no liabilities for injury or damage resulting from an unauthorized modification or alteration to the machine. Any unauthorized modification or alteration to this machine voids all warranties.
- **DO NOT TOUCH THE MUFFLER OR ENGINE UNTIL THEY HAVE COOLED.** The muffler and the engine become hot enough while the

Safety

machine is in operation, and for a long time after the machine is shut off, to cause severe burns.

- **CHECK AND REPLACE THE FILTER FOLLOWING THE RECOMMENDED MAINTENANCE SCHEDULE.** A dirty engine filter can cause overheating.
- **CHECK OIL BEFORE EACH USE, AND FILL OR CHANGE AS NEEDED.** Overheating can be caused by insufficient or low oil.
- **NEVER OVER-FILL ENGINE WITH OIL.** Over-filling could cause irreparable damage to the engine.
- **DO NOT ENGAGE STARTER FOR MORE THAN 5 SECONDS.** Allow a 10 second cool-down period for second failed start-up attempt.
- **PERFORM ALL RECOMMENDED SCHEDULED MAINTENANCE.** Regular maintenance of your propane powered floor machine is necessary to keep it in safe working condition.
- **DO NOT OPERATE MACHINE UNLESS YOU HAVE READ AND UNDERSTAND THE OPERATION MANUAL.**
- **DO NOT OPERATE MACHINE IN FLAMMABLE OR EXPLOSIVE AREAS.**
- **BEFORE STARTING MACHINE, ENSURE ALL SAFETY DEVICES ARE IN PLACE AND FUNCTIONING PROPERLY.** Before starting machine check for proper operation.
- **WHEN USING MACHINE, GO SLOWLY ON INCLINES OR SLIPPERY SURFACES.** Use care when operating machine in reverse.
- **WHEN SERVICING MACHINE, STAY CLEAR OF MOVING PARTS.** Do not wear loose clothing when working on machine. Block machine wheels before raising or jacking up machine. Use hoist stands that will support the weight of the machine. Wear eye and ear protection when using pressurized air or water. Disconnect battery connections before servicing machine. Use only replacement parts supplied by NFE or an NFE authorized distributor.
- **WHEN LOADING OR UNLOADING MACHINE, TURN MACHINE OFF.** Only use a vehicle that will support the weight of the machine to transport. Do not push the machine on or off a vehicle unless the load height is 15 in (380 mm) or less from the ground. Block machine wheels when transporting. Tie the machine down securely to the vehicle when transporting.
- **THIS MACHINE IS MANUFACTURED FOR COMMERCIAL USE ONLY.** This machine is designed and manufactured for indoor use in burnishing wax coated hard floor surfaces. NFE does not recommend use of this machine in any environment other than an indoor environment.
- **THESE MACHINES SHOULD NOT BE USED IN THE FOLLOWING WAYS:** In nursing homes, hospitals, day-care centers, etc. that are occupied; by unqualified or untrained personnel; unless properly maintained and adjusted; on areas with obstructions such as thresholds and floor outlet boxes; in areas where loose debris or other objects are present; in rooms and areas without proper ventilation.

REFUELING AND STORAGE OF FUEL CYLINDERS

This machine uses a 20 lb (9.1 kg) capacity aluminum or steel cylinder, which meets the DOT 4E240 standards. These cylinders are also listed by UL. In addition, the steel cylinder meets European TPED specifications and is CE compliant. Filling should be done **ONLY** by a qualified propane dealer. **FILL THROUGH THE SERVICE VALVE ONLY.** A properly filled cylinder should not exceed 80% of the rated capacity.

Do not attempt cylinder repair. Return the cylinder to your propane dealer if repair is necessary. Please note that DOT regulations prohibit shipping of cylinders after the cylinder has been filled with propane.

When not in use, cylinders should always be stored outside in an upright position in a secure, tamper-proof, steel mesh storage cabinet. The cabinet may be located next to the building, but with at least five feet (1.5 m) of space between the cabinet and the nearest building opening (door or window).

The cylinder to be used on this machine is a vapor withdraw cylinder. A liquid withdraw cylinder is not to be used with this machine. The use of a liquid withdraw cylinder on a vapor withdraw system could freeze the regulator and create a fire hazard. The National Fire Protection Association (NFPA) Standard for Storage and Handling of LP Gas is the appropriate authority for safe propane use.

OPERATOR RESPONSIBILITY

The operator is responsible for performing the recommended daily maintenance and checkups of the machine to keep it in good, working condition. The operator must inform the service mechanic or supervisor when recommended maintenance procedures are required as described in the maintenance section of this manual.

Read this manual carefully before operating this machine. Do not operate machine before reading and understanding the operation manual.

Check the machine for shipping damage. Keep your machine regularly maintained by following the maintenance information in this manual. Order parts and supplies only from NFE or an authorized distributor. Use the parts illustration section of your manual when ordering parts.

During and after operation, perform the recommended daily and hourly procedures outlined in the maintenance chart.

TEST FOR OPERATOR-EAR SOUND PRESSURE LEVEL AND HAND-ARM VIBRATION

NFE measures and rates the operator-ear sound pressure level for hand-guided floor treatment and floor cleaning machines for industrial use.

All tests are performed in accordance with European Machinery Directive (2006/42/EC).

NFE measures and rates the vibration at the machine-hand contact surface of hand-guided machines that are provided with handles in accordance with European Machinery Directive (2006/42/EC).

Machine Preparation

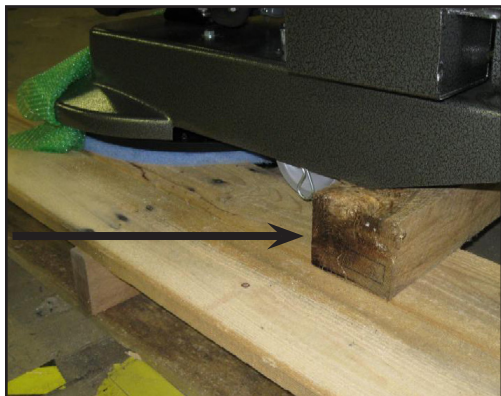


FIG. 1

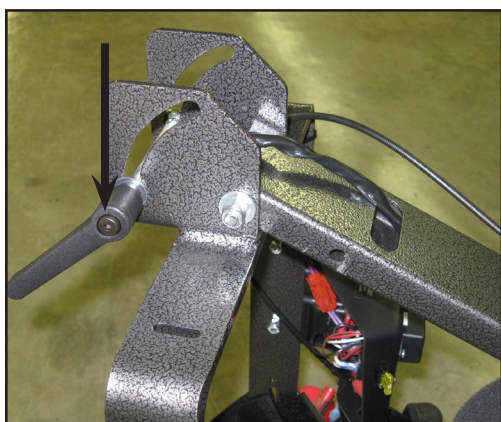


FIG. 1.1



FIG. 1.2

UNPACKING AND RE-PACKING THE MACHINE

The machine is boxed on a wooden pallet when shipped. To unpack the machine:

1. Cut and remove bands holding the box to the pallet.
2. Remove staples attaching the box to the platform at the bottom edge of the box.
3. With two people, one at either end of the box, lift box straight up and off machine.
4. Cut and remove bands securing the machine to the pallet.
5. Remove back brace (Figure 1).
6. Remove adjustment lever, bolt, and washer from the handle (Figure 1.1).
7. Rotate handle to the user position. Insert the bolt through the handle bracket and handle top (Figure 1.2).
8. Place the washer and adjustment lever on the bolt. Adjust the handle to the desired height and tighten the adjustment lever.
9. Connect the battery cables to the battery. *Note: Connect the red cable to the (+) post and the black cable to the (-) post.*
10. Check machine fluid levels (engine oil). See Maintenance section. *Note: If machine was shipped by airfreight, add engine oil.*
11. Carefully, back the machine off the pallet.

Reverse for re-pack. Use the original packing materials and container.

TRANSPORT

When transporting a propane-powered floor machine with the fuel cylinder installed, the cylinder should be securely fastened with the service valve closed and the machine should be secured in the vehicle. Any propane fuel cylinders not installed should be securely fastened to avoid movement and damage. Never store machine with cylinder installed or store spare cylinders in an enclosed vehicle. It is a good practice to check propane cylinders for overfilling before transporting them. If overfilled, correct before loading them in the vehicle by venting the excess propane outside in a safe area using the bleeder valve.

MACHINE STORAGE

Only authorized, trained personnel should have access to propane cylinders and machines.

1. Remove propane fuel cylinder when not in use and store it outside in a storage cage in accordance with NFPA Handbook 58 CAN/CGAB149.2. Do not release or bleed propane inside the building. Please consult your local Fire Marshal to ensure that you are in compliance with local fire codes.
2. Store machine away from objects that may fall and damage it.
3. Never store machine or fuel cylinders near an open flame or heat-producing device.
4. Make sure machine is cleaned properly before storing.
5. Never store machine with cylinders installed, or store spare cylinders in an enclosed van or trailer.
6. Store machine in a dry location, temperature not to exceed 120°F (50°C).

Machine Preparation

FILLING THE LP CYLINDER

This machine uses the 20 lb (9.1 kg) capacity cylinder, which meets the D.O.T. 4E240 standards. These cylinders are also listed by UL. In addition, the steel cylinder meets European TPED specifications and is CE compliant. Filling should be done ONLY by a qualified propane dealer. A properly filled cylinder should not exceed 80% of the rated capacity. Do not overfill the cylinder or use a liquid withdraw cylinder on the machine. The use of a liquid withdraw cylinder on a vapor withdraw system could freeze the regulator and create a fire hazard.



CAUTION: ALWAYS OPEN SERVICE VALVE SLOWLY TO ALLOW PRESSURE TO EQUALIZE IN HOSES. OPENING QUICKLY MAY CAUSE THE FLOW CHECK VALVE TO ENGAGE, LIMITING FUEL FLOW.

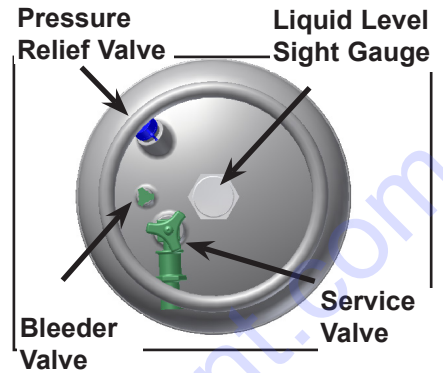


FIG. 2

INSTALLING THE LP CYLINDER

Place the cylinder on the cylinder platform at the back of the machine. Connect the fuel hose coupling to the service valve by turning to the right (clockwise). **HAND TIGHTEN ONLY!** Make sure coupling is not cross-threaded and check for leakage by noting any propane odors immediately after cylinder is connected. Finally, secure the tank to the machine using the adjustable strap. Remove slack by pulling on the loose end and securing with the velcro.

REMOVING THE LP CYLINDER

Reverse the above procedure. Always connect or change cylinders in a well-ventilated area.

ROK-BAK POSITION

1. Close the valve on the propane cylinder; allow the engine to stop.
2. Turn the machine OFF.
3. Remove the propane cylinder
4. Raise the handle to the full-up position (about a 45° angle).
5. Lift up on the front of the deck, rocking the machine back until it rests on the handle grips (Figure 3).
6. When lowering the machine down, do not drop it. Slowly lower the machine to the floor until the wheels are on the ground.



FIG. 3

CHANGING THE PADS

1. Place the machine in the Rok-Bak position.
2. Remove centering device and inspect pad. If pad has worn to less than 1/4" (6mm), replace it.
3. If the pad holder has cracks or is damaged, replace as well. A damaged pad holder rotating at high speeds may be an extreme hazard if it should come apart.

HANDLE ADJUSTMENT

The height of the handle can be adjusted by raising or lowering the handle. Loosen the handle adjustment lever on the side of the handle. Move handle to the desired height and tighten the lever.

Machine Preparation

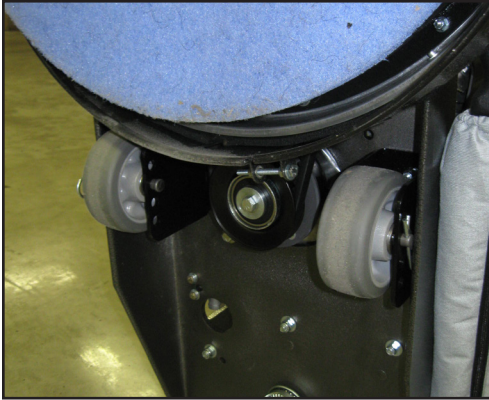


FIG. 4

FUSES

The machine's electrical circuit is protected by a fuse, which stops the flow of current in the event of a circuit overload. Once a fuse blows, it must be replaced. If the overload that caused the fuse to fail is still present, the new fuse will fail and the problem must be corrected. Do not bypass any fuse. The ignition fuse is located on the side of the starter switch panel.

WHEEL ADJUSTMENT

1. Close the valve on the propane cylinder; allow the engine to stop and turn the machine OFF.
2. Remove the propane cylinder.
3. Place machine in the Rok-Bak position.
4. Remove the clevis pin that retains each wheel and relocate to the desired wheel position (Figure 4).

Note: To increase pad pressure (more aggressive) move wheels to rear of machine. To decrease pad pressure (less aggressive) move wheels toward the front of machine.

DUST BAG - OPTIONAL

1. Pull up on rear of dust bag to detach Velcro from the support tab.
2. Pull dust bag downward off dust tube by holding at the front and pulling down and to the rear to remove.
3. Empty bag by rubbing or gently tapping on sides, in a downward motion, to loosen soil trapped on sides of bag. For heavy soil, turn bag inside out to clean.
4. Reinstall bag by hooking elastic edge onto back of dust tube lip, and fitting elastic around dust tube.
5. Pull rear of dust bag towards rear of machine and reattach to Velcro on the support tab.

Machine Operation

MACHINE COMPONENTS

KEY SWITCH

This machine features a key switch ignition (Figure 5):

- **START:** Turn the key all the way clockwise to engage the engine starter motor. Once the engine starts, release the key. Always start the machine with the engine throttle in the idle or slow position.
- **RUN:** This is the position the key will rest in while the engine is running.
- **OFF:** Turn the key to this position to stop the engine from running. For safety, always close the propane cylinder valve to stop the engine and then turn the key switch to the OFF position.

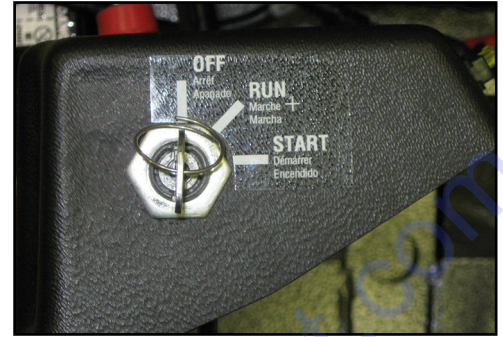


FIG. 5

ENGINE THROTTLE

The engine throttle (Figure 6) controls the engine speed. To increase engine speed, move the hand lever forward. For idle position, pull the lever all the way back.



FIG. 6

ECOSENSE EMISSIONS MONITORING SYSTEM - OPTIONAL

Machines with model numbers ending in "X" are equipped with the EcoSense Emissions Monitoring System (Figure 7). EcoSense is an emissions monitoring device that monitors the exhaust emissions and will shut the engine down if the emissions levels are too low or too high.

The oxygen sensor must reach operating temperature before it will start to send signals to the EcoSense module. This time is set at one minute. A unit may shut down at a cold start up after one minute because the oxygen sensor did not reach required temperature to start to send signals. If this happens, turn the key to the off position for several seconds to clear the EcoSense module and restart the engine. Once the engine has started, advance the throttle to full throttle position and start the operation. With the engine at full throttle under load, the signal from the oxygen sensor should be within the normal operating ranges for safe operation. If the engine's air intake filter needs to be serviced, or an over-filled cylinder has been installed by mistake, or there is a problem with the fuel system that causes the oxygen sensor's signal to be out of range, EcoSense will shut the unit down in four minutes.

The unit can be re-started after clearing the module by turning off the key switch. If corrections have not been made to the unit, EcoSense will continue to shut the unit down after the one minute warm-up and/or four minute out of limit periods.

Engines tend to go to lean burn if allowed to idle for even short periods. Even at high idle speeds most engines will continue to lean downward. It is always best to shut the engine off when it is not being used to do work. Remember the engine is always creating emissions as long as it is running.

The best manner to operate a unit equipped with EcoSense is as follows:

1. With the throttle in the slow position, turn the key switch to the start position; once the engine starts, move the throttle to the fast position.
2. When ready to stop operation, release clutch (if equipped) and move throttle to the slow position. If the unit will not be used within one minute, turn the key switch to the OFF position. If the unit will not be returned to service within a few minutes it is best to turn the gas valve on the tank off first and let the engine consume all fuel that is in lines. Once the engine dies, turn the key switch to OFF position.
3. When ready to restart, open the gas valve on the tank, put the throttle in slow position and turn key switch to the START position. Follow engine throttle instructions.



FIG. 7

Machine Operation



FIG. 8

CLUTCH LEVER

The clutch lever (Figure 8), when pulled, will engage the electric clutch. On models that have an electric clutch, the pad will not turn until the switch is engaged. Only one lever requires engagement at one time, allowing the user to alternate hands during operation.

TACHOMETER / HOUR METER

The hour meter/tachometer (Figure 9) records the number of hours the machine has been powered ON. The hour meter reading is used to mark recommended maintenance intervals. It also displays the engine speed. This meter displays hours when the machine is turned OFF and engine speed when the machine is turned ON.



FIG. 9

PRE-OPERATION CHECKLIST

- Check the engine oil level. Add oil if needed.
- Inspect the engine dust filter and clean off any debris or dust buildup.
- Inspect the burnishing pad; replace if necessary.
- Inspect the pad holder for cracks or damage; replace if necessary.



WARNING: A DAMAGED PAD HOLDER ROTATING AT HIGH SPEEDS MAY BE AN EXTREME HAZARD SHOULD IT DISINTEGRATE.

- Inspect air filter; clean or replace if necessary. A dirty air filter could lead to elevated levels of carbon monoxide.
- Inspect the drive belt. Replace if necessary.
- Check the machine for leaks or loose fasteners.

STARTING THE MACHINE

1. Check oil and fuel levels.
2. Check and clean engine dust filter.
3. Check carburetor air filter; change if necessary.



CAUTION: NEVER RUN CONTINUOUSLY FOR MORE THAN 1 HOUR WITHOUT CLEANING OR CHANGING THE ENGINE DUST FILTER.

4. Turn propane service valve counterclockwise to open. Open slowly to allow pressure to equalize in hoses. Opening quickly may cause the flow check valve to engage, limiting fuel flow.
5. Tilt machine backward slightly (pad off floor) and move throttle to idle or slow position.
6. With the engine throttle in the idle position, engage the starter by turning the key switch to the starting position for approx. 5 seconds. If the engine does not start, release the key switch for 10 seconds, then try again for another 5 seconds.
7. After the engine has started, move the throttle forward approx. halfway and allow the engine to warm up for 30 seconds.



WARNING: CATALYTIC MUFFLERS REQUIRE A WARM-UP PERIOD BEFORE EFFECTIVELY REMOVING HARMFUL EMISSIONS. MAKE SURE OF PROPER VENTILATION DURING THE WARM-UP PERIOD.

Machine Operation

BURNISHING

It is recommended to start burnishing on the right side of the aisle. Turn and come back down the aisle in the opposite direction, overlapping the previous path slightly. Continue this pattern until the floor area to be burnished has been covered with the last pass being on the right side of the machine. The forward speed is generally at normal walking speed.

1. After the engine has started and the warm up is complete, advance the throttle to operating speed.
2. Lower the burnishing head to the floor while moving the machine. If the machine is allowed to run in one spot, damage to the floor may occur.
3. To stop burnishing, push down on handle to raise the burnishing head off the floor.
4. When done burnishing, push the machine to the desired location. Turn off the LP cylinder service valve. When the fuel is depleted and the engine stops, turn the key switch to OFF.
5. Remove the LP cylinder and store properly.



CAUTION: DO NOT ADD WEIGHT TO THE BURNISHER HEAD. DO NOT LIFT UP ON THE HANDLE TO ADD PRESSURE WHILE BURNISHING. TO NOT COMPLY WITH THESE WARNINGS COULD CAUSE THE ENGINE TO OVERHEAT AND/OR DAMAGE THE PADHOLDERS OR DRIVE COMPONENTS.

IDLING AND STOPPING THE MACHINE

To stop the engine, close the service valve on the fuel cylinder by turning it clockwise. The engine will stop when the fuel in the lines is used up. Once the engine stops, turn the key switch to OFF.



DANGER: ALLOWING THE ENGINE TO IDLE EXCESSIVELY WILL INCREASE CARBON MONOXIDE EMISSIONS.

Maintenance



FIG. 10



FIG. 11

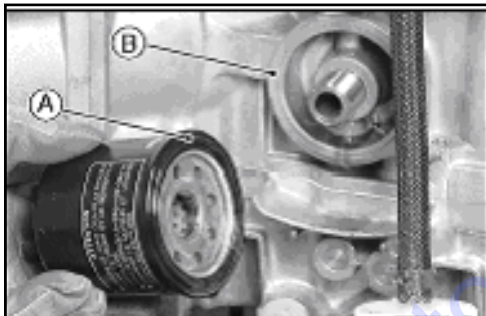


FIG. 12

CHECK OIL LEVELS

1. Push machine to level surface.
2. Turn off LP cylinder and remove it.
3. Clean area around oil gauge before removing it.
4. Remove oil gauge and wipe down with a clean cloth.
5. The machine should be in an upright, level position. If necessary, place a block under the back of the machine or apply weight to the front of the deck to maintain position.
6. Insert the oil gauge into the tube, but do not tighten the oil gauge (Figure 10).
7. Check the oil level. It should be between the FULL and ADD marks on the gauge. If the oil level is near or below the ADD mark, remove oil gauge and add enough engine oil to bring oil level to the FULL mark. If the oil level is too high, remove the excess oil by loosening the oil drain valve.



CAUTION: DO NOT FILL ABOVE FULL MARK ON THE GAUGE. EXCESS OIL WILL CAUSE A SMOKING CONDITION AND MAY CAUSE THE ENGINE TO OVERHEAT.

OIL CHANGE

1. Change the oil after the first 8 hours of operation and every 50 hours thereafter.
2. Start and warm the engine so the oil will drain easily and completely.
3. Push machine to a level surface; stop the engine.
4. Turn off LP cylinder and remove it.
5. Remove cap on the end of the oil drain hose (Figure 11).
6. Place a suitable container under the end of the oil drain hose.
7. Slowly turn the valve counterclockwise, until the oil starts to drain. In order for oil to drain, the oil fill cap may need to be loosened.



WARNING: BE CAREFUL WITH HOT OIL BEING DRAINED. IT MAY BE HOT ENOUGH TO CAUSE SEVERE BURNS.

8. Close drain valve. Place cap back on the end of the hose.
9. Remove oil cap and add clean oil. Use 1.6 qt (1.5 L) when the filter is not changed and 1.8 qt (1.7 L) when the filter is changed.
10. Screw in oil gauge. Reconnect the LP cylinder to the fuel hose.
11. Run the engine at low idle for 2 minutes. Check for leaks around the engine.
12. Stop the engine.

OIL FILTER CHANGE

1. Place a suitable container underneath the oil filter.
2. Using a strap wrench or oil filter wrench, remove the oil filter. Turn the filter counterclockwise to remove it.
3. Apply a thin coat of new oil or grease to the oil filter seal (Figure 12, A).
4. Install the new filter by turning it clockwise.
5. Turn the filter until the seal contacts the mounting surface of the engine. Then, turn the filter by hand 3/4 turn more (Figure 12, B).
6. Reconnect the LP cylinders to the fuel hose.
7. Run the engine on idle for 2 minutes. Check for leaks around the engine.

8. Stop the engine. Check the oil level.

SPARK PLUGS

1. Turn off the LP cylinder and remove it.
2. Pull spark plug cap off of spark plug.
3. Remove spark plug by turning counterclockwise; inspect it for damage or build-up. If the plug is oily or has carbon build-up on it, clean the plug using a high flash-point solvent and wire brush (or other suitable tool). If the spark plug electrodes are corroded or damaged, or if the insulator is cracked, replace the plug. **Use the same type of spark plug; do not use any other spark plug.**
4. Measure the gap with a wire-type thickness gauge. The correct gap is .025 in (.635 mm). If the gap is incorrect, carefully bend the side electrode with a suitable tool to obtain the correct gap.

Figure 13: (A) Insulator, (B) Center Electrode, (C) Plug Gap, (D) Side Electrode.

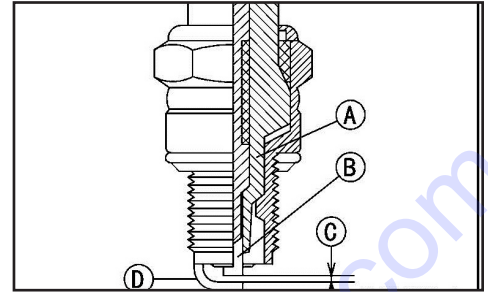


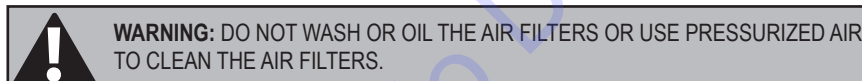
FIG. 13



FIG. 14

AIR FILTERS

1. Push machine to level surface.
2. Turn off LP cylinder and remove it.
3. Turn the two knobs 1/4 turn counterclockwise and remove the filter cover (Figure 14).
4. Loosen clamp that retains filter and remove the air filter.
5. Inspect both primary and secondary filters. If necessary, clean primary filter by lightly tapping the seal ends, then wiping down the ends with a clean cloth. If primary filter cannot be cleaned or is bent or damaged, it must be replaced. If secondary filter is dirty, do not attempt to clean it. Replace with a new filter.



WARNING: DO NOT WASH OR OIL THE AIR FILTERS OR USE PRESSURIZED AIR TO CLEAN THE AIR FILTERS.

6. Check the intake hose for cracks or damage.
7. Install filters and replace cover.

FUEL HOSE AND CONNECTIONS

1. Push machine to level surface.
2. Turn off LP cylinder and remove it.
3. Inspect hoses for abrasions and other signs of wear. Replace all worn or damaged hoses.
4. Check for gas leaks by spreading a soapy water solution around all connections while the LP cylinder is reconnected and the service valve is turned on (Figure 15).
5. If a leak is detected, turn off the LP cylinder. If the leak is in a hose, replace it. If the leak is at a fitting, loosen and clean it; apply pipe-sealing compound and re-tighten it.
6. Re-check for leaks using soapy water solution. If leaks persist at fittings, replace them and re-check with a soapy water solution once more.



FIG. 15

Maintenance



FIG. 16

ENGINE DUST FILTER

1. The engine dust filter should be cleaned each hour and after each use by shaking out the dust and then rinsing with water and mild detergent. The filter can also be vacuumed with a wet-dry vacuum (Figure 16).
2. Squeeze out excess water (do not wring).
3. Allow the filter to air dry.

Failure to maintain a clean engine filter will cause the engine to overheat. Also, it may cause the exhaust emissions to elevate to harmful levels. If necessary, replace.

COOLING FINS

1. Remove blower housing and any other shrouds.
2. Clean the cooling fins as necessary using compressed air or pressure washer.
3. Re-install all housings and shrouds.

PAD AND PAD HOLDERS

1. Push machine to level surface.
2. Turn off LP cylinder and remove it.
3. Place machine in Rok-Bak position.
4. Remove centering device and inspect the pad. If the pad has worn less than 1/4" (6 mm), replace it.
5. Inspect the pad holder for cracks or damage. If the pad holder does not have any damage, proceed to step 9.



WARNING: A DAMAGED PAD HOLDER ROTATING AT A HIGH RATE OF SPEED MAY BE AN EXTREME HAZARD SHOULD IT COME APART.

6. If the pad holder needs to be removed, a 3/4" wrench will be required. Locate the wrench flats on top of the spindle shaft. With the spindle shaft secure, turn the pad holder counterclockwise until it is free of the spindle shaft.
7. Save the washer and/or spacer that is on the spindle shaft; use the wrench to keep the shaft from turning. Be sure the pad holder is tight before proceeding.
8. Secure the pad with the centering device.
9. Lower the machine.

BELTS

1. Push machine to level surface.
2. Turn off LP cylinder and remove it.
3. Place machine in Rok-Bak position.
4. Rotate the pad drive and inspect the belt.
5. If cracks or excessive wear are present, the belt needs to be replaced.
6. To check for the proper tightness, squeeze the belt together. The belt should depress between 1/4" (.6 cm) and 1/2" (1.3 cm).

To change the belt:

1. Place the machine in the Rok-Bak position. Remove the pad holder by holding the

end of the shaft on the top of the machine with a 3/4" wrench and turning the pad holder counterclockwise. (Models equipped with dust collection will require removing the pulley cover to gain access to the belt.)

2. Use the 3/4" wrench to turn the end of the spindle shaft on top of the machine while removing the old belt from the spindle pulley.
3. Finish removing the belt from the engine pulley, if necessary.
4. Check engine pulley for correct alignment with the spindle pulley. Check hardware attaching pulleys for proper tightness.
5. Install the new belt onto the engine pulley.
6. Re-install the new belt onto the spindle pulley using the 3/4" wrench to turn the spindle clockwise. Make sure the belt is correctly placed on the idler pulley.
7. Re-install the pad holder onto the spindle shaft.
8. Turn the machine upright in the burnishing position.
9. Check belt for correct operation. Check all hardware for proper tightness.

BATTERIES

The battery supplied with this machine is a sealed, absorbed glass mat (AGM), maintenance-free type. It never needs servicing. When battery replacement is necessary:

1. Push machine to level surface.
2. Turn off LP cylinder and remove it.
3. Disconnect the BLACK negative battery cable first. Disconnect the RED positive battery cable last.
4. Loosen battery-retaining strap.
5. Lift out old battery and replace with new battery.
6. Secure battery with battery-retaining strap.
7. Connect the RED positive battery cable first. Connect the BLACK negative battery cable last.

Dispose of old battery in the proper manner. Most auto parts stores accept used batteries for recycling.

Scheduled Maintenance Chart

Operation	Interval							
	Daily	First 8 Hrs.	Every 50 Hrs.	Every 100 Hrs.	Every 200 Hrs.	Every 300 Hrs.	Every 400 Hrs.	Every 500 Hrs.
Check & add engine oil	•							
Check for loose or lost fasteners	•							
Check for oil leakage	•							
Inspect fuel hose and connections	•							
Clean engine dust filter	•							
Inspect pad holder	•							
Change engine oil		•	•					
Change engine oil filter		•		•				
Check & clean air cleaner paper element				•				
Check & clean air cleaner foam element				•				
Inspect battery and battery connections				•				
Replace air cleaner paper element					•			
Replace air cleaner foam element							•	
Inspect, clean, & re-gap spark plugs, Replace if necessary				•				
Check & adjust valve clearance.* Retorque heads.*						•		
Clean & lap valve seating surface.*						•		
Check engine emissions*								•
Clean cooling fins			•					
Inspect drive belt				•				
Inspect burnishing head assembly			•					
Replace drive belt					As Required			
* Contact Discount-Equipment customer service.								

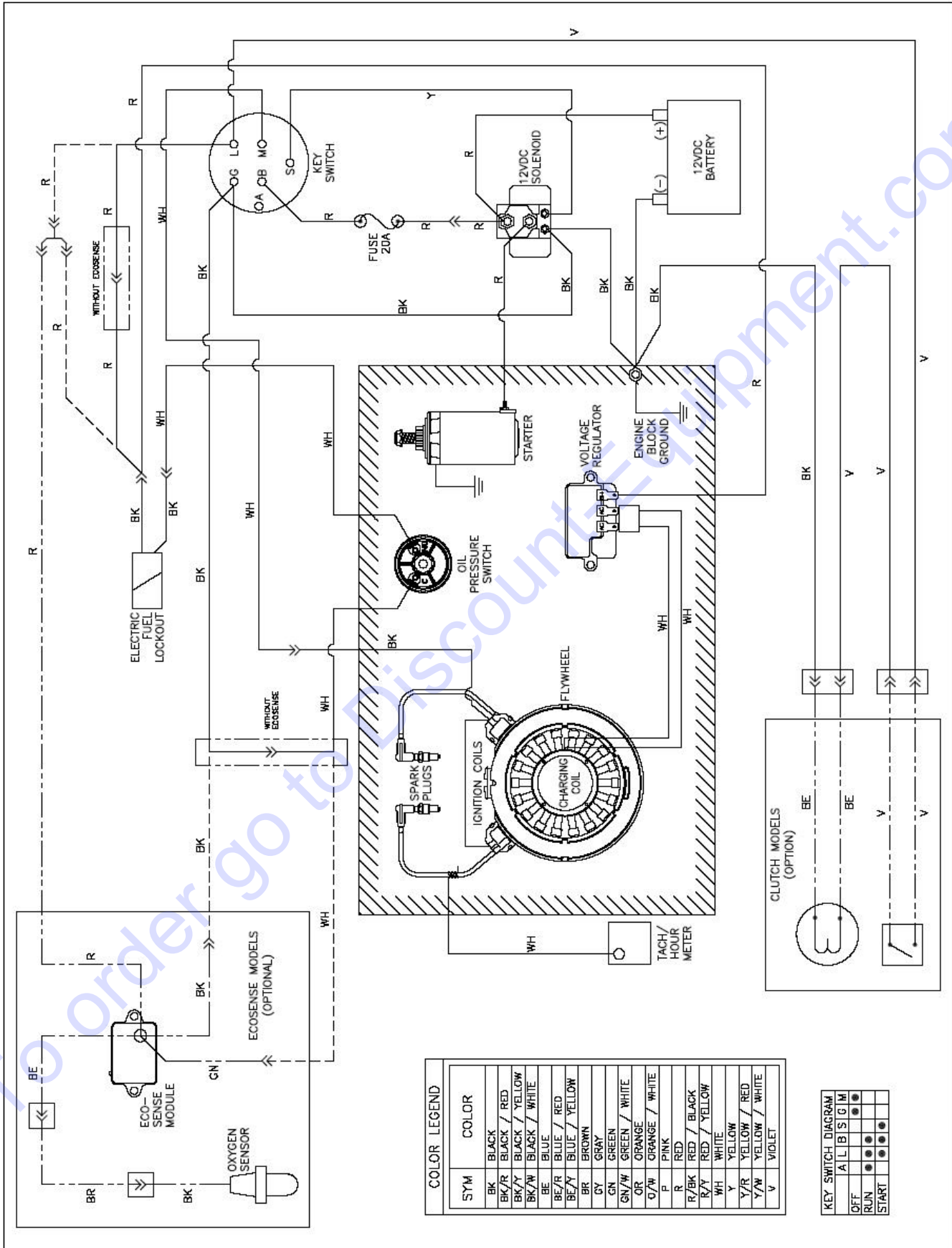
Troubleshooting

Problem	Cause	Solution
Engine is hard to start.	Propane cylinder is not properly connected.	Check connection and open service valve slowly.
	Battery is weak.	Charge battery or replace.
	Oil level is too low.	Check the oil level and add more if needed.
	Insufficient vacuum.	Place the engine throttle in the idle position; check the regulator vacuum hose for breaks, a pinched hose, or a bad connection.
	Coil air gap out of adjustment.	Adjust coil air gap. Contact Discount-Equipment.
	Spark Plug or head bolts loose.	Re-torque. Contact Discount-Equipment.
	Head gasket blown or valves need adjusting.	Replace head gasket; adjust valves and replace if necessary. Contact Discount-Equipment.
Engine will not start.	Propane cylinder is empty.	Install properly filled cylinder.
	Oil level is too low.	Check the oil level and add more if needed.
	Machine is in the wrong position.	Lower machine to operating position.
	Main fuse is blown.	Inspect fuse; if blown, replace.
	Insufficient vacuum.	Place the engine throttle in the idle position; check the regulator vacuum hose for breaks, a pinched hose, or a bad connection.
	Head gasket blown or valves need adjusting.	Replace head gasket; adjust valves and replace if necessary. Contact Discount-Equipment.
	Wires broken or disconnected.	Reconnect or replace wires.
	Defective coil(s).	Replace coil(s). Contact Discount-Equipment.
	Spark plug gap is incorrect.	Adjust gap to .025" (.64 mm).
	Spark plug is defective.	Replace spark plug.
	EcoSense shut the machine down.	If the light is blinking (no oxygen connection), turn the key switch to the OFF position and wait 30 seconds before trying again; if bad module, contact Discount-Equipment.
Engine lacks power.	Insufficient vacuum.	Place the engine throttle in the idle position; check the regulator vacuum hose for breaks, a pinched hose, or a bad connection.
	Dirty air filter(s).	Clean or replace the primary filter (paper element); clean or replace the secondary filter (foam element).
	Governor out of adjustment or malfunctioning.	Adjust governor and replace if necessary. Contact Discount-Equipment.
	Leaky head gasket.	Replace head gasket.
	No compression.	Piston rings and/or cylinder head(s) require replacement. Contact Discount-Equipment.
	Fuel mixture is too lean.	Check and adjust fuel mixture if necessary. Contact Discount-Equipment.
	Valves need adjusting or replacing.	Adjust valves. Contact Discount-Equipment.

Troubleshooting

Problem	Cause	Solution
Smell of burned rubber.	Belt out of adjustment.	Check the automatic tensioner.
Machine vibrates.	Loose fasteners.	Check the engine, tensioner, spindle, and pad holder fasteners. Tighten any that may be loose.
	Pad is not centered on the pad holder.	Re-center pad; replace if necessary.
	Pad holder is out of balance.	Remove pad holder from the machine and clean both sides. Check for cracks or tears; replace if necessary.
Machine is burnishing too aggressively.	Wheels are adjusted too far back.	Move both wheels forward in the wheel bracket.
	Improper pads.	Only use recommended burnishing pads.
Machine pulls to one side.	Bent wheel bracket.	Replace wheel bracket.
	Wheel is worn or has a bad bearing.	Replace wheel.
	Wheels are adjusted too far back.	Move both wheels forward in the wheel bracket.
Engine stops running.	Propane cylinder is empty.	Install properly filled cylinder.
	Engine oil level is too low.	Check the oil level and add more if needed.
	Dirty air filter(s).	Clean or replace the primary filter (paper element); clean or replace the secondary filter (foam element).
	EcoSense shut the machine down.	Check close loop vacuum line; clean filters; check for loose wiring or fuel line connections; service machine and check fuel settings. Contact Discount-Equipment.
Clutch will not engage.	Loose connection.	Check all wiring for a bad connection or broken wire.
	Clutch is bad.	Replace clutch if necessary.
Dust collection not working properly.	Dust collection bag is not collecting dust.	Empty dust bag; check the dust scoop and/or the dust tube for obstructions.
	Skirt is not sealing to the floor.	Adjust skirt to fit tightly against the seal, but still be able to move freely. If problem persists, skirt is bent, damaged, or worn and may require a replacement.

Wiring Schematic



COLOR LEGEND

SYM	COLOR
BK	BLACK
BK/R	BLACK / RED
BK/Y	BLACK / YELLOW
BK/W	BLACK / WHITE
BE	BLUE
BE/R	BLUE / RED
BE/Y	BLUE / YELLOW
BR	BROWN
GY	GRAY
GN	GREEN
GN/W	GREEN / WHITE
OR	ORANGE
O/W	ORANGE / WHITE
P	PINK
R	RED
R/BK	RED / BLACK
R/Y	RED / YELLOW
WH	WHITE
Y	YELLOW
Y/R	YELLOW / RED
Y/W	YELLOW / WHITE
V	VIOLET

KEY SWITCH DIAGRAM

	A	L	B	S	G	M
OFF						
RUN	●					
START	●	●	●	●	●	●

Spare Parts

PART#	DESCRIPTION
14420-MP047500	Pad Holder, 24" Complete Assembly
14420-MP124700	Bag, Vacuum
14420-MP8310	Velcro, Hook, Stud, 24"

To order go to Discount-Equipment.com

Warranty

National Flooring Equipment Inc. (referred to as "the Company") warrants that each new unit manufactured by The Company, to be free from defects in material and workmanship in normal use and service for a period of twelve (12) months from date of shipment from the Company. For administrative ease, will honor warranty for a period of fifteen (15) months from date of shipment from the company. Accessories or equipment furnished and installed on the product by the Company but manufactured by others, including but not limited to: engines, motors, electrical components, transmissions etc., shall carry the accessory manufacturers own warranty. Battery warranties are prorated over the warranty period. Customer is responsible for the inspection of equipment / parts upon delivery. Freight damages reported beyond authorized time frame will not be honored.

The Company, at its determination of defect, will repair or replace any product or part deemed to be defective in material or workmanship within specified warranty time period. All product determinations and / or repairs will take place at the designated Company repair facility, or at a certified warranty location designated by the Company. The Company will coordinate and be responsible for all freight expenses associated with valid warranty claims. Freight and shipping expenses associated with abuse or misuse will be back charged to the Distributor/Customer. The Company reserves the right to modify, alter or improve any part / parts without incurring any obligation to replace any part / parts previously sold without such modified, altered or improved part / parts. In no event shall the seller or manufacturer of the product be liable for special, incidental, or consequential damages, including loss of profits, whether or not caused by or resulting from the negligence of seller and / or the manufacturer of the product unless specifically provided herein. This warranty shall not apply to any products or portions there of which have been subjected to abuse, misuse, improper installation or operation, lack of recommended maintenance, electrical failure or abnormal conditions and to products which have been tampered with, altered, modified, repaired, reworked by anyone not approved or authorized by the Company or used in any manner inconsistent with the provisions of the above or any instructions or specifications provided with or for the product. Any and all unauthorized onsite warranty work conducted by unauthorized personnel or any outside person(s), is not covered by the Company unless the work has been pre-authorized by a predetermined manufacturer representative. This excludes wearable parts and/or consumables.

Defective or failed material or equipment shall be held at the purchaser's premises until authorization has been granted by the Company to return or dispose of defective products. Products returned for final inspection must be returned with a manufacturer authorized Return Material Authorization (RMA). Any unauthorized return of equipment will be declined at the dock by the Company. Any non-approved items returned with approved returned items are subject to rejection and will not be credited. Credit will be issued for material found to be defective upon the Company's inspection based on prices at time of purchase.

To obtain a Material Safety Data Sheet and/or a copy of the CE Declaration of Conformity please contact Discount-Equipment. This product is CE compliant.

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