

HOT WATER PRESSURE WASHER MANUAL

IMPORTANT!

Read this before you operate your Hot Water Pressure Washer.



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CONGRATULATIONS ON YOUR PURCHASE OF THIS HIGH QUALITY HOT WATER PRESSURE WASHER. THIS MACHINE IS DESIGNED TO GIVE YOU MANY HOURS OF SERVICE, HOWEVER, REASONABLE CARE, ROUTINE MAINTENANCE AND PROPER OPERATOR INSTRUCTIONS FOR USE IS REQUIRED.

AS YOU PROCEED THROUGH THIS OPERATOR MANUAL IT IS IMPERATIVE THAT YOU FOLLOW AND ADHERE TO THE FOLLOWING SAFETY MESSAGES.

SAFETY MESSAGES

Your safety and the safety of others is very important. We have provided important safety messages in this manual and on the machine. PLEASE READ THESE MESSAGES CAREFULLY.

A safety message alerts you to potential hazards that could hurt you or others. Each safety message is preceded by a safety alert symbol ! and one of these three words: DANGER, WARNING, or CAUTION.

THESE MEAN:

DANGER! You may be SERIOUSLY HURT or KILLED if you don't follow instructions.

WARNING! You COULD be SERIOUSLY HURT or KILLED if you don't follow instructions.

CAUTION! You CAN be HURT if you don't follow instructions.

Damage Prevention Messages

You will see other important messages that are preceded by the word NOTICE.

This word Means:

NOTICE Your machine or other property could be damaged if you don't follow instructions.

The purpose of these messages is to ensure your safety and to help prevent damage to your machine, other property, or the environment.

OPERATOR SAFETY INSTRUCTIONS

DANGER!

DO NOT ATTEMPT TO INSTALL OR OPERATE THIS MACHINE UNTIL YOU HAVE READ THIS MANUAL. IF YOU OR YOUR OPERATOR CANNOT READ ENGLISH, HAVE THIS MANUAL EXPLAINED FULLY BEFORE ATTEMPTING TO OPERATE THIS EQUIPMENT.

DANGER! (Electric Models)

THIS MACHINE MUST BE PROPERLY GROUNDED TO AVOID FATAL ELECTRICAL SHOCK IN THE EVENT THAT IT BECOMES ACCIDENTALLY GROUNDED. HAVE ELECTRICAL CONNECTIONS MADE BY A QUALIFIED ELECTRICIAN.

WARNING! (Electric Models)

DISCONNECT THIS MACHINE FROM ELECTRICAL SOURCE BEFORE MAKING ANY REPAIRS.

WARNING!

THIS MACHINE IS DESIGNED TO PRODUCE VERY HIGH PRESSURE AT GUN TIP. TO PREVENT INJURY OR DAMAGE, HOLD CLEANING GUN SECURELY AT ALL TIMES WHEN PUMP IS IN OPERATION AND FLUID IS BEING SPRAYED.

CAUTION!

CHECK CLEANING EQUIPMENT, REMOTE HOSE, GUN, WAND AND FITTINGS PRIOR TO OPERATION. DO NOT OPERATE THIS MACHINE WITH A DAMAGED OR WORN HOSE, LEAKS, OR WITH ANY COVERS OFF THAT WOULD EXPOSE BELTS, PULLEYS OR ELECTRICAL DEVICES OR CONNECTIONS.

DANGER! (Explosion Hazard)

DO NOT OPERATE THE UNIT WHEN THERE IS AN ODOR OF GAS PRESENT. IF YOU OPERATE THE UNIT WHEN THERE IS AN ODOR OF GAS, IT COULD RESULT IN INJURY TO YOU OR OTHER PERSONNEL.

DANGER!

TAMPERING WITH THE MACHINE'S FACTORY PRESET UNLOADER VALVE SETTINGS AND/OR THE PRESSURE RELIEF VALVE SETTING COULD RESULT IN A MACHINE EXPLOSION. DO NOT ATTEMPT TO CHANGE THE SETTINGS. DISCONTINUE USE IF A MALFUNCTION OCCURS AND CONTACT YOUR LOCAL AUTHORIZED DISTRIBUTOR.

DANGER!

DO NOT OPERATE THE UNIT WITH A MALFUNCTIONING BURNER OR BURNER CONTROLS. INSPECT BURNER AND BURNER CONTROL OPERATION BEFORE EACH USE. FAILURE TO DO SO MAY RESULT IN AN EXPLOSION. IF YOU SUSPECT A PROBLEM WITH THE BURNER, DISCONTINUE USE IMMEDIATELY AND CONTACT YOUR LOCAL AUTHORIZED DISTRIBUTOR.

WARNING! (Liquid Petroleum or Natural Gas Fired Units)

FOR YOUR SAFETY, IF YOU SMELL GAS:

1. OPEN WINDOWS.
2. DO NOT TOUCH ELECTRICAL SWITCHES.
3. EXTINGUISH ANY OPEN FLAME.
4. IMMEDIATELY EVACUATE PREMISES AND CALL YOUR GAS SUPPLIER.

DANGER!

MACHINES CAN CAUSE AN EXPLOSION WHEN OPERATED NEAR FLAMMABLE MATERIALS AND VAPORS. DO NOT- USE THIS MACHINE WITH OR NEAR FUELS, GRAIN DUST, SOLVENTS, THINNERS. OR OTHER FLAMMABLE MATERIALS.

DANGER!

THIS UNIT MUST BE INSTALLED IN COMPLIANCE WITH ALL APPLICABLE GAS CODES. FAILURE TO DO SO COULD RESULT IN INJURY TO YOU OR TO OTHER PERSONNEL.

CHAPTER 1

INSTALLATION

GENERAL INFORMATION - Insure that all codes are followed in the installation of your hot water pressure washer. Installation is easy but good plumbing and electrical practices must be followed. If uncertain, a qualified electrician and plumber should be consulted.

LOCATIQN- Place the washer in a clean, well ventilated, dry location; allowing access for normal maintenance. Do not install washer where overspray will be directed toward or around the unit. Do not install unit in an area where combustible materials are used or stored.

WATER SUPPLY - Test the water source to determine water hardness. If the hardness exceeds seven (7) grains, a suitable water softener should be installed. Installing a water softener greatly improves chemical action and prevents "spotting" on glass, chrome and other washed surfaces. If local water pressure exceeds 60 psi, a water pressure reducing valve must be installed.

If the water source is not adequate (capable of supplying a minimum of 1/2 gallon more than the volume of the pump) a tank or other suitable water source must be provided. (Running a pump with out sufficient volume will damage packings and or shorten pump life.)

FRESH AIR SUPPLY - Your unit is equipped with an air cooled motor and requires fresh air ventilation. Do not enclose unit or stack items around unit that could prevent proper air movement.

CARE OF WASH HOSE

Following these suggestions will increase the life of your wash hose.

1. Don't drag hose over sharp objects that could damage cover.
2. Don't allow hose to "lay around" when not in use.
3. Don't tug at hose if caught around tires. Dislodge without pulling, stretching or jerking the hose.
4. Don't drag hose "down the line" behind mobile wash units.
5. Don't leave hose out in freezing weather. If accidentally frozen, allow to thaw, remove tip and flush before using

FREEZE PREVENTION

The pump, plumbing and wash hose may burst by freezing water within them. To avoid costly repairs:

1. Install washer in a heated area where temperature exceeds 32 degrees F.
2. Insulate all lines leading to the washer that are exposed to freezing temperatures.
3. During extended shutdown periods, thoroughly drain the water system, chemical system and wash hose. Fill with anti-freeze solution. See CHAPTER 3 - FREEZE PROTECTION

NOTICE

DO NOT allow hose to be run over. The wire braid will flatten and the hose will have to be replaced.

OPERATING INSTRUCTIONS

1. STOP! Read operator's manual before operating this machine. Failure to read operation and warning instructions may result in personal injury or property damage.
2. Read engine manual, turn on gas valve and choke. Turn the engine switch to the START position and hold it there until the engine starts. NOTE: Do not use the starter for more than five seconds at a time. If the engine fails to start, release the switch and wait ten seconds before operating the starter again. When the engine starts, allow the engine switch to return to the ON position. If the engine is to be started without the battery, turn switch to start position and pull rope to start. Turn off choke.
3. With spray nozzle pointed away from you and anyone else, press trigger on spray gun to Obtain pressurized cold water spray.
4. For hot water, turn the burner switch ON when a steady stream of water flows out of the spray gun. Burner will light automatically.

NOTE: Do not start machine with burner switch on.

5. Adding exhaust vent pipe to your oil fired burner is not recommended due to restricted air flow which causes carbon build-up, which affects the operation, and increases maintenance on the coil. If a stack must be used, refrain from using 90° bends. If the pipe cannot go straight up then use only 45° bends and go to the next size pipe. The overall pipe length must not exceed 6' in length.
6. Avoid installing in small areas or near exhaust fans. Exhaust contains poisonous carbon monoxide gas; exposure may cause loss of consciousness and may lead to death. It also contains chemicals known, in certain quantities, to cause cancer, birth defects or other reproductive harm.

WARNING!

RISK OF ASPHYSIATION. USE THIS PRODUCT ONLY IN WELL VENTILATED AREA.

7. Never run pump dry or leave gun closed longer than 3 minutes.
8. The best insurance against an accident is precaution and knowledge of the machine.
9. The manufacturer is not liable for any changes made to our standard units, or any components not purchased from the manufacturer.
10. Read engine safety instructions provided.
11. Do not allow children to operate the pressure washer at any time.
12. Use No. 1 or No. 2 Kerosene or diesel. NEVER use gasoline in your fuel oil tank. Gasoline is more combustible than fuel oil and could result in a serious explosion. NEVER use crankcase or waste oil in your burner assembly. Fuel unit malfunction could result from contamination.
13. Do not confuse gasoline and fuel oil tanks. Keep proper fuel in proper tank.

WARNING!

RISK OF FIRE OR EXPLOSION: USE VAPOR FUEL ONLY. (Liquid Petroleum and Natural Gas Units Only)

14. Protect unit from freezing.
15. Be certain all quick coupler fittings are secured before using pressure washer.
16. Do not allow acids, caustic or abrasive fluids to pass through the pump.
17. Inlet water must be cold.
18. Protect high pressure hose from vehicle traffic and sharp objects.
19. Before disconnecting high pressure hose from water outlet, turn burner off and pull the trigger on the spray gun allowing water to cool to below 100°F before stopping machine. Then open the gun to relieve pressure. Failure to properly cool down or maintain the heating coil may result in a steam explosion
20. Do not overreach or stand on unstable support. Keep good footing and balance at all times.
21. This machine must be attended during operation.
22. Do not operate this equipment under the influence of drugs or alcohol.
23. Keep area clear of other people.

PRE-OPERATION CHECK and SET-UP PROCEDURES

- Pump oil (use only oil prepared for use in oil bath drive plunger & piston high pressure pumps)
- Cold Water Supply
- Hose, Wand and Nozzle
- Water filter (intact, nonrestrictive)
- Engine fuel (unleaded 86 octane or higher)
- Engine oil (SAW 10W30)
- Burner fuel (No.1 home heating fuel or diesel)

SET-UP PROCEDURES

1. Attach water hose to inlet connector. Minimum flow should be 5 GPM.
2. Attach high pressure hose using quick coupler. Lock coupler securely into place by pulling back coupler collar and inserting it onto discharge nipple and then pushing collar forward to lock in place.
3. Check oil level on sight glass on side of pump. Oil should be visible one-half way up sight glass. The oil level can also be checked by using the dipstick on the top of the pump.
4. Fill gasoline tank and check engine oil.
5. Fill fuel tank. Do not confuse gasoline and fuel oil (diesel) tanks. Keep proper fuel in proper tanks.
6. Install proper battery making sure that the red cable is attached to the positive terminal. Use only a group 24 marine type deep cell battery with a 90 amp hour rating (battery included)

Marine Deep Cell Battery is used for 12 V Skid units only, All Generator Skid Units use 12v, 235 Cranking & Garden style Battery

CHAPTER 2

OPERATIONS

DON'T — DON'T — DON'T

1. DON'T let the pump run (without water supply)
2. NEVER run the burner without water flowing through it (except for short periods for testing the burner).
3. DON'T run acids or hard caustics through the pump and heating coil.
4. DON'T SUBJECT YOUR WASHER TO FREEZING TEMPERATURES UNLESS IT HAS BEEN WINTERIZED. Consult preventative maintenance section for winterizing instructions.
5. NEVER allow children or untrained adults to operate the machine. Keep children at a safe distance when an adult is using the machine.
6. NEVER clean off machine using its own spray wand. The machine is water protected but not water proof. Damage could occur to components from high pressure spray.

STARTING THE MACHINE

1. On electric models make certain all switches are off before connecting to power supply.
2. Initial starting - after initial installation, coil descaling, or a long period of non-use, your unit should be run with the nozzle or wand removed to flush out dirt, rust or loose scale which could plug the nozzle.
3. Gas fired machine - turn on gas supply, light pilot by turning control knob to pilot position. Press knob and light pilot. Hold for 30 seconds and release. If pilot goes out wait 5 minutes and repeat. When pilot is lit turn knob to on position.
4. PUMP ON - hold gun firmly with trigger squeezed if so equipped, turn on the pump. Allow the pump water spray to develop constant operating pressure.
5. BURNER ON - after cold water spray is running steadily, turn on burner switch for hot water operation. The self- priming oil burner or gas burner will ignite and heat the water. Adjust temperature control to desired setting if so equipped.
6. Chemical control - to start the “soap” mode (chemical solution spray), install chemical injector between pump and high pressure hose and replace high pressure tip with black chemical tip.

SHUTTING DOWN AFTER USE

Following these simple techniques can prolong the life of your machine and help prevent service problems:

1. Finish cleaning in the RINSE mode, or run straight water through the machine after finishing.
2. Turn the burner switch off, and let the unit pump cold water until the heating coil assembly has cooled down.
3. Turn the pump off. Make sure the chemical valve is completely closed, and wrap up the wand, hose and power cord for safe storage.

PREVENTIVE MAINTENANCE

Routine Inspection

Regular, routine inspection of the machine's sub-system and critical components is the key to preventive maintenance. To prevent breakdowns and to prolong the life of your unit, follow these simple routines religiously.

DAILY

1. Check WATER SUPPLY before starting.
2. Check FUEL SUPPLY.
3. Check CHEMICAL SUPPLY.
4. Check NOZZLE for clogging.
5. Check pump oil level (crankcase type pump).
6. Check belt for wear and proper tension.

WEEKLY

1. Check the PRESSURE HOSE for wear and damages.
2. Check the FUEL FILTER for dirt and sediment.

FUEL

OIL FIRED - use clean #1 or #2 home heating oil diesel or kerosene. (Use #1 fuel in cold temperatures.) DO NOT use gasoline, lube oils, mixes or fuel contaminated with water. Diesel fuel may be used but it contains additives meant for high compression engines that soot up the combustion chamber and may require frequent cleaning to maintain efficient performance.

#2 fuel may vary in BTU or heat content. Contact the nearest service person if excessive heating or thermostat cycling occurs.

GAS FIRED - Natural Gas Fired Machine operate on 3 1/2" of water column (2 oz.) pressure at the valve and it must have from 5" to 7" water column (3 to 4 oz.) pressure supplied to the unit at the inlet. The water column check point is as follows:

Check the water column pressure at the valve with burner operating. The water column pressure is checked with a manometer.

A gas shut-off valve should be installed on the gas line with a union between the valve and the machine.

Butane or Propane gas fired machines operate on 11" (6.36 oz) water column pressure. These Propane (LP) gas machines are not equipped with a gas regulator. Therefore, a gas regulator of sufficient size to allow for pressure drop from the tank to the machine must be installed on the LP tank.

Check the 11" water column (6.36 oz.) at the valve.

OPERATIONS

WINTERIZING PROCEDURE

1. Disconnect Water Supply.
2. Operate Pump to expel all water from system. Shut off pump and remove nozzle from gun wand. Use RV antifreeze as a pump saver until some comes out the HP output. A cut off garden hose and funnel may help.

DELIMING INSTRUCTIONS

The build-up of lime or mineral scale during the normal use of your unit will decrease the operating efficiency of the heating coils. How often you need to clean the heating coil will depend on your water condition. If your water is known to be hard or to have a high mineral content, a preventative maintenance schedule to clean the coil every 90 days is recommended.

1. In a five gallon container, mix deliming acid with water according to the manufacturer's recommendations. CAUTION: DO NOT use raw muriatic acid. Acid must be properly inhibited to protect pump and coil.
2. Turn off your water supply. Disconnect the hose at the inlet of the pump. Connect five or six feet of hose to the hose barb at the pump inlet. Tighten the hose clamp securely. Remove the spray nozzle from the gun and place the discharge end of the gun and the suction end of the water hose into the container. Elevate the container above the level of the pump. Secure the pump suction hose approximately five inches above the bottom of the container. We recommend the use of a strainer screen on the suction hose.
3. Turn on the pump and circulate the acid solution through the coil for 30 minutes, or until the discharge solution stops foaming. When foaming stops, the coil will be clean.

COIL CLEANING

Poor grade of fuel oil or inadequate combustion air will cause heavy soot buildup on the outside surfaces of the heating coil. This deposit of soot retards heating and restricts air flow through the coil. To clean off soot deposits, periodically add liquid "Red Devil" soot remover or a similar product to the fuel oil. Use manufacturer's mixing instructions. If sooting is severe, remove the coil and clean it with fuel oil and pressure wash the coil with detergent.

NOTICE

RINSE WATER /RUN OFF

Do not allow rinse water and run off from cleaning surface to be deposited into storm drain or environment. A collection system must be used that is in accordance with codes and regulations for the city, state and federal agencies.

TROUBLESHOOTING GUIDE (Electric Models)

<u>PROBLEM</u>	<u>POSSIBLE CAUSES</u>	<u>REMEDY</u>
1. Washer electrically dead	<ol style="list-style-type: none"> 1. No power to the machine 2. Defective power cord 3. Defective main on/off switch 4. Faulty or loose wiring 	<ol style="list-style-type: none"> 1. Check circuit breaker. Check for defective electrical outlet. 2. Repair or replace bad cord. 3. Test switches and replace if defective. 4. Check switch and motor wiring for Solid connections.
2. Power supply circuit breaker trips often and will not stay "ON"	<ol style="list-style-type: none"> 1. Short circuit in washer or elsewhere on the circuit 2. Undersized circuit being used or too much total load on circuit 3. Supply voltage is low 4. Undersized extension cord causing undervoltage to washer 	<ol style="list-style-type: none"> 1. Check washer (and other loads same circuit for faulty wiring, loose wire, etc.) 2. Put the washer on a larger circuit, or remove other loads from the existing circuit. 3. 110 V. units require a minimum of 110 V.; 220 V. units require 220 V. Check line voltage and connect washer to adequate voltage supply. 4. Contact electrician or supplier for size and length.
3. Thermal overload Protector on	<ol style="list-style-type: none"> 1. Partially or totally clogged spray nozzle over burdens motor 2. Undersized spray nozzle in use 	<ol style="list-style-type: none"> 1. Remove and clean out nozzle. Make strainers on water inlet swivel and chemical suction tube are present and in good, clean condition. 2. Make sure nozzle size is correct as given in "Specifications" section.
4. Thermal overload protectors trips often in either of both motors (pump and oil burner)	<ol style="list-style-type: none"> 1. Supply voltage is low 2. Undersized extension cord 	<ol style="list-style-type: none"> 1. Check line voltage and ensure a minimum 110 volts (minimum of 220 volts in 220 V, units) to the machine. 2. Contact electrician or supplier for size and length.
5. Electrical shock from cabinet or spray wand	1. Electrical leakage exists and WASHER IS NOT PROPERLY GROUNDED	<ol style="list-style-type: none"> 1. DO NOT USE. FIND PROBLEM OR CONTACT QUALIFIED ELECTRICIAN. Washer must be completely grounded at all times. This means a solid ground connection to the side of the cabinet, and strict use of properly grounded extension cords and receptacles. NEVER use an ungrounded, 2 conductor extension cord, and NEVER remove the grounding pin on the washer's power cord.

TROUBLESHOOTING GUIDE

<u>PROBLEM</u>	<u>POSSIBLE CAUSES</u>	<u>REMEDY</u>
1. Burner motor runs but burner will not light	<ul style="list-style-type: none"> A. No fuel B. No spark C. Poor atomization of fuel D. Excessive combustion air E. Air leak in fuel inlet line F. Clogged fuel filter G. Defective fuel pump (locked up) H. Air lock I. Defective temperature switch 	<ul style="list-style-type: none"> A. Fill tank B. Check ignition transformer and high tension insulators. (see transformer diagram) C. Adjust oil pres. of fuel pump to 120 PSI or replace fuel nozzle. (see fuel pump diagram) D. Close air band, open gradually until clean combustion is achieved. E. Tighten fuel line fittings. F. Clean out or replace the fuel filter cartridge. G. Replace with new fuel pump. H. Bleed fuel pump. I. Replace switch.
2. Burner smokes	<ul style="list-style-type: none"> A. Not enough air to burner B. Wrong type fuel C. Stack restriction D. Air flow through coils restricted due to soot buildup 	<ul style="list-style-type: none"> A. See 6-D for remedy. B. Use kerosene or #1 heating fuel. C. Use same size stack as vent size on machine D. Periodically add "Liquid Soot Remover" to fuel oil. If sooting is severe, remove the coil and clean it with fuel oil and pressure wash the coil with detergent.
3. Burner fails to start	<ul style="list-style-type: none"> A. Defective switch B. Check for loose elec. connections C. Motor bearings frozen D. Motor shut-down by Thermo-protector E. Generator not working properly 	<ul style="list-style-type: none"> A. Check with voltage tester. B. Tighten C. Free shaft and lubricate. D. Allow motor to cool and push reset button, if motor cuts out again, check wiring to locate cause. E. Check with voltage tester.
4. Engine will not start	<ul style="list-style-type: none"> A. Malfunction 	<ul style="list-style-type: none"> A. See Engine Manual.

TROUBLESHOOTING GUIDE

<u>PROBLEM</u>	<u>POSSIBLE CAUSES</u>	<u>REMEDY</u>
5. High operating pressure, Pressure relief valve leaking	A. Lime deposits B. Wrong nozzle C. Nozzle clogged D. Defective pressure relief valve	A. Delime coil. B. Replace with proper size nozzle. C. Clean nozzle. D. Replace with new pressure relief valve.
6. Water temperature too hot	A. Thermostat set too high B. Water supply to unit is too warm	A. Adjust on dial below 210 degrees. B. Reduce fuel oil pressure or replace with Smaller fuel nozzle.
7. Water temperature is too cold	A. Thermostat set too low B. Low fuel pressure C. Scale build-up in coil	A. See 9-A B. Increase fuel pressure. (See burner section) C. Descale (according to instructions) adjust
8. Water Pump Malfunctions		See pump manual for your specific model.

LIMITED WARRANTY

All machines are warranted by the manufacturer to be free of defects in materials and workmanship under normal use. The manufacturer's obligation under this warranty shall be limited to the repair of or exchange of any parts that may prove defective subject to normal use. **Repairs must be pre-authorized.** In no event shall the manufacturer be liable for incidental nor consequential damages nor labor charges, which result from any defect in the product or breach of this warranty.

This warranty shall not apply to any part or parts, which have been subjected to accident, negligence, alteration, abuse or misuse. If any defect appears, immediately contact the dealer from which it was purchased. **Returned units or parts must be shipped to the manufacturer prepaid only. A dated sales receipt with the serial number is required for all warranty claims.**

Returned Goods: All products must be approved by the manufacturer prior to return and must be accompanied by an RMA (Return Material Authorization) number. All products must be returned at customer's expense and warranted products will be returned to the customer at no additional shipping charge.

MANUFACTURER'S WARRANTY – AR, CAT, GENERAL PUMPS

Pumps are warranted to the original purchaser for a period specified by the manufacturer from the date of purchase.

Warranty covers manufacturing defects or workmanship that may develop under normal use in a manner up to the directions and usage recommended by the manufacturer.

Warranty does not apply to misuse or when pump or accessory is altered or used in excess of recommended speeds, pressures, temperatures or handling fluids not suitable for pump or accessory material construction. Warranty does not apply to normal wear, freight damage, freezing damage or damage caused by parts or accessories not supplied by the manufacturer.

Liability of manufacturer for warranty is limited to repair or replacement at the option of the manufacturer when such products are found to be of original defect or workmanship at the time it was shipped by the factory.

ACCESSORIES WARRANTY

Guns, hoses, tips, valves, etc. have a warranty of 90 days. This warranty does not apply to malfunction caused by fault or negligence or improper use.

ENGINES

Honda GX – 2 year limited warranty against defects in material and workmanship under normal use. Refer to Honda Owner's Manual or contact your nearest authorized Honda dealer.