

**Trak Pak 3
Gas Powered
Hydraulic Power Unit
910202
Operating and Maintenance Manual**





Trak Pak 3 Gas Powered Hydraulic Power Unit 910202

Record of Changes

Rev.	Date	Description of Changes
1	10.2022	New Release
1.1	12.2022	Add hose statement to Starting the Engine section. Update hydraulic oil specs
1.2	3.2023	Add environmental section, add PPE section, update hydraulic hoses and recommended fluids chart
1.3	10.2023	Update Technical Support & Service information

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Section 1: Overview and Safety

Trak Pak 3 Power Unit Overview

Racine Railroad Products designs and manufactures equipment primarily for the repair and new construction of rail and railroad tie track maintenance.

The Racine Railroad Products Power Unit is designed to provide hydraulic flow and pressure for the operation of H.T.M.A. Type I and Type II hydraulic tools.

The unit provides power for operation of Type I or Type II open center tools (5-10 gpm / 19-38 lpm @ 2000 psi / 140 bar).

General

The power unit is equipped with a

- Honda Engine GX690TXA2
- Rotary operated hydraulic selector valves
- Electric start with 12-volt battery and fan-cooled heat exchanger
- The fuel and hydraulic systems are self-contained with the required reservoir, filtration, and level indicators.

Hydraulic System

- The hydraulic system consists of a hydraulic system fluid reservoir, filter assembly, and a single gear pump. The filter element is a 10-micron cellulose type element.
- The filter housing has a pressure bypass valve to divert fluid directly to the tank in the event of a restricted flow.
- Pressure hoses from the pumps are connected directly to a control module, which contains a relief valve, a pressure control valve and a pressure return port.

Do not use this machine for other than its intended purpose.

Please read these instructions when using this tool, which can only be used for the specified purpose. This instruction manual should be kept throughout the life of the tool.

The operator of this tool should:

- Have access to this operation instruction.
- Read and understand this operation instruction.

Note: Information in this document is subject to change without notice.

Environmental Protection



Comply with relevant national waste disposal laws and regulations. Waste electronic devices cannot be treated as household waste.

Equipment, accessories, and packaging shall be recyclable.



Do not throw the discarded equipment in trash cans.

Safety Information

For safe installation and operation of this equipment, carefully read and understand the contents of this manual. Improper operation, handling, or maintenance can result in equipment damage and personal injury.

Only trained and authorized personnel should be allowed to operate this machine. In addition, all personnel at the worksite should be aware of the safety concerns and their individual responsibilities prior to working with this machine.

Please read and comply with all the safety precautions in this manual **before** operating this machine. Your safety is at risk.

Safety Terms



DANGER indicates a hazardous operating procedure, practice, or condition. If the hazardous situation is not avoided death or serious injury will occur.



WARNING indicates a hazardous operating procedure, practice, or condition. If the hazardous situation is not avoided death or serious injury could occur.



CAUTION indicates a potentially hazardous operating procedure, practice, or condition. If the hazardous situation is not moderate or minor injury could occur.

Machine Use and Safety Precautions



Failure to follow safety precautions when operating this equipment can result in serious injury or death to the operator or other persons in the area.
Observe the following precautions whenever you are operating, working on or near this equipment.

Do not use this machine for other than its intended purpose.

Do not make any modifications without authorization or written approval from Racine Railroad Products. Replace all Racine Railroad Products and OEM parts with genuine Racine Railroad Products and OEM parts. Using non-OEM parts may compromise the safety of the machine.

Do not wear loose clothing, jewelry, radio belts, etc., when operating, working on or near this equipment. They can be caught in moving parts and may result in severe injury.

Always wear appropriate personal protective clothing when operating this equipment: e.g., orange safety vest, hard hat, safety glasses with side shields, hearing protection, steel-toed safety boots, leather gloves, dust respirator, etc.

Always lift heavy objects with the knees and legs, not the arms and back.

Always keep hands, arms, feet, head, clothing, etc., out of the operating area and away from all rotating or moving components when operating, working on or near this machine.

Always make sure that all guards, covers, belts, hoses, and operating components are in good working order and that all controls are in the appropriate position before starting the engine.

Always make sure that all safety equipment installed properly and are in good working order. Do not operate the machine until unsafe conditions have been corrected.

Always operate in a well-ventilated area and make sure that the air filters, air filter covers, and muffler are in good condition.

Always keep the machine clean and free of debris. Operate the machine in a safe and responsible manner. Exercise caution when fueling, working on or near rotating or moving components, hot components, and fuel systems. Be aware of potential fire hazards and prevent sparks, exhaust, etc., from starting fires on the machine and/or work area.

Always comply with all instructions provided on any decals or placards installed on the machine and with any relevant amplifying information provided in this manual or other general operating procedures.

Always disconnect the power source and make sure that all controls are in a safe position and install all appropriate locking and safety devices before doing any of the following:

- Lubricating
- Adjusting
- Installing Tooling
- Making Repairs
- Performing Service

Section 2: Specifications and Installation

Specifications

- Honda Engine GX690TXA2
- Rotary operated Hydraulic Selector valves
- 7-gallon Fuel Tank
- 9-gallon Hydraulic Reservoir
- 10-micron Element Return Line Filter
- Electric Start with 12-volt Battery
- Fan-Cooled Heat Exchanger

Desirable Properties of Hydraulic Fluid

Proper Viscosity: Choose a viscosity high enough to provide good sealing and proper lubrication, but not too high to cause significant pressure drops, loss of efficiencies or high power consumptions.

Good Lubricity: Choose oil that has good lubricity, which is the ability to carry heavy loads while maintaining low frictional properties.

High Viscosity Index: The measure of the degree of change in the viscosity of fluid as change in temperature occurs. High index is the less the oil will thin when the temperature increases and low index the less the oil will thicken when temperature decreases.

Stable & Non-degrading: Fluid should be thermal and shear stable and should resist breakdown from oxidation and bacteria.

Low Compressibility: Compressibility is important when oil is subjected to higher pressure. High compressibility results in lower efficiency and higher apparent viscosity characteristics.

Low Foaming: Low foaming is critical to performance. Excessive foaming can cause cavitation of the pump and premature wear

High Heat Transfer: An important aid to remove heat generated in normal pumping and use of hydraulic fluids.

Good Demulsibility: Demulsibility is the ability to resist emulsification and allow for separation and removal of water.

Non-corrosive & Rust Inhibitors: Oils that are compatible with hydraulic components. Should contain effective rust inhibitors.

Low Vapor Pressure: Assists in preventing cavitation and high wear rates of the hydraulic pump.

Cleanliness: Extremely important to use clean and non-contaminated hydraulic oil. With extremely tight tolerances built into pumps any contamination could destroy a pump. Even new oil should be filtered before using. A 10-Micron Medium is recommended.

Setup

Note: It is extremely important that the pump is not started until oil is in the system. As the warning tag indicates operating a pump even for a brief time will result in damage.

1. Remove oil breather cap and fill reservoir to the point that the oil level is approximately 1" from the top of the tank, (approximately 9-gallons).
2. Replace the oil breather cap when the tank has been properly filled. Wipe up any oil that might have spilled.

Note: Before proceeding to Step 3, Make sure that the engine has been properly serviced and fueled. Refer to *Honda Engine Manual*.

3. Fill the fuel tank.
4. Serviced with the proper oil level in the reservoir.

Starting the Engine



When starting the power unit, the tool or hoses must be connected to the power unit. The flow control will not bypass to tank when hoses or tool are not connected to power unit.

For initial start-ups, the power unit should be allowed to run a couple of minutes before it is allowed to build system pressure.

1. Start the engine (See engine manual for proper starting of the engine).

Note: An adjustable veneer style throttle controls the engine that has been factory set at 1200 rpm for low idle and 3450 rpm top speed.

The engine speed is what determines the amount of flow from the pump. If the rpms are set too low, there will be less flow and possibly not enough torque to support the pump's demand. If the engine is overloaded, it will shut down. Throttle positions are to be maintained in the Factory Preset Range.

Maximum speed is 3450 rpms which will produce 10 gpm.

The engine speed is controlled by pre-determined stops. When the veneer throttle is completely pushed in the engine will be operating at 1200 rpms. When the veneer throttle is completely pulled out the engine speed will be approximately 3450 rpms.

Make sure that the hydraulic circuit is properly plumbed and adequate so that the reservoir does not run out of oil. Depending on what the power unit is plumbed to it could lower the reservoir level considerably.

Setup and Adjustments

Power Unit is completely assembled and set up with a Manual Adjustable Flow Control Valve and an Adjustable Relief Valve.

Proper plumbing connections must be provided prior to starting the engine and engaging the Adjustable Flow Control Valve, otherwise the pressure will build immediately and dump over the relief valve setting causing excessive heat to be dumped into the system.

Note: **The Power Unit is capable of operating at 2000 psi. It is extremely important that the pressure hoses used for power beyond the power unit are rated for 3000 psi or greater value.**

The Adjustable Flow Control Valve (locate at the control manifold block) has been factory set at 2000 psi.

Note: The power unit is equipped with rotary operated hydraulic selector valves. Proper plumbing connections must be provided before starting the engine and engaging the Hydraulic Selector Valve.

Open-center type valves must be used downstream when using any additional valves.

1. Properly connect the appropriate pressure hose to the *pressure work ports* (male quick couplers) based on the flow circuit that is installed in the *hydraulic selector valves*.
 - Connections are made using the supplied quick couplers.
2. Properly connect appropriate pressure hose to the *return line port* (female quick couplers) installed below the main hydraulic selector valve on the right side of the power unit.
 - Connections are made using the supplied female quick coupler.

CAUTION

The Adjustable Flow Control Valve should be in the OFF position before starting the power unit and before connecting or disconnecting pressure hoses.

If the Adjustable Flow Control Valve is in the ON position when starting the power unit, a tremendous load on the engine will occur and most like the load will be too great to start the engine.

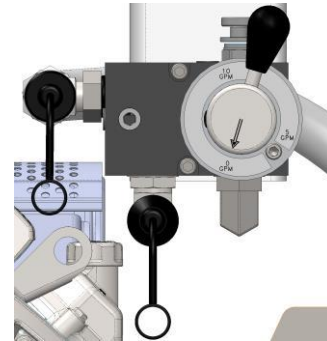
3. After the engine is set at the correct speed and the hoses are connected, rotate the Adjustable Flow Control Valve counter-clockwise to the required operating flow (see decal on machine).
4. After the engine is set at the correct speed and the hoses are connected, rotate the Adjustable Flow Control Valve counter-clockwise to the required operating flow (see decal on machine).

Adjustable Flow Control Valve

The Adjustable Flow Control Valve is in the OFF position when completely turned clockwise.

The valve must be in the OFF position when either connecting or disconnecting the pressure hoses.

- Turn the valve counterclockwise one click to set it at 5 gpm.
- Turn the valve counterclockwise until handle contacts bolt stop for full flow (10 gpm).



Hydraulic Systems

The Racine Hydraulic power unit is equipped with one 10 gpm (40 lpm) circuit.

If the power unit is used in cold weather, preheat the hydraulic fluid by running power source at low engine speed. The fluid temperature should be at or above 50°F (10° C) before use when using recommended fluids. Using too thick fluid may result in tool damage.

Check the power system type. The power unit may be used with open or closed center systems.

Check hydraulic hoses for cracks, leakage, and damage. If the hoses or couplers show any of these wear characteristics, replace them before operating the tool.

WARNING

Never attempt to locate leaks with your hands, personal injury may occur from the pressure system.

Use a calibrated flow meter and pressure gauge to check the hydraulic power source for 10 gpm (38 lpm) at 2000 psi (400 bar).

- The system's relief valve has been factory tested and pre-set at 2000 psi. Do not exceed the 2000 psi setting.
- The hydraulic system's back pressure should be less than 250 psi (17 bar) measured at the tool end of the operating hoses. All systems checks should be made at minimum operating temperatures.
- The hydraulic fluid cooling system should limit maximum fluid temperature to 160°F (70°C) at the maximum expected ambient temperature.
- The minimum cool capacity should be 5 hp (3.73kW) at a 60° F (33° C) difference between ambient temperature and fluid temperature.
- A minimum of 25-micron filtration is required for the hydraulic system. For cold weather startup and maximum dirt holding capacity a filter element sized for 25 gpm (12 l cpm) is recommended.

Hose Requirements

It is not often necessary or advisable to use long hoses. All hoses must have an oil resistant inner surface and an abrasion resistant outer surface. Each hose must have male pipe ends for most application.

Longer hoses can be used when necessary but can affect the operation of the tool due to resistance in the hose.

If small diameter or long hoses are used, or if restrictive fittings are connected to the supply and return ports, the pressure required to push the fluid through the system and back to the tank will be higher. This will reduce tool power.

Important: Oil should always flow from the male coupler through the female coupler.

Note: The pressure increases in uncoupled hoses left in the sun. This may make it difficult to connect. When possible after use, connect the free ends of the operating hoses together.

Hose Types

Hydraulic hose types authorized for use with the tool are:

1. **Labeled and certified non-conductive.**
 - This is the only hose authorized for use near electrical conductors.
 - Constructed of thermoplastic or synthetic rubber inner tube, synthetic fiber braid reinforcement, and weather resistant thermoplastic or synthetic rubber cover.
2. **Wire braided** (conductive)
 - This hose is conductive and must **never** be used near electrical conductors.
 - Constructed of synthetic rubber inner tube, single or double wire braid reinforcement, and weather resistant synthetic rubber cover
3. **Fiber braided** (not certified or labeled non-conductive)
 - This hose is conductive and must **never** be used near electrical conductors.
 - Constructed of thermoplastic or synthetic rubber inner tube, synthetic fiber braid reinforcement, and weather resistant thermoplastic or synthetic rubber cover.

The rated working pressure of the hydraulic hose must be at least 175 bar (2500 psi).

Hydraulic Hose Recommendation

Hydraulic Hose Recommendation								
Flow Per Circuit		Length Each Hose		Use	Inside Diameter		SAE Spec Hose (Wire Braid)	SAE Spec Hose (Fiber Braid)
GPM	LPM	Feet	Meter		Inch	MM		
5 to 8	19 to 30	To 50	To 15	Both	1/2	13	SAE 100R1-8	100R7-8
5 to 8	19 to 30	51 to 100	15 to 30	Both	5/8	16	SAE 100R2-10	SAE 100R8-10
5 to 8	19 to 30	100 to 300	30 to 90	Pressure Return	5/8 3/4	16 19	SAE 100R2-10 SAE 100R1-12	SAE 100R8-10 SAE 100R7-12
9 to 12	34 to 45	To 50	To 15	Both	5/8	16	SAE 100R2-10	SAE 100R8-10
9 v 12	34 to 45	51 to 100	15 to 30	Pressure Return	5/8 3/4	16 19	SAE 100R2-10 SAE 100R3-12	SAE 100R8-10 SAE 100R7-12
9 to 12	24 to 45	100 to 200	30 to 60	Pressure Return	3/4 1	19 25.4	SAE 100R2-12 SAE 100R1-16	SAE 100R8-12 SAE100R7-16

The rated working pressure of the hydraulic hose must be at least 2500 psi / 173 bar.

Hydraulic Fluid Recommendation

Inspect hoses for cuts, crushing, leaks, or abrasion, which may be a safety hazard or reduce fluid flows.

The following fluids work well over a wide temperature range at startup, allow moisture to settle out, and resist biological growth likely in cool operating hydraulic circuits.

Others that meet or exceeds the specifications of these fluids may also be used.

Type	Hydraulic fluid
Amsoil	AWH ISO 32
Chevron	Rando HD Premium Oil MV ISO VG 32 Rando HDZ ISO 32
Gulf	Harmony AW ISO Multi-Grade 32
Mobil	DTE Oil Excel 32
Schaeffer	Dilex Supreme Hydraulic Fluid w/ Dynavis ISO 46.
Shell	Shell Tellus S2 VX 32
Sunoco	Sunvis 1032 HVI Hydraulic Oil

Tool Connecting Procedures

1. Stop the engine before connecting the tool and or hoses to the power unit, and when switching hoses or tools.
2. Turn the hydraulic on/off valve to the off position before starting the engine.

Make sure all hoses are connected for correct flow direction to and from the tool being used.

When routing hose in the work area, position them where personnel will not be at risk of tripping over them where vehicles can run over the hoses. Do not lay hose over sharp objects.

 **WARNING** Pressurized fluid escaping from a damaged hose can penetrate the skin and be injected in the body causing injury or death.

Do not pull on hoses to drag the power unit or tool.

Connecting Hoses

1. Wipe quick couplers with a clean lint free cloth before connecting them.
2. Depressurize the system.
3. Allow system and hydraulic fluid to cool if too hot to handle.
4. Securely connect the return (tank “R”) hose from the power source to the tool.
5. Securely connect the supply (pressure “P”) hose from the power source to the tool.

It is recommended that you connect the return hoses first and disconnect last to minimize or avoid trapping pressure within the tool.

When connecting the quick couplers, the flow should run from male coupler to the female coupler. The female coupler on the tool is the inlet. Quick couplers are marked with a flow direction arrow.

 **WARNING** Pressurized fluid escaping from a damaged hose can penetrate the skin and be injected in the body causing injury or death.

Do not pull on hoses to drag the power unit or tool.

Note: When possible, connect the free ends of uncoupled hoses to prevent build up in the hoses. The sun can also increase pressure in the hoses and make connecting them difficult.

Disconnecting Hoses

1. Stop the hydraulic power source.
2. Depressurize the system.
3. Allow system and hydraulic fluid to cool.
4. Disconnect the supply (pressure) hose to the power source (pressure port) from the tool (IN port).
5. Disconnect the return (tank) hose to the hydraulic power source (return port) from the tool (OUT port).
6. To prevent contamination, always install dust caps over the hydraulic ports of the tool when disconnected.

Section 3: Tool Operation

Personal Protective Equipment



Before operating this machine, make sure that all general safety precautions are observed, and that proper personal protective clothing is worn as described below.

At a minimum, operators should wear the following Personal Protective Equipment:

1. Safety Glasses
2. Hearing Protection
3. Hard Hat
4. High Visibility Safety Vest
5. Leather Work Gloves
6. Steel Toed Safety Shoes

Pre-Operation Checks



It is extremely important that the pump is not started until oil is in the system. Power Units are shipped without oil, operating a pump even for a time will result in damage.

Hydraulic Oil

The reservoir must be filled before the power unit is started. Be certain that the oil being used is filtered as it is being put into the reservoir.

1. Remove the oil breather cap and fill reservoir to the point that the oil level is approximately 1-inch from the top of the tank, (approximately 9-gallons). Refer to the Sight / Level /Temperature Gauge on the end of the reservoir to determine when the reservoir is full.
2. Replace the oil breather cap when the tank has been properly filled. Wipe up any oil that might have spilled.

Engine Crankcase Oil Level

Check that the engine oil level is full.

Serviced with the proper oil level in the reservoir, the engine can be jogged, but not started. Repeat the jogging a few times and then stop.

Fuel Level

Always fill the tank before starting the engine. Use clean, fresh, fuel. The fuel tank holds approximately 7 gallons.

Jog the engine without starting, to prime the pump before starting.

Note: Purchase fuel in quantity that can be used within 30 days.

Battery

Battery is 12 volts, 245 cold crank rated. If the battery will not hold charge, discard, and replace.

Hydraulic Connections

Pressure and return hoses are connected to the ports at the control panel.

The pressure return ports are marked per the labels. When installing couplers, the pressure port receives the female coupler, and the return port receives the male coupler.

The hoses can then be connected directly to the couplers. Couplers are available through your Racine Railroad Products dealer.

Start Up



When starting the power unit, the tool or hoses must be connected to the power unit. The flow control will not bypass to tank when hoses or tool are not connected to power unit.

For initial start-ups allow the power unit to run a couple of minutes to build system pressure and to allow the engine speed to increase to the pre-determined maximum speed of 3000 rpms.

1. Make sure the flow control circuit is set at **0 gpm**.
2. Pull out engine choke lever, then turn the ignition key to start the engine.
3. Allow the engine to run at low speed until the engine and hydraulic circuits are warm.

Hydraulic Circuit

Make sure that the hydraulic circuit is properly plumbed and adequate, so the reservoir does not run out of oil. Depending on what the power unit is plumbed to it could lower the reservoir level considerably.

Fan-Cooled Heat Exchanger

The Power Unit is equipped with a Fan-Cooled Heat Exchanger.

The setting cannot be changed on the thermostat. The thermostat will be provided power when the engine is started.

The temperature setting for the heat exchanger to come on is 122° F.

Cold Weather Start Up

1. Move the choke control to the CHOKE position.
2. Turn the ignition key to start the engine. Repeat, if necessary, with the choke off and the throttle control in FAST position.
3. Operate engine with choke off and throttle in slow to medium position.
 - Use short starting cycles, 15 seconds per minute, to prolong starter life. Extended cranking can damage the starter motor.

Tool Operation

1. Start the engine as specified above.
2. Turn the hydraulic circuit to the **ON** position or a flow setting to start the fluid flowing to the tool.



WARNING

Do not connect two tools when running in combine mode.

Note: When you leave this equipment, even for a short time, shut off the hydraulic motor and disengage the hydraulic supply hoses.

Shutdown

Always return the Adjustable Flow Control Valve to the 0 GPM position before disconnecting the pressure hose. There will be no flow at the quick coupler.

1. Pull the throttle lever to low speed.
2. Return the hydraulic circuit to the **OFF** position or **0** flow.
3. Turn the ignition key to **OFF**.
4. Disconnect the hydraulic hoses and store in a suitable area.

Emergency Procedures

In the event of any malfunction, **immediately shut-off the hydraulic power source** and correct the problem.

Section 4: Maintenance

It is highly recommended to practice regular check-ups and maintenance in accordance with the usage frequency to keep your tool in better condition and reduces total running costs.

Normal maintenance of the Gas Powered Hydraulic Power Unit can be performed without any special maintenance related safety devices.

Periodic inspection of all fasteners should be done as a routine precautionary procedure.

- Practice routine periodic inspection of the condition of hydraulic hoses and fittings. A failure of hydraulic hose can be very hazardous, frequent inspection for damage is good practice.
- Check hydraulic oil reservoir level periodically. Proper oil level is approximately 1"-1 ½" from the top of the reservoir.



WARNING

Do not perform maintenance on the power source while the motor is running or when the hoses are connected. Allow the unit to completely cool down.

Honda Engine

The Honda Engine used should be serviced and maintained per the maintenance scheduled as outlined in the Honda Engine Owner's Manual.

Periodic inspection of the condition of hydraulic hoses and fittings should be routine. A failure of hydraulic hose could be very hazardous, so frequent inspection for damage is good practice.

Check hydraulic oil reservoir level periodically. Proper oil level should be approximately 1"-1 ½" from the top of the reservoir.



Do not perform maintenance on the power source while the motor is running or when the hoses are connected. Allow the unit to completely cool down.

Hydraulic System Maintenance

Hydraulic system includes a return line filter. Routine inspection is necessary to determine when to replace filter element.

A clogged filter element should be replaced instead of trying to get extended life out of it. There are too numerous factors to consider in giving an element, projected life. The life of the element varies with the amount of contaminants or dirt introduced into the system. The amount of dirt introduced into the circuit varies from hour to hour and day to day. We therefore recommend frequent inspections.

1. Observe the following for maximum performance and service life from the hydraulic system.

- Always use the correct hydraulic fluid.
- Always keep the hydraulic system and fluids clean.
- Keep water out of the fluid.
- Keep air out of the lines, air is indicated by the hydraulic system overheating and foam at the hydraulic tank breather. Tighten all suction line fittings and clamps.
- Hydraulic system wear is noted by increasing heat during tool operation, reducing tool performance and eventual system breakdown.

Remove condensed moisture from hydraulic fluid. Condensation is a frequent problem with cool mobile hydraulic circuits. This condition occurs in moist or cold climates. When warm air in the reservoir tank draws moisture from the cooler outside air, water accumulates in the tanks.

Approximately once each week (less often in hot dry weather) take a small sample from the bottom of the hydraulic tank by removing the 1/2-inch N.P.T. drain plug.

If clear water appears, drain the tank until clean oil starts to show. If fluid is milky, allow unit to settle for about 48 hours before draining.

1% water in a 2000 psi/140 bar hydraulic can cause a 25% increase in wear rate.

Note: Operate the unit with fluid temperature at 50° F to 140° F (10° C to 60° C) for improved seal and hose life, maximum efficiency, and operator comfort.

2. Check suction hose from the hydraulic tank to the pump inlet to see that it is not kinked and that the clamps are secure. This will reduce the risk of pump cavitations and sucking air into the system. All pump fittings must be tight.

3. Check hydraulic unit for loose lines, fittings, leaks, etc., through the entire hydraulic circuit.

Escaping fluid under pressure can have sufficient force to penetrate skin, causing serious personal injury. Before disconnecting lines, be sure to relieve all pressure. Before applying pressure to the system, be sure all connections are tight, and that lines and hoses are not damaged.

Fluid escaping from a very small hole can be almost invisible. Use a piece of cardboard or wood rather than hands to search for suspected leaks.



Do not attempt to locate pin hose leaks with your bare hands. Pinhole leaks can penetrate the skin.

If injured by escaping fluid, see medical attention immediately. Serious infection or reaction can develop if proper medical treatment is not administered immediately.

4. Change hydraulic filter.

For maximum filter element performance: consistently connect the hose ends together when detached from the tool and wipe off contaminants before connecting quick disconnects.

To replace the filter element:

- Stop the engine and unscrew the cover from the filter housing.
- Carefully remove the element and filter barrel from the housing minimizing agitation.
- The filter barrel is equipped with a sump area at the bottom and needs to be thoroughly cleaned prior to reinstalling.

Filter: Use a 10-micron filter with built in 25 psi bypass check. Contact RRP to get the correct replacement element.

5. Fill the hydraulic tank by removing the filter cap. The tank is full when oil reaches the notch in the dipstick

Do not use engine oils or transmission fluids other than petroleum-based hydraulic fluids.

Use the recommended fluids. These fluids will flow easier when cold, will allow water to settle for draining and will prevent wear at high pressure and cold temperature during tool use.

Testing and Troubleshooting

Periodically test the hydraulic system and engine to make sure that the power unit is operating at peak efficiency. Performing the recommended test will help to isolate problems that may exist in the engine and hydraulic system.

- Start the engine and listen for any unusual sounds.
- Check the engine fuel and cooling systems for leaks before performing any tests.

Testing the Hydraulic Circuit

If the unit is equipped with two hydraulic circuits, test them individually using the circuit tester. Test each hydraulic circuit as follows.

1. Set the hydraulic circuit to the **OFF** or **0** flow position.
2. Connect the hydraulic hoses to the appropriate connectors on the control panel for the circuit you are testing. Connect a hydraulic tester to the opposite end of the hoses. Make sure the flow direction is correct.
3. Start the engine and allow the hydraulic fluid to warm to about 100° F (38° C).
4. Open the tester restrictor valve (fully open). This represents minimum load.
5. Check the flow rate and pressure on the tester gauges.
 - Record the flow and pressure.
 - The flow should be slightly over the unit (or port's) rated flow. The pressure gauge will indicate tool back pressure.
6. As the hydraulic system relief valve begins to crack (open) and bypass fluid through the valve, the flow rate will begin to drop.
 - At this time, the pressure in the system should be between 2000 and 2200 psi (148 and 155 bar).
7. Repeat Step 2 through Step 8 for the second circuit.

Note: If internal circuit wear is present, the cause should be determined.

Most circuit wear is caused by poor maintenance. Proper maintenance is essential for preventing problems. Always keep hydraulic circuits clean.

Adjusting the Hydraulic Circuit Relief Valve

If the pressure is not as specified, the hydraulic circuit relief valve must be adjusted or replaced.

- There is a relief valve for each hydraulic circuit. Adjust or replace the relief valve for the ports at the circuit being tested.
- Turn the adjustment clockwise to increase the pressure setting.
- Always set the pressure by turning the screw in (increasing the pressure). If you go past the setting back out the screw and reset. When setting relief valve, unscrew completely cartridge adjustment (minimum pressure setting). Turn adjustment screw clockwise to increase relief pressure. Set at 2000 PSI.

Analyzing Hydraulic Flow

During Steps 3 through Step 8 (listed above) the engine should hold nearly constant speed.

A drop in the flow of more than 1.2 gpm (4.5 lpm) of that recorded in Step 6 would indicate wear inside the hydraulic flow. This can be analyzed as follows:

- If the pressure stabilizes between 2000 and 2200 psi (148 and 155 bar) and the flow rate begins to drop, the relief valve is opening, and the system is operating properly.
- If the flow rate gradually decreases while system pressure increases, the pump or control valves may be worn.

Other Checks

Check the following and correct as required.

- Proper hydraulic fluid
- Dirt or water in the hydraulic fluid
- Clogged return filter
- Air leaks in circuit
- Damaged pump-suction hose

Testing the Engine

When performing the following test with both circuits operating, the hydraulic oil may overheat. Perform these tests as efficiently as possible to reduce overheating.

At higher altitudes or during humid/hot weather conditions, the engine power may decrease below normal, causing smoke. This condition is normal because cold, dense air (for efficient combustion) is not being provided. If this occurs often, consult your Racine Railroad Products dealer for power unit modifications.

1. When the engine and hydraulic fluid are warm, set the appropriate circuit to 5 GPM or the flow being tested.
 - Close the tester restrictor valve for 0 flow on the tester flow gauge.
 - At this time, the circuit relief valve should be open (by passing fluid).
 - Record the pressure.
 - Engine high speed should be at approximately 3600 RPM at 2000 PSI.
2. Set the circuit to 0 GPM flow and connect the hoses to the other circuit.
 - Remove hoses from the first circuit.
3. Open the tester restrictor valve and set the second circuit to ON.
 - Leave the lever for the first circuit OFF.
4. Close the tester restrictor valve.
 - Adjust the relief valve on circuit so the system pressure is at 2000 psi (140 bar).
5. Set the first circuit to 0 GPM.
6. Adjust the relief valve on the circuit to the pressure recorded for the first circuit in Step 4.
7. Shut down the engine and disconnect the hoses.

Troubleshooting

If the symptoms of poor performance develop, the following charts can be used as a guide to isolate the problem. When diagnosing faults, review the recommended maintenance procedures given. Perform the hydraulic and engine tests given in this section.

Problem	Possible Cause	Correction
Starter will not crank engine.	Engine working against the hydraulic pump pressure.	Make sure the hydraulic valve is at 0 GPM.
	Battery discharge or not properly connected.	Check the condition of the battery, cable connections, etc. Replace battery.
	Starter defective.	Inspect starter. Replace as necessary.
	Ignition switch or solenoid switches defective.	Replace as necessary.
Engine cranks but will not start.	Water in fuel.	Empty water sediment trap. Bleed injectors per engine manual.
	Cold start no functioning.	Check the current to the spark plugs on cold start units. Replace spark plugs as required.
	Inadequate compression.	Check for clogged air cleaner, valves seated, cylinder compression loss. Repair as required,
Engine runs but hydraulic circuit will not drive.	Tool not connected to power unit.	Connect tool. Check couplers.
	Hydraulic fluid reservoir low.	Check and fill as required.
	Tool hoses blocked.	Remove obstruction.
	Too hoses incorrectly connected to circuit fittings.	Check that the tool hose goes from the top port tool pressor or the IN port and from the tool return or OUT the port to the lower port, both ports on the same side of the manifold.

Maintenance Schedule

Maintenance Operation	8 hours or daily	25 hours or every season	150 hours or every season	500 hours or every season	1000 hrs or every season
Engine					
Check / Fill Oil Level	X				
Change Oil			X Note 1		
Change Oil Filter				X	
Service Air Filter Pre-Cleaner		X Note 2			
Service Air Filter Cartridge				X Note 2	
Inspect spark arrester, if equipped			X		
Clean cooling system				X Note 2	
Replace spark plugs					X
Replace in-line fuel filter					X
Check Valve Clearance					X
Hydraulic System					
Check fluid level	X				
Check fluid for condensation		X Note 3			
Change oil and filter			X	X	X
Inspect hydraulic system for leaks	X				
*	Change oil after 8 hours, then every 50 hours or every season				
Note 1	Change oil every 25 hours when operating under heavy load or in high temperatures				
Note 2	Clean more often under dusty conditions or when airborne debris is present. Replace air cleaner parts if very dirty.				
Note 3	Check more often if temperatures (ambient) changes quickly over a short period of time.				

Dispose of consumable items (filters, oil, etc.) in a responsible manner.

Section 5: Parts and Service Support

Technical Support & Service

Telephone and web-based technical support is available for current production models through our Customer Service Department. Service Manuals and limited technical support may be available for models that are no longer in production.

Telephone and E-mail Technical Support

Telephone and e-mail technical support is available on normal U.S. business days from 8:00 AM to 5:00 PM U.S. Central Time Zone (GMT +6 (+5 Daylight Savings Time)).

Phone: (262) 637-9681

Email: custserv@racinerailroad.com

Racine Railroad Products
1955 Norwood Court
Mount Pleasant, WI 53403

Non-Warranty Technical Support

Depending upon the circumstances and availability of technical service personnel, we may provide technical assistance and/or field service support, *at the customer's expense*, to assist in the correction of non-warranty related problems. Contact our Customer Service Department to coordinate Non-Warranty Technical or Field Service Support.

Warranty Support Technical Support

Depending upon the circumstances and availability of technical service personnel, we may provide technical assistance and/or field service support, *at no charge to the customer*, to assist in the correction of warranty related problems. Contact our Customer Service Department to coordinate Warranty Technical or Field Service Support.

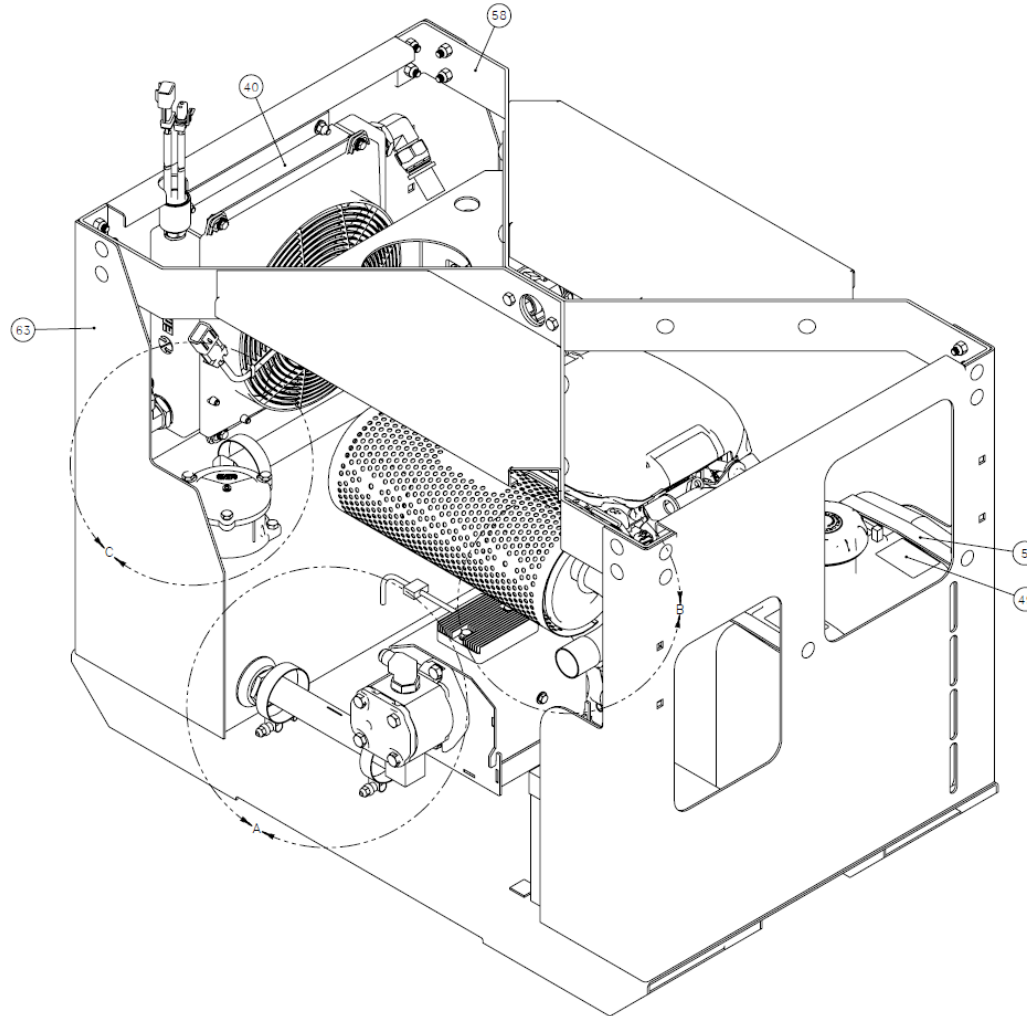
Warranty Parts Claims

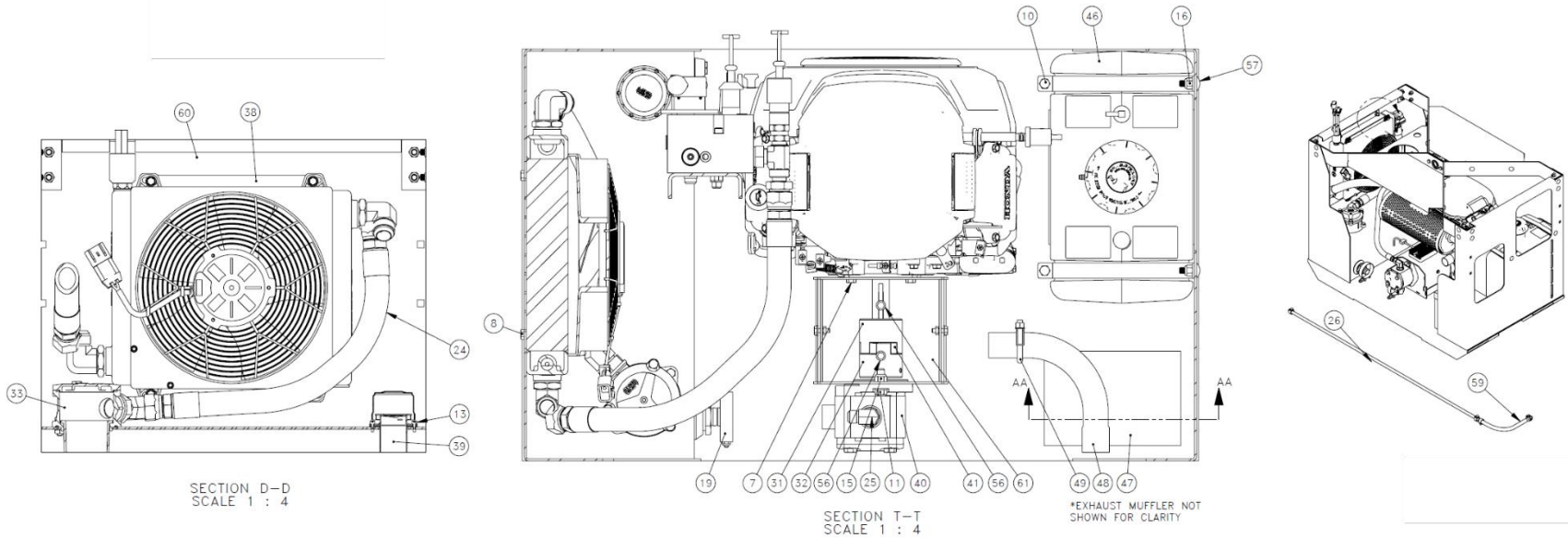
Material claimed to be defective must be returned to our factory for evaluation. Defective materials will be replaced, or your account will be credited if replacement materials have already been purchased. Please contact our Customer Service Department at the address provided below if you have any questions or problems.

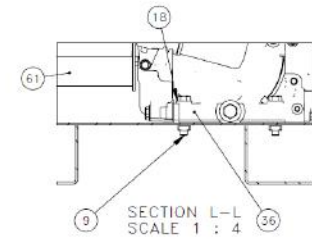
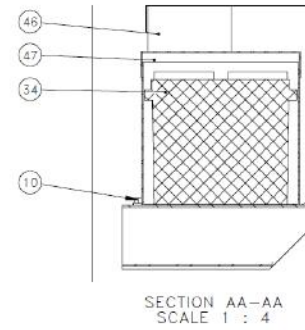
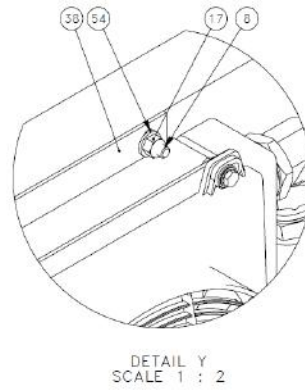
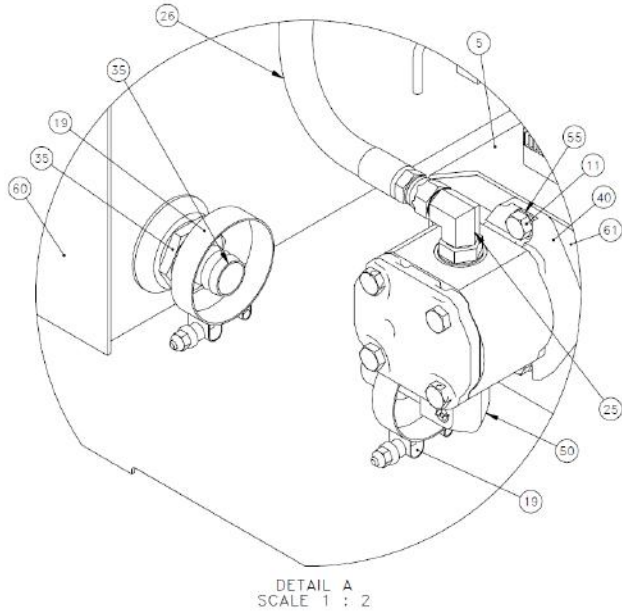
Warranty Service Support

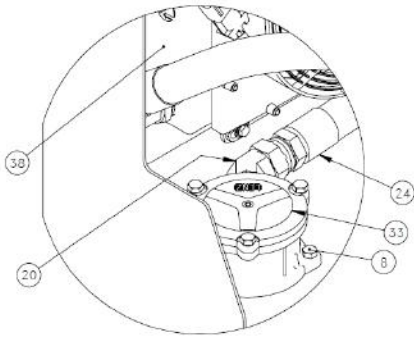
Depending upon the circumstances and availability of technical service personnel, we may provide technical assistance and/or field service support, *at no charge to the customer*, to assist in the correction of warranty related problems. Contact our Customer Service Department at the address provided above to coordinate Warranty Service Support.

Power Unit, Gas Hydraulic / RRP# 719488 [Rev 2 (4.2020)]

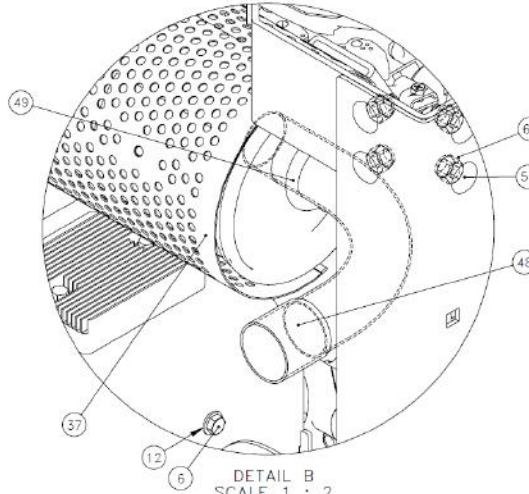




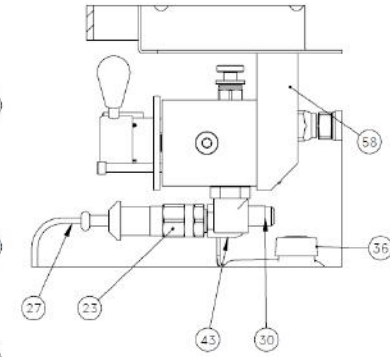
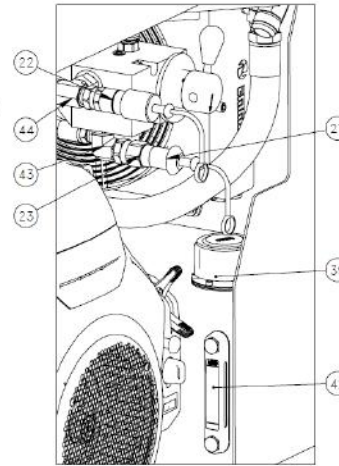




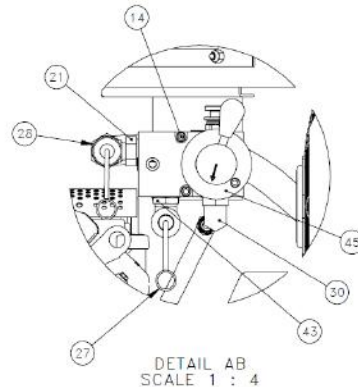
DETAIL C
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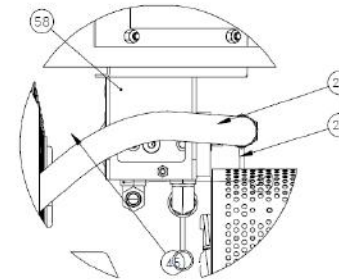
DETAIL B
SCALE 1 : 2



SECTION H-H
SCALE 1 : 3



DETAIL AB
SCALE 1 : 4




DETAIL AC
SCALE 1 : 4

Power Unit, Gas Hydraulic / RRP# 719488 Parts List

NO.	QTY	DESCRIPTION	PART NO.				
1	AR	HOSE, HYDR: #16	004039	31	1	COUPLING, DRIVE: HALF	473839
2	AR	LOCTITE, 242	008806	32	1	COUPLING, DRIVE: HALF	473840
3	AR	LOCTITE, 271	008826	33	1	FILTER, HYDR OIL	473989
4	2	BRACKET, FUEL TANK	320970	34	1	BATTERY, 12 VOLT	474911
5	1	COVER, COUPLING	320978	35	1	HOSE END, #16 HOSE X 1.25 NPT(M) BRASS	474915
6	2	SCR, HEX: .25-20 X .75	400684	36	1	ENGINE, HONDA GX690TXA2-15259	474916
7	4	SCR, HEX: .31-18 X .62	400708	37	1	MUFFLER	474917
8	6	SCR, HEX: .31-18 X .88	400711	38	1	COOLER, OIL	474920
9	4	SCR, HEX: .38-16 X 1.75	400718	39	1	CAP, FILL	474921
10	2	SCR, HEX: .38-16 X .75	400725	40	1	PUMP, HYDR: .85 CIR	474922
11	2	SCR, HEX: .44-14 X 1.25	400739	41	1	INSERT, DRIVE COUPLING	474924
12	2	WASHER, FLT: .25	401626	42	1	GAUGE, FLUID LEVEL	474925
13	6	SCR, SOC: 10-24 X .5	402396	43	1	ELBOW, 90°: .5 NPT(M) X #12 SAE(M)	474927
14	2	SCR, SOC: .31-18 X 3.25	403768	44	1	TEE, .5 NPT(M) X .5 NPT(F) X .5 NPT(M)	474928
15	3	NUT, HEX ES: .44-14	407315	45	1	VALVE, FLOW CONTROL	474934
16	18	NUT, HEX ES: .38-16	450577	46	1	TANK, FUEL	474988
17	6	NUT, HEX ES: .31-18	450578	47	1	BOX, BATTERY	474990
18	4	WASHER, FLT: .38	454778	48	1	ELBOW, 90°: 1.5 EXHAUST	474993
19	2	CLAMP, HOSE: 1.31-3.25 DIA	458982	49	1	CLAMP, EXHAUST: 1.5 ID	474994
20	1	ELBOW, 45°: #16 JIC(M) X #16 SAE(M)	459922	50	1	ELBOW, 90°: #12 SAE(M) X #16 HOSE	476499
21	1	ADAPTER, .5 NPT(F) X #12 SAE(M)	460306	51	1	ADAPTER, .5 NPT(M) X #16 JIC(M)	476501
22	1	DISCONNECT, FEMALE QUICK: #6	462773	52	1	HOSE ASSY, #16 X 24.5 CR	476502
23	1	DISCONNECT, MALE QUICK: #6	462774	53	2	NUT, HEX ES: .25-20	491232
24	1	HOSE ASSY, #16 X 21 CR	463324	54	4	WASHER, FLT: .31	491259
25	1	ELBOW, 90°: #8 JIC(M) X #10 SAE(M)	464886	55	2	WASHER, FLT: .44	491276
26	1	HOSE ASSY, #8 X 28 CR	466687	56	2	SCR, HEX FLG .25-20 X 1.25	491612
27	1	CAP, MALE DUST	467880	57	18	SCR, CARR: .38-16 X 1	492159
28	1	CAP, FEMALE DUST	467881	58	1	LIFT, HYDRAULIC POWER UNIT	719487
29	AR	LOCTITE, 5452	470626	59	1	HOSE ASSY, VAPOR RETURN	719524
30	1	ELBOW, 90°: #8 JIC(M) X #12 SAE(M)	471179	60	1	FRAME, HYDRAULIC POWER UNIT	781862
				61	1	GUARD, COUPLING	781863

Honda Engine GX690TXA2 Service Parts

HONDA ENGINE
 ENGINE POWER #GX690TXA2-15259 
 688CC V-TWIN GAS
 4-CYCLE OHV
 12V ELECTRIC START
 22HP, 17A
 9.3:1 COMPRESSION RATIO
 Ø1.125 X 3.969 CRANKSHAFT
 96.8LBS DRY
 67 OZ OIL CAPACITY
 INCLUDES MUFFLER KIT, MUFFLER ELBOW, AND MUFFLER CLAMP

FOR SERVICE ONLY

NO.	QTY	DESCRIPTION	PART NO.
1	REF	FILTER, AIR	475087
2	REF	PLUG, SPARK	475088
3	REF	CARBURETOR	474504
4	REF	COIL, IGNITION	475089
5	REF	FILTER, ENGINE OIL	471770
6	REF	FILTER, FUEL	471771

Section 6: Warranty Terms and Conditions

Warranty Period

Each new machine and new parts of our manufacture are warranted against defects in material and workmanship for one year from the date of shipment from our factory.

When contacting customer service for factory parts, service or warranty support please provide the:

- Racine Railroad Products Model
- Serial Number
- Any locally assigned identification

Vendor Parts Warranty Period

Other equipment and parts used, but not manufactured by Racine Railroad Products, Inc., are covered directly by the manufacturer's warranty for their products.

Warranty Parts and Service

We will repair or replace, without charge, F.O.B. factory, Racine, Wisconsin, USA, any part Racine Railroad Products manufactures which is proven to be defective during the warranty period.

Material claimed defective must be returned, if requested, to the factory within 30 days from the date of the claim for replacement. Ordinary wear and tear, abuse, misuse, and neglect are not covered by this warranty. Depending upon the circumstances, we may provide technical assistance and/or technical service support, without charge, to assist in the correction of warranty related problems.

Non-Warranty Parts and Service

Material damaged through normal wear and tear, abuse, misuse and/or neglect are not covered by our warranty and should be ordered directly from Customer Service.

Note: Parts for models that are no longer in production may not be available.

Non-Warranty Parts Orders

When placing a parts order please provide the following information:

- Company Name and Billing Address
- Purchase Order Number and Issuing Authority
- Shipping Address
- Special Handling Instructions
- Contact Phone Number
- Machine Model and Serial Number
- Part Numbers and Quantities Being Ordered

Note: *Please use Racine Railroad Products part numbers when ordering parts.* Racine Railroad Products part numbers are shown in the parts lists and drawings of this manual and have only six (6) numbers.

Any part number with other than six numbers (e.g., contains alpha-numeric characters) is a Vendor Part Number and **not** a Racine Railroad Products part number