Operating and Service Manual

Diesel Hydraulic Power Unit

(Reference Serial Number Plate)

Racine Railroad Products
1955 Norwood Court
Mount Pleasant, WI 53403
Phone: {262) 637-9681
Fax: (262) 637-9069

910152-M 170221

ASSEMBLY INSTRUCTIONS-

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

NOTE: System is capable of operating at 2000 P.S.I. It is extremely important that the pressure hoses used for power beyond the power unit are rated for 3000 P.S.I. or greater value.

Step 1) Properly connect appropriate pressure hoses (Supplied by others). Connect Pressure Supply Port (Male Coupler). Connect the Return Hose from the Remote valve or device to the Return Line Coupler (Female Coupler).

NOTE: THE ADJUSTABLE FLOW CONTROL VALVE (BLACK HANDLE) SHOULD BE SET AT "0", HANDLE ROTATED COMPLETELY CLOCKWISE.

NOTE: SHOULD THE ADJUSTABLE FLOW CONTROL VALVE BE POSITIONED IN THE "ON" POSITION IT WOULD PUT A TREMENDOUS LOAD ON THE ENGINE WHEN THE TRYING TO START THE ENGINE. THE LOAD MORE THAN LIKELY WOULD BE TOO GREAT TO START THE ENGINE.

NOTE: THE ADJUSTABLE FLOW CONTROL VALVE MUST ALWAYS BE IN THE "OFF" POSITION WHEN THERE IS NOT A PRESSURE HOSE CONNECTED TO THE PRESSURE PORT ALLOWING THE FLOW TO POWER BEYOND. WHEN THE FLOW CONTROL IS "ON" THE PRESSURE COMPENSATOR ELEMENT THAT IS BUILT INTO THE CIRCUIT HAS NO FUNCTION AND IF THE POWER UNIT WERE ALLOWED TO "DEADHEAD" IT WOULD DUMP ALL THE FLOW OVER TE RELIEF VALVE CAUSING AN EXTREME AMOUNT OF HEAT.

NOTE: NEVER CONNECT OR DISCONNECT QUICK COUPLERS WHEN THE FLOW CONTROL VALVE IS "ON". NEVER CONNECT OR DISCONNECT QUICK COUPLERS WHEN THE CIRCUIT IS UNDER PRESSURE.

-PREPARATION-

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. NOTE: It is IMPERATIVE that the hydraulic reservoir is filled with "Premium Quality" hydraulic oil, (Approximately, 9-Gallons). Reservoir must be filled before power unit is started. Be certain that the oil being used is filtered as it is being put into the reservoir. Oil should have anti-wear characteristics, excellent rust protection and contain additives to protect against foaming.

NOTE: Manufacturer uses hydraulic oil supplied by U.S. Oil Corporation with the following characteristics.
Viscosity Index 101
Grade 32
@ 100 F. it has a viscosity of 156
@210 F. it has a viscosity of 43.7

Cross-referencing to other manufacturers the following oils could be substituted.
Gulf Harmony 32A
Mobile D.T.E. 24
Shell Tellus 32
Texaco Rando H.D. 32

NOTE: System will operate with any High Quality, Petroleum Base Hydraulic Oil.

Step 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)

Step 2) Replace oil breather cap when 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 Kohler Engine Manual).

Step 3) **Fill the Diesel Fuel Tank. Note: Fuel tank holds approximately 7-Gallons**

Step 4) Serviced with the proper oil level in the reservoir the Kohler Engine can be jogged, but not started. Repeat the jogging a few times and then stop.

NOTE: Jogging the Engine without starting it will allow the pump to be primed before it is started.

PREPARATION (CONTINUED)

Step 4) Start the engine (See engine manual for proper starting of the engine).
NOTE: An adjustable throttle controls The Engine; that has been FACTORY SET at 2800 R.P.M. for low idle and 3600 R.P.M top speed. (The engine speed is what determines the amount of flow from the pump. If the R.P.M.'s 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 shutdown. Throttle positions are to be maintained in the Factory Preset Range.
NOTE: Maximum SPEED IS 3600 R.P.M'S which will produce APPROXIMATELY 10 G.P.M.

NOTE: 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.

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

NOTE: THE POWER UNIT IS EQUIPPED WITH AN ADJUSTABLE FLOW CONTROL VALVE TO DIRECT THE CIRCUIT TO POWER BEYOND. 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. THE POWER UNIT MUST BE PLUMBED TO AN OPEN CENTER VALVE.

NOTE: POWER UNIT IS EQUIPPED WITH A FAN-COOLED HEAT EXCHANGER. THE FAN COOLED HEAT EXCHANGER IS CONTROLLED BY A THERMOSTAT THAT WILL BRING THE FAN ON AT 122 DEGREES F. ELECTRICAL POWER IS PROVIDED TO THE THERMOSTAT AS SOON AS THE ENGINE'S IGNITION SWITCH IS PUT INTO THE "ON" POSITION.

NOTE: WHEN STARTING THE POWER UNIT IT SHOULD BE ALLOWED TO RUN FOR AT LEAST (10) MINUTES AT A TIME TO ASSURE THAT THE BATTERY IS ALLOWED TO BE RECHARGED. STARTING AND STOPPING THE POWER UNIT FRQUENTLY AND OPERATING FOR ONLY SHORT PERIODS OF TIME WILL NOT BE ADAQUATE TO KEEP THE UNIT'S BATTERY FULLY CHARGED.

NOTE: IF THE POWER UNIT HAS BEEN OPERATING FOR A LONG PERIOD OF TIME THE OIL WILL MORE THAN LIKELY BE ABOVE THE 122 DEGREES F. ESPECIALLY IF THE AIR TEMPERATURE IS ELEVATED. BEING THAT POWER IS SUPPLIED TO THE HEAT EXCHANGER AS SOON AS THE ENGINE'S IGNITION IS SWITCHED ON THERE IS THE POSSIBILITY THAT THE HEAT EXCHANGER'S MOTOR AND THE ENGINE'S STARTING MOTOR WOULD BOTH BE PULLING AMPERAGE AT THE SAME TIME AND DEPENDING ON THE STATE OF CHARGE IN THE BATTERY, THERE MIGHT NOT BE ADAQUATE COLD CRANKING AMPS TO START THE ENGINE. SHOULD THIS EVER HAPPEN IT IS ADVISABLE TO SIMPLY DISCONNECT THE POWER SUPPLY CONNECTION TO THE HEAT EXCHANGER UNTIL THE ENGINE IS STARTED AND THAN RECONNECT THE POWER TO THE HEAT EXCHANGER AFTER THE ENGINE IS STARTED.

-OPERATING INSTRUCTIONS-

Once the proper oil has been put in the reservoir and the engine has been properly serviced the engine can be started.

NOTE: AN ADJUSTABLE RELIEF VALVE LOCATED AT THE PRESSURE CIRCUIT OF THE HYDRAULIC SELECTOR VALVE CONTROLS SYSTEM PRESSURE. RELIEF VALVE HAS BEEN FACTORY SET @ 2000 P.S.I.

NOTE: ADJUSTABLE FLOW CONTROL VALVE MUST BE IN THE IN "OFF" Position Before Starting The Power Unit, (BLACK HANDLE ROTATED COMPLETELY CLOCKWISE), OTHERWISE THERE WILL BE A CONSIDERABLE LOAD ON THE ENGINE WHEN TRYING TO START THE ENGINE. THE BATTERY MORE THAN LIKELY WILL NOT BE STRONG ENOUGH TO TURN THE ENGINE OVER FAST ENOUGH TO START. THE POWER UNIT IS EQUIPPED WITH A FLOW METER. WHEN THE ENGINE IS OPERATING AT TOP SPEED OF 3600 R.P.M. AND THE ADJUSTABLE FLOW CONTROL IS OPENED (ROTATED COUNTER-CLOCKWISE) THE INCREASE FLOW IN THE CIRCUIT CAN BE READ BY PLUGGING IN AN OPTIONAL FLOW METER.

-ADJUSTING PRESSURE-

Step 1) Remove the Cap nut that is covering the Adjusting Screw

Step 2) Loosen the Hex JAM NUT at the base of the adjusting screw.

Step 3) Change or adjust system pressure is done by rotating the adjusting screw.

A) To **DECREASE SYSTEM PRESSURE**, turn the adjusting screw counter-clockwise to desired pressure setting and than lock in place by tightening the jam nut.

B) To **INCREASE SYSTEM PRESSURE**, turn the adjusting screw clockwise to desired pressure setting and than lock in place by tightening the Hex JAM NUT.

NOTE: System's Relief Valve has been Factory set and tested at 2000 P.S.I.

NOTE: System is rated at 2000 P.S.I. Maximum Pressure. Never exceed the 2000 P.S.I. rated pressure.

NOTE: NEVER EXCEED 2000 P.S.I. SYSTEM PRESSURE

NOTE: IT IS IMPORTANT TO LET THE POWER UNIT CONTINUED TO RUN AFTER A LONG WORK CYCLE UNTIL THE HEAT EXCHANGER HAS STOPPED WORKING TO COOL OFF THE HYDRAULIC OIL. THE POST RUN PERIOD WILL ALLOW THE BATTERY TO KEEP UP A CHARGE. IF THE HEAT EXCHANGER IS OPERATING AND THE ENGINE IS TO BE STARTED AT THE SAME TIME THERE MIGHT NOT BE ADAQUATE CAPACITY FOR BOTH FUNCTIONS AT THE SAME TIME.

MAINTENANCE

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

The Kohler Engine used should be serviced and maintained per the Maintenance scheduled as outlined in the Kohler 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.

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.

-CAUTION-

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.

If injured by escaping fluid, **SEE A DOCTOR AT ONCE**. Serious infection or reaction can develop if proper medical treatment is not administered immediately.

HYDRAULIC COMPONENTS

Photo #1

1). Part # 450320: Bolt-on Protective Bumper
2). Part # 450321: Fuel Tank Hold Down Strap With Fuel Hose Bracket
3). Part # 450303: Fuel Tank, 7 Gallon, Diesel.
4). Part # 450280 : Diesel Cap
5). Part # 450281: Throttle Assembly
6). Part # 450215: Fan Cooled Heat Exchanger,
7). Part # 450282: 1/2" Pressure Hose, 1/2" NPT Male both Ends, 23" Long
8). Part # 450234: Main Base Frame Assembly
9). Part # 450283: Engine Base Assembly
10) Part # 450284: Suction Hose, 30" Long

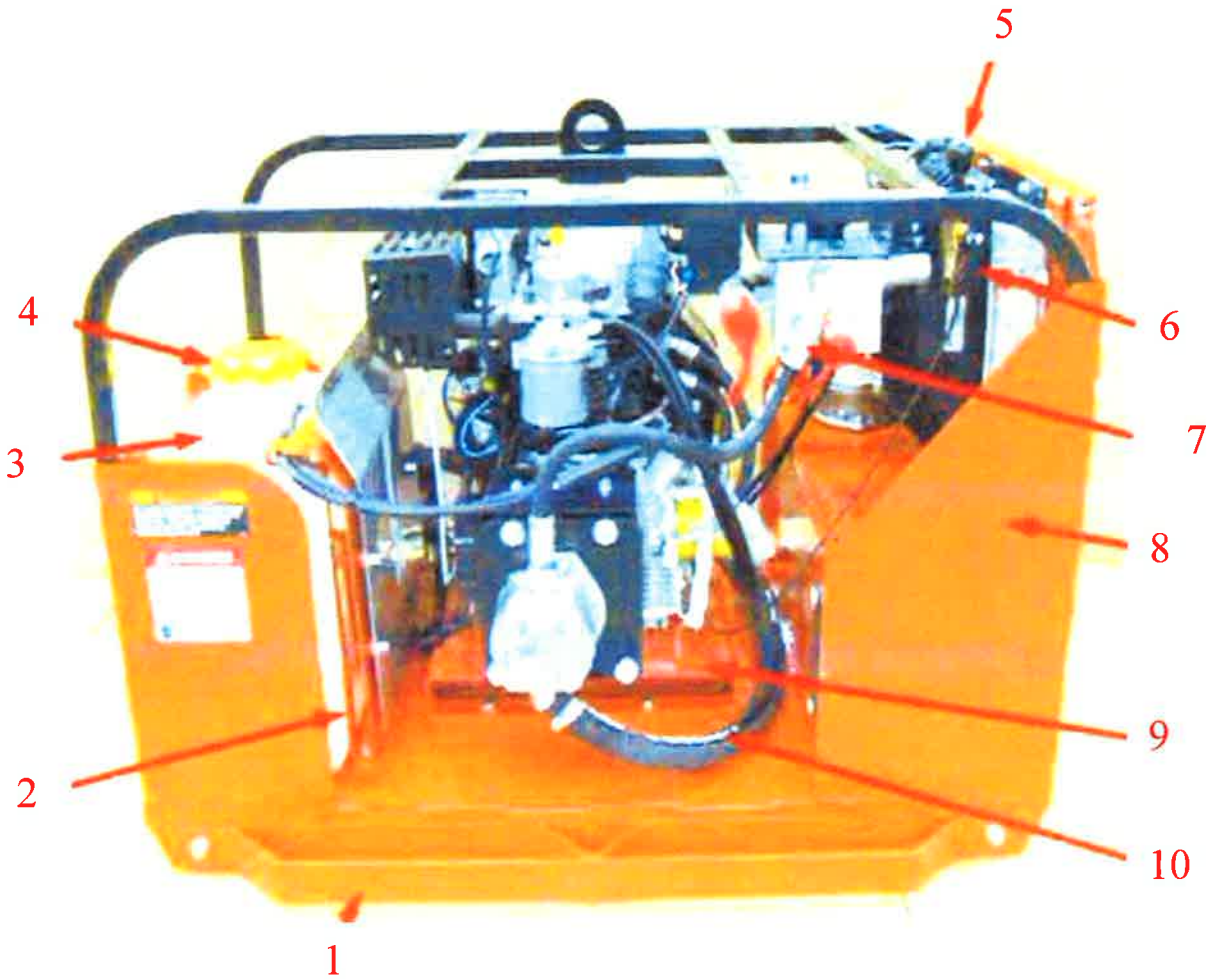

Photo #2

1). Part # 450217: Filter Element Only (Not Shown)
2). Part # 450237: 90 Degree 1" NPT Male x 1" Hose Barb,
3). Part # 450239: Worm Gear Clamp, #10 (2) Pcs.
4). Part # 450235: 45 Degree Fitting, #16 "O" Ring x 3/4" Hose Barb
5). Part # 450238: Return Hose, 13" Long

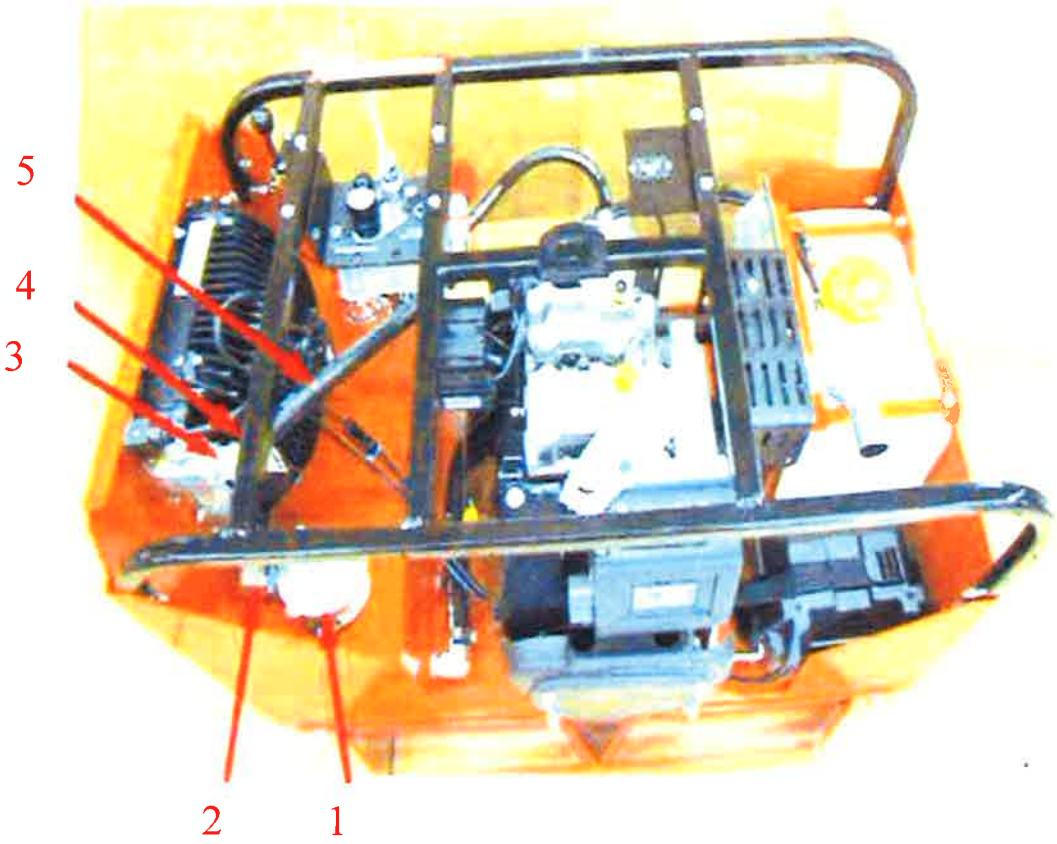

Photo "3"

1). Part # 450220 : Temperature Switch Thermostat,
2). Part # 450241 : Protective Cage Assembly
3). Part # 450224 : 90 Degree Deflector with Clamp
4). Part # 450226 : Battery Box
5). Part # 450227 : Battery U-154, 12-Volt (Not Shown)
6). Part # 450237 : 90 Degree 1" NPT Male x 1" Hose Barb,
7. Part # 450278 : Heat Exchanger Guard
8) Part # 450235 : 45 Degree Fitting, #16 "O" Ring x 3/4" Hose Barb,

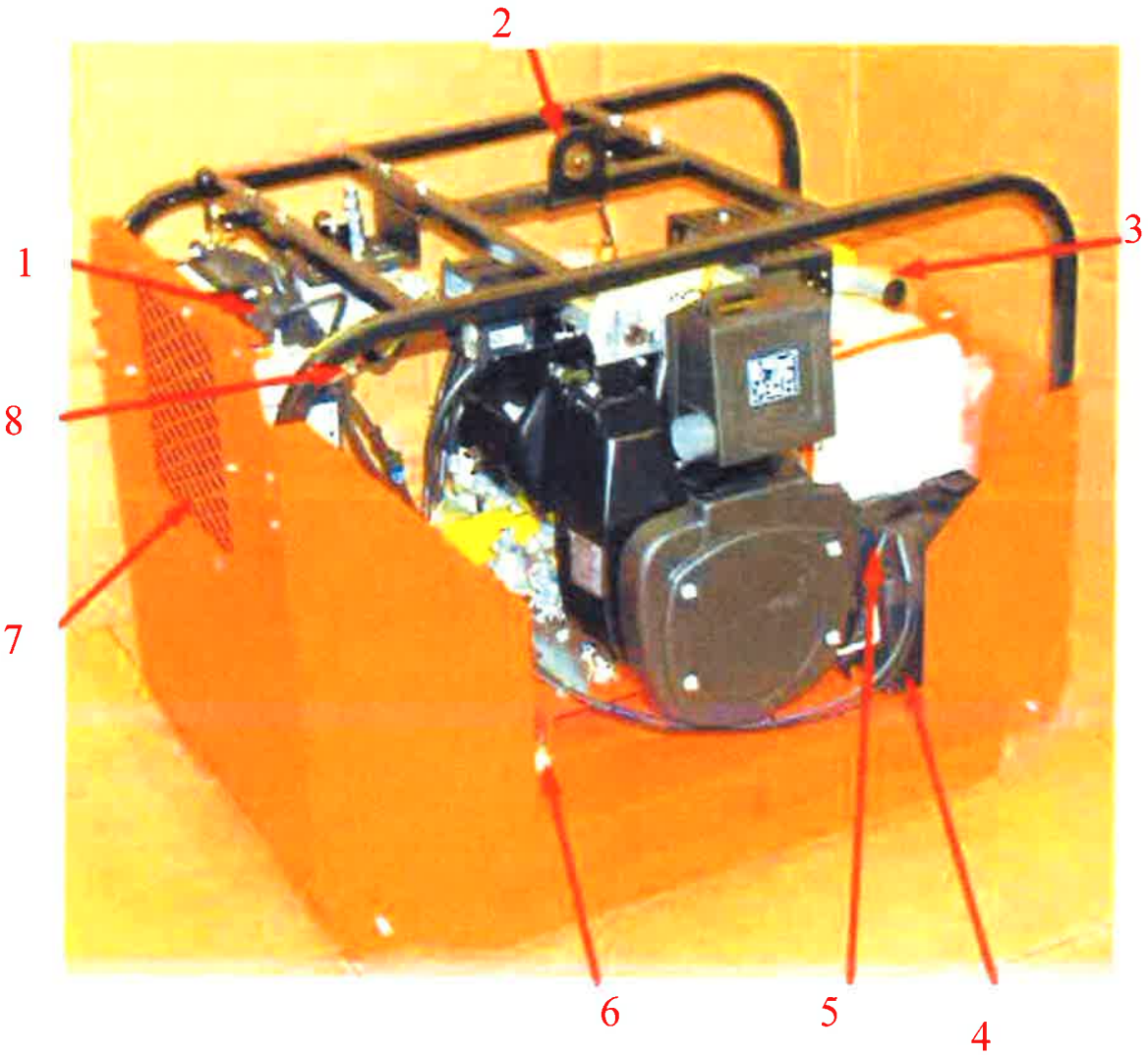

Photo #4

1) Part # 450248: Cartridge Relief Valve Assembly
2) Part # 450322: Acorn Cap Nut To Cover Adjusting Screw
3) Part # 450258: Flow Control Valve Assembly Complete
4) Part # 450254: Knob Only, For Flow Control Valve
5) Part # 450216: Lenz Submerged Filter,
6) Part # 450293: Flow Control Valve Mounting Plate
7) Part # 450294: Mounting Bracket For Throttle Assembly
8) Part # 450219: Filler/Breather Cap Assembly, (Behind Side Plate)
9) Part # 450200: Sight/Level Temperature Gauge,
10) Part # 450285: Drive Coupling Guard
11) Part # 450286: Pump Mounting Plate
12) Part # 450287: Adapter,
13) Part # 450284: Suction Hose, 30" Long
14) Part # 450288: Single State Gear Pump,
15) Part # 450231: Worm Gear Clamp, #16 Size, (4) Pcs.
16) Part # 450325: Fuel Supply Hose
17) Part # 450324: Fuel Exhaust Return Hose
18) Part # 450326: Fuel Tank Inner Shield Guard
19) Part # 450243: Relay For Temperature Switch,
20) Part # 450323: Stainless Steel Outer Fuel Tank Guard
21) Part # 450327: Fuel Tank Mount Strap, Exhaust Side
22) Part # 450289: Heat Shield

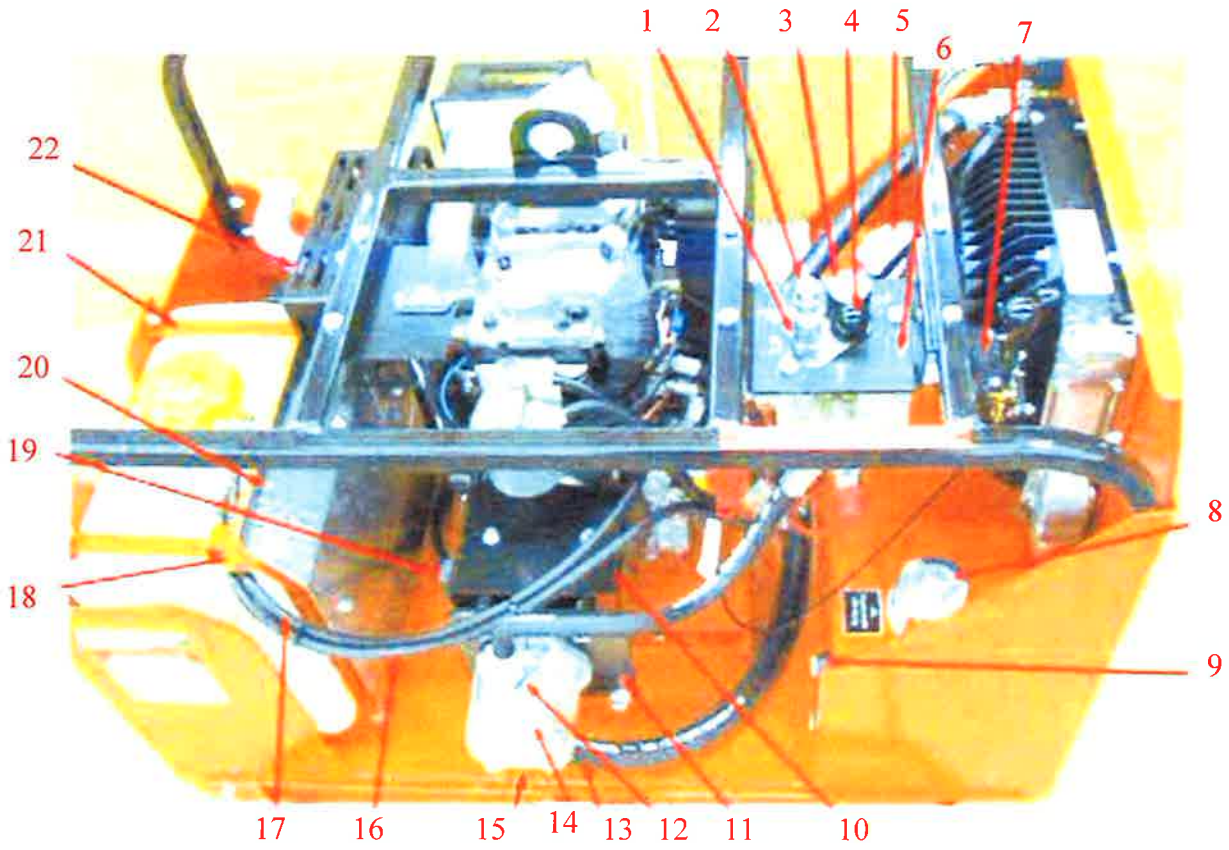

Photo #5

1). Part #450299: Hour Meter Bracket
2). Part #450300: Hour Meter,
3). Part #450240: Tee, 1/2" NPT Male x 1/2" NPT Male x NPT Female
4). Part #450252: 45 Degree Fitting, 1/2" NPT Male x 3/4" Hose Barb
5). Part #450231: Worm Gear Clamp, #16 Size
6). Part #450255: Quick Coupler, Female
7). Part #450210: Manifold Assembly, Flow Control, Relief Valve And Complete Manifold
8). Part #450256: Bushing, #12 Straight "O" Ring x 1/2" NPT Female
9). Part #450213: 90 Degree #12 Straight "O" Ring x 1/2" NPT Female
10) Part #450256: Bushing, #12 Straight "O" Ring x 1/2" NPT Female
11) Part #450259: Adapter #12 Straight "O" Ring x 1/2" NPT Male
12) Part #450260: Quick Coupler, Male
13) Part #450214: Dust Cap, Male Quick Coupler
14) Part # 450328: Angle Stiffener, Radiator Side

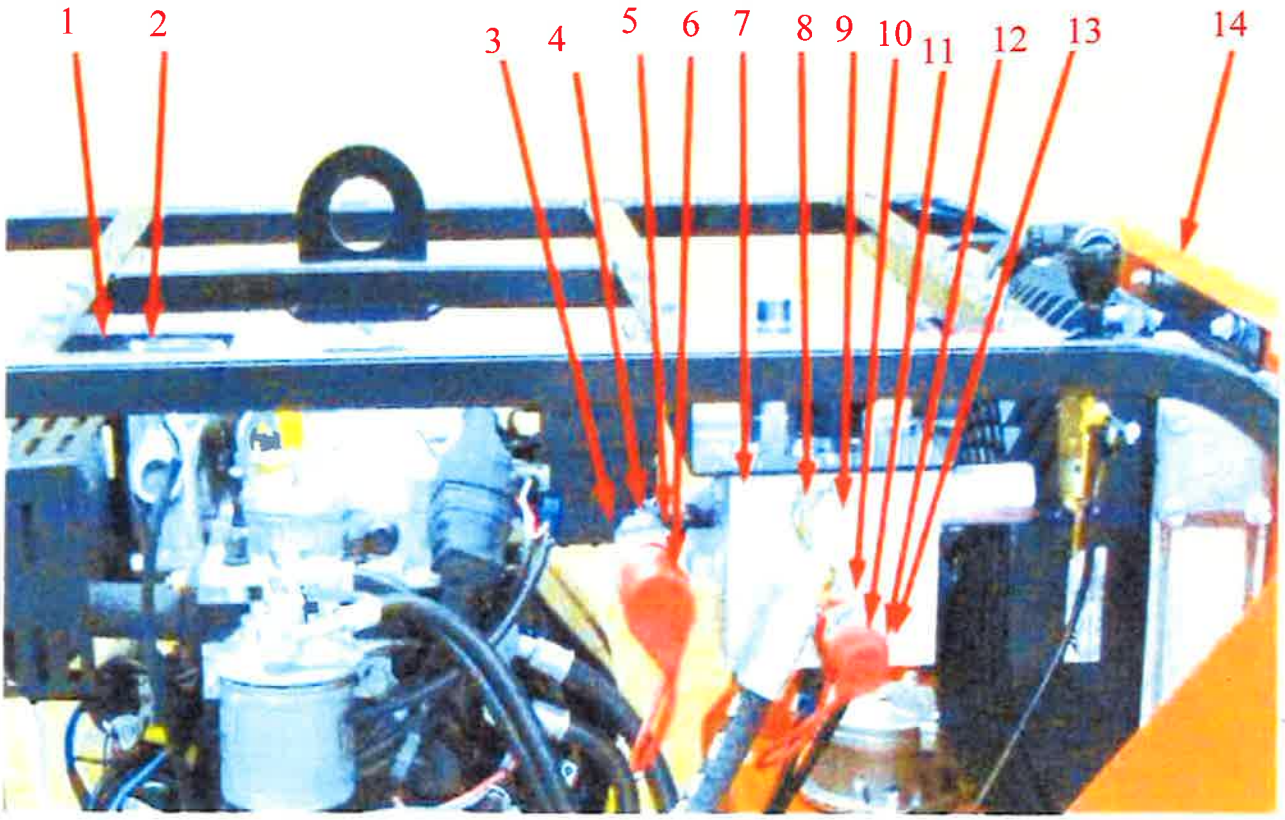

Photo #7
OPTIONAL FLOW METER KIT

1). Part # 450296: Flow Meter, 1-15 G.P.M. 2).
2). Part # 450297: Adapter, (2) Pcs.
3). Part # 450298: Hose, (2) Pcs.
4). Part # 450214: Dust Cap,
5). Part # 450260: Male Quick Coupler
6). Part # 450209: Dust Cap
7). Part # 450255: Female Quick Coupler,