

This manual contains important warnings and information. READ AND KEEP FOR REFERENCE.

# LIQUIDYNAMICS

## Heavy Duty Filter Cart with Depth Media, 5 GPM

### Instruction & Parts Manual

This Manual Covers P/N 33277



# **WARNING**

This symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

# **CAUTION**

This symbol indicates a potentially hazardous situation which, if not avoided, may result in injury or damage to equipment.

## **READ THIS MANUAL CAREFULLY BEFORE OPERATING OR SERVICING THIS EQUIPMENT.**

It is the responsibility of the employer to place this information in the hands of the operator. Keep for future reference.

# **WARNING**

DO NOT USE THIS CART SYSTEM TO PUMP FLAMMABLE, EXPLOSIVE OR CORROSIVE PRODUCTS SUCH AS GASOLINE, DIESEL FUEL, METHANOL, OR CHEMICALS.

# **WARNING**

Before each use, inspect the power cord to ensure it is not cut, nicked, has any exposed wires and ground lug on plug is intact and functional.

### **UNCRATING & ASSEMBLY:**

1. When removing carton exercise caution not to cut hose or power cord that may have shifted during transport.
2. Remove straps securing pump assembly from shipping pallet.
3. Inspect for damage. If damage is found please report damage to freight carrier.

Part Number # \_\_\_\_\_

Voltage: \_\_\_\_\_

Motor Serial # \_\_\_\_\_

Tested by: \_\_\_\_\_

Gearbox Serial # \_\_\_\_\_

Date: \_\_\_\_\_

Pump Serial # \_\_\_\_\_

All pumps have been assembled and tested at the factory and are ready for use. In cases where hoses are not provided, a few general guidelines should be followed.

### **Suction Hose:**

- Use non-collapsible hose rated for 25" Hg Vacuum.
- Should be the same size as pump inlet or larger
- Short as practical, no greater than 15' in length.
- If handling heavy lubes or **operating in colder temperatures, consider using next larger hose diameter.**

### **Discharge Hose:**

- Should be the same size as pump discharge or larger.
- Short as practical. Maximum hose length will vary according to viscosity of product handled. Consult factory.

## **INTRODUCTION**

Depth filter media 5 GPM filtration systems are designed for filtering Light-to-Heavy Viscosity using either 115 VAC. Or 208-230VAC. All pump systems are tested and shipped to operate with 115 VAC unless otherwise specified. This system uses 5 GPM positive displacement spur gear design pump, which is exceptionally well suited to handle refined oils and temperatures to 400F. Pump and motor connections are achieved using a rigid double NEMA C face connection protecting a rubber pillow block style coupling connection from misalignment due to rough handling.

Pumps can be operated in a vertical or horizontal orientation. All pumps include an internal bypass valve set at the factory for optimum performance.

## **TECHNICAL DATA**

Motor RPM	1750 RPM
Motor HP	2 HP
Motor Voltage	115/230 VAC
Flow Rate @ 1750 RPM	5 GPM
Pump Bypass pressure	50 PSI
Pump Inlet	1" NPTF
Inlet Strainer	30 Mesh
Suction Hose Length	1" x 10'
Pump Discharge	1" NPTF
Discharge Hose Length	1" x 15'
Shipping Weight	111 lbs.
Plumbing Material	Schedule 40 black pipe

## **WARNING**

Before each use, inspect the power cord to ensure it is not cut, nicked, has any exposed wires and ground lug on plug is intact and functional.

### **FILTERING OPERATION**

1. Ensure power switch located on motor is in the off position.
2. Insert power cord plug into 110VAC receptacle.
3. Insert suction stub into lubricant to be filtered.
4. Connect suction hose to suction stub.
5. Connect discharge hose to tank return stub.
6. Turn pump on. If system is equipped with a PowerMaster, select load setting 20 or 15 Amp and set % Speed to 100%. and Set the Start/Stop Switch to the "Start" position.
7. Allow air to escape and pump to prime.
8. Once flow is established, make note of pressure on pressure gauges connected to the filter. If equipped with a power master adjust % Speed to the desired flow rate, make note of pressure on pressure gauge connected to the filter. (Set speed before noting reading)

**Note:** Initial pressure reading will vary with type and viscosity of the fluid filtered. When filtering heavy cold lubricants it is generally best to visually note the discharge flow rate and pump sound. During the process occasionally compare the flow rate to that when starting the filtering process, when flow is substantially reduced replace filters. After the operator gains experience he will be able to recognize when filters are becoming plugged by the change in sound when the pump begins to bypass.

9. When filter operation is complete turn power switch to the off position.

**Note:** If filtering is complete it is considered a good practice to disconnect the hose from the suction stub. While pump is running, holding suction hose up allowing product to gravity flow to pump. Allow oil to be purged from the system. This practice allows the filter housing to be less than full for filter element inspection and allows room to absorb thermal expansion protecting system seals and reduces the amount of cross contamination when filtering different lubricants.

10. Disconnect, stow discharge & suction stubs.

Note: When filtering any lubricant it's recommended to perform filtering operations when lubricants are warm to hot in order to obtain the highest particulate removal efficiency. When operating at the upper end of the viscosity range or colder temperatures, it may be necessary to "walk-the-hose" (Disconnecting suction hose from the suction stub while pump is running, allowing oil to purge from hose, pump cavity and filter housing).

This procedure will protect the motor from attempting to start under an excessive load. Failing to adhere to this procedure will cause motor to overheat, trip the circuit breaker and adversely shorten the useful life of the motor. Due to tight running clearances, liquids containing solids and abrasives will accelerate pump wear and/or cause pump damage not covered by warranty.

## **CAUTION**

Dry running leads to immediate damage to pump components. Due to tight running clearances, liquids containing solids and abrasives will accelerate pump wear and/or cause pump damage.

### **POWERMASTER OPERATION**

The useable current available from an electrical outlet is dictated by age of the circuit breaker and other equipment that may be sharing the same circuit. The PowerMaster is designed to sense available current and automatically reduce motor load by decreasing flow rate to prevent overloading. Additionally, on the enclosure cover of the PowerMaster there is a 15/20 Amp switch allowing the operator to select the desired load range.

It is reasonable, when initially connecting to an unfamiliar electrical outlet to attempt using the 20 Amp setting in order to obtain maximum performance. Because the PowerMaster provides a soft motor start, therefore reducing the current spike during start up. It is possible to run in the 20 Amp mode when on a 15 Amp circuit without overload. However, if the circuit is known to be a 15 Amp circuit with additional equipment running on it the PowerMaster will be more sensitive to current fluctuations while in the 15 Amp setting.

It has been established in ISO filter testing, that passing product through a filter slowly extends filter life and optimizes the ability of a filter to remove particulates. Incorporated into the PowerMaster is a "% Speed" Potentiometer allowing an operator to manually adjust flow rate to best filtration specifications depending on fluid viscosity, required ISO cleanliness targets and quantity of fluid to be filtered.

The operation of a pumping system that has the "PowerMaster" option is essentially the same except an operator selects:

- A. Either 15 or 20 Amp load setting.
- B. The flow rate using the "% Speed" Potentiometer.

The PowerMaster contains two diagnostic LEDs mounted on the enclosure cover displaying the operational status.

**POWER ON LED** "Power" will illuminate green when AC power is applied.

## **WARNING**

**Do not depend on the Power LED as a guaranteed power off condition. Be sure the power cord is unplugged before servicing this device.**

**STATUS LED** “Status” LED is a tricolor LED which provides indication of a fault or abnormal condition. The information provided can be used to diagnose overload condition and provides an indication to inform the operator that the PowerMaster operating parameters are normal Table below summarizes the Status functions.

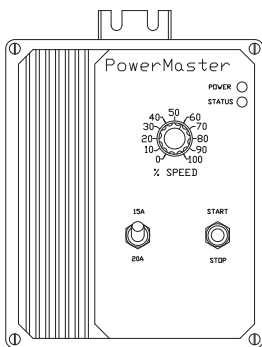
POWERMMASTER OPERATING CONDITION AND STATUS LIGHT INDICATOR

PowerMaster Operating Condition	Flash Rate (1) and LED Color
Normal Operation	Slow Flash Green
Overload (120% - 160% Full Load)	Steady Red (2)
Power Master Timed Out	Quick Flash Red (2)
Under Voltage	Quick Flash Red / Yellow (3)
Over Voltage	Slow Flash Red / Yellow (3)
Stop	Steady Yellow

Notes: (1) Slow Flash = 1 second on and 1 second off. (2) When the overload is removed, before times out and trips the drive, the Status LED will flash green. (3) When the under voltage or over voltage condition is corrected, Status LED will flash Red / Yellow / Green.

**START-UP PROCEDURE.**

If AC power is applied the “Power” LED will illuminate green. The “Status LED will indicated PowerMaster Status, as described in Table above.



(Fig. 1)

To start the PowerMaster, momentarily set the Start/Stop Switch to the “Start” position. (Fig.1) The motor will begin to accelerate to speed set on %Speed Potentiometer located on the front cover.

**STARTING THE POWERMMASTER AFTER A FAULT HAS BEEN CLEARED** – The PowerMaster monitors four faults (Undervoltage, Overvoltage, Short Circuit and Overload) See Table for the Status LED indication.

To start the drive after a fault has been cleared, momentarily set the Start/Stop Switch to the “Stop” position.

**ON/OFF SWITCH**

A heavy duty rotary on/off switch is located on the motor electrical box. It is positioned for maximum protection from accidental breakage.

The switch is activated by lightly rotating the knob 25 degrees right or left. “0” (the 12:00 O’clock position) is “OFF” and “1” (the 2:00 O’clock position) is “ON”.

**MAINTENANCE**

**Frequency**

Since usage varies for different users, the frequency and extent of pump maintenance is best established

based upon past performance. Keeping detailed maintenance records of past performance aids in determining future preventive maintenance intervals. During routine operating inspections, pay particular attention to seal, bypass, bearing areas of the pump and abnormal vibration or noise.



Before attempting to service the pump disconnect motor power and release all pressure within the system. Wear appropriate personal protection equipment and handle equipment with care.

**Inspect for Wear**

**PUMP**

If the gear pump exhibits reduced flow, an inability to maintain pressure, is noisy or performs otherwise abnormally; refer to the Troubleshooting Matrix.

If the problem persists, the pump should be inspected for wear or damage. Pump internals may be readily inspected in the field usually without removal from the drive or system plumbing. Simply remove the cover screws to pull the cover. Full pump removal and complete disassembly may be needed for a comprehensive inspection. Contact the factory.

**BYPASS**

The internal bypass valve is factory set and should not require any maintenance or adjustment.

**COUPLING**

Visually inspect the rubber coupling spider located between the pump and motor.

**MOTOR**

2 HP 115/230V TEFC Totally enclosed fan cooled motor.

No preventive maintenance is required on motor assembly.

Visually inspect to ensure shroud, mounting bolts and electrical cords are secure.

Sealed bearings require no lubrication.



Not approved for Class I Div 2 explosion proof environment

**CART**

Constructed of thick wall powder coated steel tubing. Tire inflation up to 50 PSI

## Troubleshooting Matrix

Difficulty	Probable Cause	Remedy
No Liquid Delivery	1. Closed Valves	Open valves
	2. Plugged suction	Eliminate restriction, check strainer
	3. Filters plugged	Replace filter
	4. Air leak at suction	Locate and repair leak
	5. Bypass valve pressure set to low	Adjust bypass pressure
	6. Suction lift too high	Do not exceed vapor pressure of liquid
	7. Motor wired incorrectly	Check wiring diagram
	8. Wrong rotation	Correct rotation
Low Liquid Delivery	1. Filters plugged	Replace filter
	2. Pump shaft speed incorrect	Check driver speed, motor speed, % speed
	3. Discharge pressure too high	Reduce downstream pressure
	4. Bypass valve pressure set to low	Adjust bypass pressure
	5. Air leak at suction	Locate and repair leak
	6. Worn or damaged pump	Inspect and repair as required
	7. High viscosity	Verify original application conditions
Gradually Loses Prime	1. Suction lift too high	Improve suction pressure
	2. Air or gas in fluid	Eliminate air or gas from fluid
	3. Air leak at suction	Locate and repair leak
	4. Worn or damaged pump	Inspect and repair as required
Noisy	1. Cavitating	Improve system suction pressure, provide adequate NPSH (net positive suction head), Reduce speed
	2. Solid particles in fluid	Clean suction strainer
	3. Air or gas in fluid	Eliminate air or gas from fluid
	4. Worn or damaged pump	Inspect and repair as required
Motor Runs Hot or Overloads	1. Discharge pressure too high	Reduce downstream pressure. Check relief valve setting. Be sure discharge pressure gauges function correctly
	2. Shaft speed too fast	Reduce speed
	3. Fluid viscosity higher than expected	Raise fluid temperature
	4. Incorrectly wired motor	Check wiring diagram
	5. Binding internal pump parts	Inspect and correct condition
	6. Motors normally feel hot	Verify if actual motor amperage draw is correct
Seal Leaks	1. Dry running	Open valves. Prime pump.
	2. Solids in fluids	Add suction strainer
	3. Damaged during field replacement	Inspect and replace damaged components

Parts List – P/N 33277

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Parts List – P/N 33277



### Spare Parts Items

1. P/N 901102	Cart Frame, Powder Coated
2. P/N 905001	2 HP, Dual Voltage TEFC Motor
3. P/N 905002	Rotary ON/OFF Switch
4. P/N 900325-01	30 Mesh Strainer, Complete
5. P/N 901126	Inlet Pump Spir Gear w/Bypass 5 GPM
6. P/N 901007	Pneumatic Wheel, 10" (2 ea.)
8. P/N 901132	Spider Coupler, rubber (inside housing)
9. P/N 900333	Outlet
10. P/N 900332-M	Filter Drain Valve
11. P/N 950083	Pressure Gauge
12. P/N 900279	Pressure Gauge Isolation Valve
13. P/N 905006-25	Depth Media Filter Canister
14. P/N 900278	Filter Access Tee Handle
21. P/N 900188	3/8" Drain Cock

See sales literature for selection of filter elements.

