

**KNOWLEDGE BASE**

Article Type: Instructions

**Hydrostatic Pump, 40/50 HP for  
Models, 50/60****Description:**

Instructions on “How to” properly adjust the Hydrostatic Pump 40/50 HP, “AA4VG71”. Adjusting relief valves, fine and course adjustments, checking oil temperature, and pump itemized breakdown.

**WARNING**

Never work on, clean or service this unit, control panel or any machine or open or remove any protective cover, guard, grate, door, or maintenance panel until the power or energy sources has been turned off, locked out / tagged out, and all moving parts have come to a complete stop and or blocked to prevent movement. Machinery is dangerous - avoid personal injury and or death by following manufacture, Local, and OSHA safety procedures. Contact Columbia Machine for safety decals, guards, horns and beacons.

HYDROSTATIC PUMP



HYDROSTATIC  
40/50HP PUMP  
AA4VG71

Columbia Machine, Inc.  
Vancouver, Washington

HYDROSTATIC PUMP SYSTEM INFORMATION

This manual provides information applicable to the Columbia Block Machine 16HF/1600 manufacturing systems equipped with the Hydrostatic drive.

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## HYDROSTATIC PUMP

### PROCEDURES FOR ADJUSTING THE HYDROSTATIC 40/50- HP VT CARDS, COURSE AND FINE ADJUSTMENTS AND ACCELERATION AND DECELERATION HIGH PRESSURE CROSS PORT RELIEF VALVES

 **NOTE**

If the vibrator is rolling over in the neutral position, no signal to run vibrator or is offline, remove the electrical pin connector from the E-P controller if the vibrator stops the problem is electrical. Adjustment to the VT-200K or VTVSPA1 electrical card can be done after all manual adjustment have been completed. (Refer to electrical card adjustments). To proceed with relief valve settings if vibrator continues to roll over with electrical pin connector disconnected you must first adjust the fine null adjustment. Refer to fine and course null adjustments before continuing with this procedure. Adjustment to the VT-200K or VTVSPA1 electrical card can be done after all manual adjustment have been completed. (Refer to electrical card adjustments)

**To adjust the model AA4VG71 pump, follow the steps below:**

 **NOTE**

All high pressure relief valve adjustments on sizes 71 and 90 to be done with a 11 mm box wrench and a 19 mm box wrench. On 125 and 180 to be done with a 5 mm allen wrench and a 17 mm box wrench.

 **NOTE**

For new pump replacement, check to ensure that the orifice plugs in Port X1 and Port X2 have been removed. If orifice plugs have not been removed, remove orifice plugs and then proceed to acceleration/deceleration relief cartridge set-up.

1. Make sure you have a charge pump pressure of 350 psi on the center gauge (see picture for location).
2. Standing at the opposite end of the pump main shaft there are two relief cartridges. The one on the right is for acceleration and the one on the left is for deceleration. . Note: In some applications acceleration and deceleration may be opposite. These cartridges can be adjusted without removing cartridges. (See picture for location)
3. The pump must be set statically with both pressure lines plugged. Remove the two high-pressure lines from the vibrator motor and cap the two hydraulic motor fittings and plug the two hoses. There should not be any electrical voltage leak influencing the E-P controller so remove the electrical pin connector from the E-P controller coil.
4. First test the acceleration pressure by manually pushing the detent pin located on the bottom of the E-P controller in the center of the coil. Hold for just a few seconds to see what the maximum gauge pressure is reading on the acceleration gauge (see

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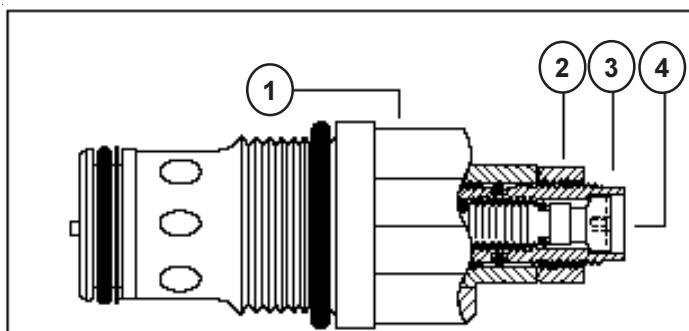
## HYDROSTATIC PUMP

picture for location). If you have no acceleration or deceleration gauge pressure, check to make sure tow option has been disengaged. To disengage tow option, loosen lock nut and turn tow option screw all the way out until it stops and lock the lock nut down. (See picture for location.) Acceleration pressure is to be set at 3500 psi. Deceleration set at 2500 psi. If gauge reading is above 3500 or 2500 psi to decrease pressure turn adjustment screw out counterclockwise. This may only require a small adjustment of possibly 1/32 turn. For increasing pressure turn screw in clockwise. (See relief cartridge below for adjustment locations.) Acceleration and deceleration pressures can be noted at gauges hooked to Ma and Mb ports.

5. Stroke the pump to approximately 20 percent of full flow in one direction and adjust the high pressure relief for that flow direction. Acceleration pressure at 3500 relief should begin to open. Deceleration set at 2500 psi. For the AA4VG71 and AA4VG90 one turn equals 2200 psi (150 bar).
6. Remember one complete turn clockwise on AA4VG71 and 90 equals 2200 psi (150 bar).
7. Make sure that the POR valve is not in use for our application. Turn POR valve in clockwise until it stops do not over tighten. Back off counterclockwise ¼ to ½ turn and lock down.

### Tow Option Engagement for AA4VG71 and AA4VG90 (Use a 4mm allen wrench)

To actuate tow option turn tow option engagement screw (Ref. #4) out three turns. To Disengage tow option turn tow option engagement screw in until it stops.



Relief valve for AA4VG71 and AA4VG90

- 1 - Nut used to torque relief valve into port block.
- 2 - Lock nut for high pressure relief adjustment.
- 3 - Adjustment screw for high pressure adjustment.
- 4 - Tow option engagement screw.

**NOTE**

Perform step 4 as quickly as possible to prevent overheating of the pump. Flow should not be permitted to spill over the high-pressure relief valves for longer than 10 seconds, especially at higher temperatures.

**NOTE**

High pressure relief valve adjustments on size 71 and 90 to be done with a 11mm box wrench and a 19mm box wrench, 125 and 180 to be done with a 5mm allen wrench and a 17mm box wrench.

## HYDROSTATIC PUMP

### FINE ADJUSTMENT



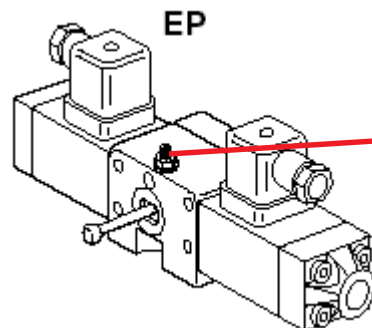
The only time fine adjustment would be made is if electrical pin has been disconnected and vibrator is still slightly rolling over.

Look at the acceleration and deceleration gauges. These will be the two outside gauges. You will notice that at this time one of the gauges will have a higher reading than the other.

With electrical pin connector disconnect from EP controller insert flat tip screwdriver into adjustment screw slot and hold adjustment screw from turning while breaking jam nut loose. While making your adjustment watch the gauges and with very slight adjustment right or left of the adjustment screw you will notice one of the gauges increase in pressure. Turn the adjustment screw the opposite direction and the other gauge will start to increase in pressure. Turn the adjustment screw back until both gauges read the same pressure. At this time hold the adjustment screw and lock the lock nut down. Again check the gauges to make sure pressure are the same. Some times it may be necessary when locking down the lock nut you may need to slightly turn the adjustment screw back so when locking the lock nut down your pressures will be equal.

At this time your vibrator should not be rolling over.

If the vibrator is still rolling over and you cannot equal the pressures on both gauges you will need to make adjustment to the course adjustment to center the pump and then return to the fine adjustment procedures again once you have completed the course adjustments.



For fine adjustment jam nut and slotted screw is located here.

## HYDROSTATIC PUMP

### COURSE ADJUSTMENT

For course adjustment the following parts will be needed:

1. Two each ¼ inch 37 degree straight thread O-ring fittings.
2. One each ¼ inch hydraulic hose with two ¼ inch 37 degree straight female swivel fitting on both ends. Length to be 10 inches long with hydraulic fittings.

Make sure pump is turned off and locked out before removing or installing these parts.

With the pumping unit locked out locate x1 and x2 ports and remove the O-ring plugs. Install the fittings and attach the hose to the fittings installed in x1 port and x2 port. Make sure all fittings are tightened down.

You are now ready to turn the pumping unit back on.

Following instructions below you will notice gauges installed in Ma and Mb ports these are the two outside gauges which we refer to as acceleration and deceleration which you will be reading for the following procedures. You do not have to plug port A or B due to the EP controller not in use at this time.

With allen wrench install break jam nut loose. Turn adjusting screw in either direction until you have 1000 psi on one of the gauges. At position of allen wrench handle make a mark below handle with pencil or black felt pen. Turn adjusting screw the opposite direction until you read 1000 psi on the other gauge. Note position of allen wrench handle and mark below. Split the difference between the two marks, which should center the pump. Lock jam nut down.

Turn pump off and lock out. Remove hose and fittings and install plugs back in x1 and x2 ports.

It may be necessary now to adjust your fine adjustment again. Follow steps for fine adjustments on previous page.

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## HYDROSTATIC PUMP

### PREPARATION FOR ADJUSTMENT

The control piston has strong centering springs to ensure that once the pump is adjusted for the neutral position it will always return to neutral. If an adjustment is necessary follow the steps listed below.

To ensure there is equal pressure on both sides of the control module during the centering operation, it is necessary to connect the X1 and X2 ports together by means of hose or tubing (No less than a ¼ inch ID). The port sizes are as follows:

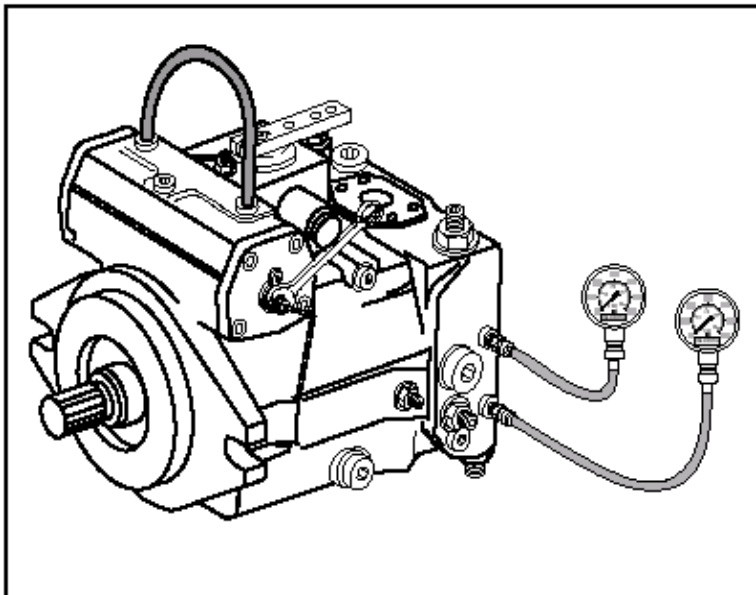
Size 28...90            7/16"-20 UNF

Size 125 & 250        9/16"-18 UNF

Pump Size	Allen Wrench	Wrench
28...56	6 mm	19 mm
71...90	6 mm	24 mm
125...250	8 mm	24 mm

With pressure gages installed at Ma and Mb, and with A and B ports blocked (or motor stalled), and with the pump running loosen the jam nut. Turn the mechanical centering adjusting screw until 1000 psi is read on Ma or Mb then turn screw opposite direction until 1000 psi is read on other pressure port. Turn the screw back, splitting the distance between the previous two positions. This should be the neutral position. Pressure on Ma and Mb should be equal.

Tighten jam nut, stop the pump drive, remove the hose connecting ports X1 and X2.



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## HYDROSTATIC PUMP

### CHARGE PRESSURE SETTING

#### Change Pressure Relief Valve Adjustment

For AA4VG28...AA4VG56

With pressure gauge installed at G port run pump at normal operating speed and temperature. If pressure is low, remove relief valve and add shim(s). If pressure is high, remove relief valve and take shim(s) out.

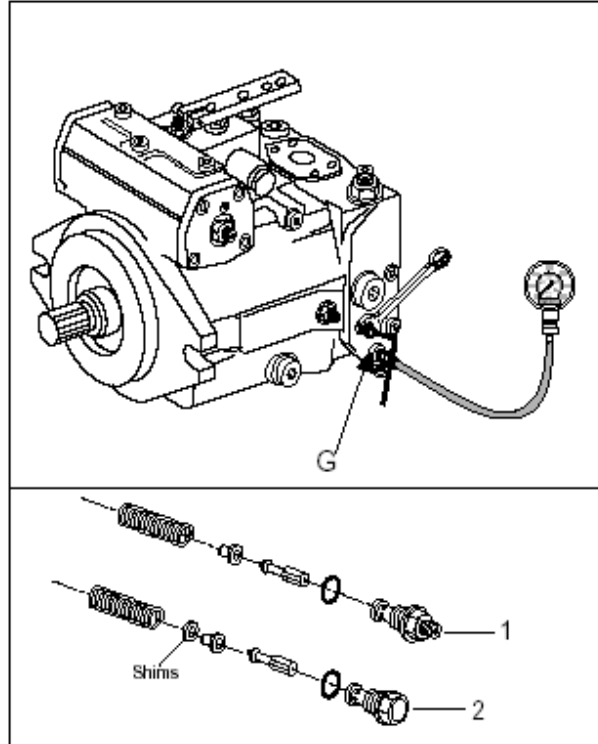
Note: 1mm=56.5 psi (3.9 bar)

For AA4VG71...AA4VG250

With pressure gage installed at G port run pump at normal operating speed and temperature. If pressure is low loosen jam nut and turn set screw clockwise. If pressure is high loosen jam nut and turn set screw counterclockwise.

Note: 1 turn = 55 psi (3.8 bar) for sizes 71 thru 125

Note: 1 turn = 43.5 psi (3.0 bar) for sizes 180 thru 250.



1. Adjustable charge pressure relief valve for sizes 71...180.
2. Shim charge relief for sizes 28 and 56.

Pump Size	Allen Wrench	Box Wrench	Wrench To Remove
28-56	N/A	N/A	27 mm
71-125	5 mm	17 mm	27 mm
180-250	5 mm	17 mm	32 mm

#### NOTE

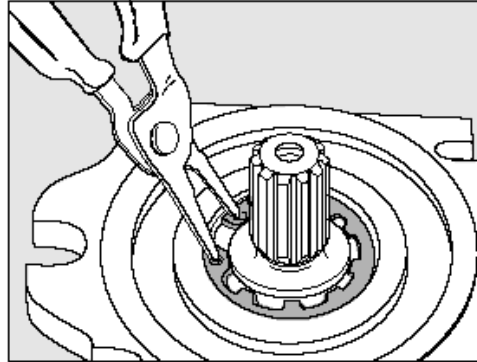
If you notice that you have no charge pressure at gauge check the following. Turn unit off. Lock out pump and remove inspection cover over coupler assembly that connects the pump and electrical motor. Make sure that coupler has not slid back or insert is not destroyed. When setting up coupler do not force coupler halves together. Allow approximately 1/32 gap between each half and insert. After repairs have been completed install inspection plate and unlock pump and turn unit on. Check pumps charge pressure. Charge pressure should be set at 350 psi to max 400 psi.



HYDROSTATIC PUMP

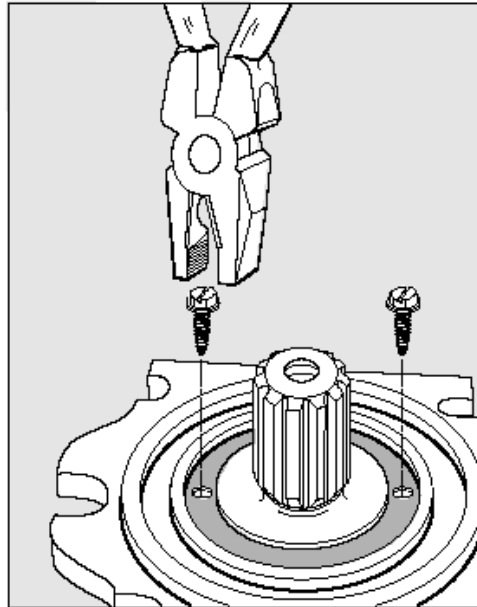
REMOVAL & INSTALLATION OF SHAFT SEAL

Remove the retaining ring with snap pliers



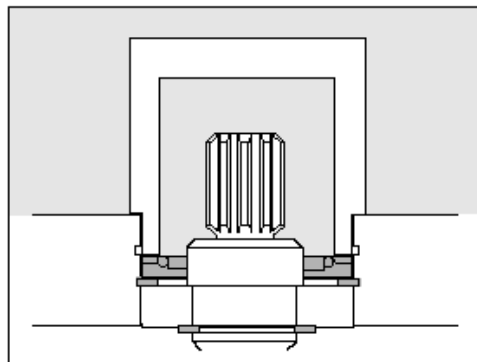
Screw in sheet metal screw into the holes fitted with rubber.

Pull out shaft seal with pliers.



Press in shaft seal with bushing to the stop.

Then replace snap ring.



## HYDROSTATIC PUMP

### CHECKING THE OIL TEMPERATURE

1. Maximum oil temperature should be 140°F (60°C).
2. The oil heater should be set to activate at an oil temperature below 100°F (37.8°C)



If adjustments on temperature are needed remove heater cap and set dial to desired temperature.

3. The oil cooler has a fixed thermostat that is activated when temperature reaches 110°F.
4. For cold weather start-up, always engage the vibrator several times to get the warm oil circulating through the motor.
5. There is a high temperature cut off if the oil temperature rises above 150°F. This will shut down the pump.
6. Check the oil temperature at least once per shift. Record the value to understand the normal oil temperature. If the oil temperature is above normal the system may have a problem.

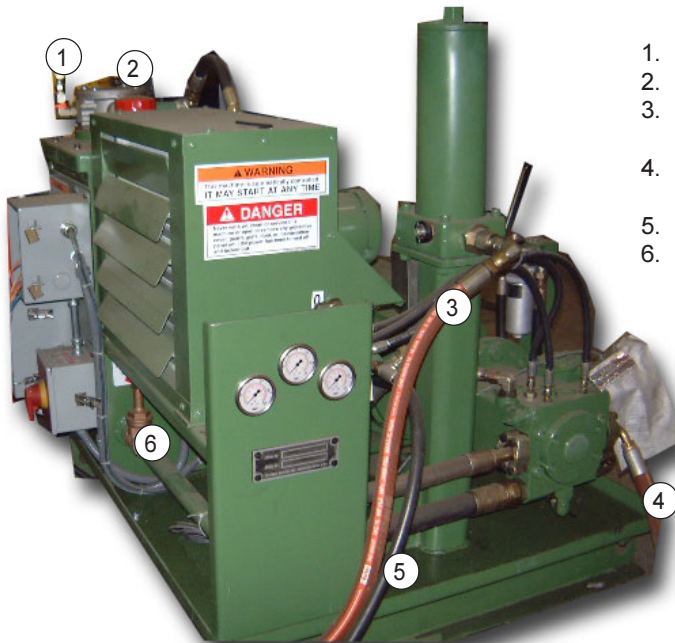
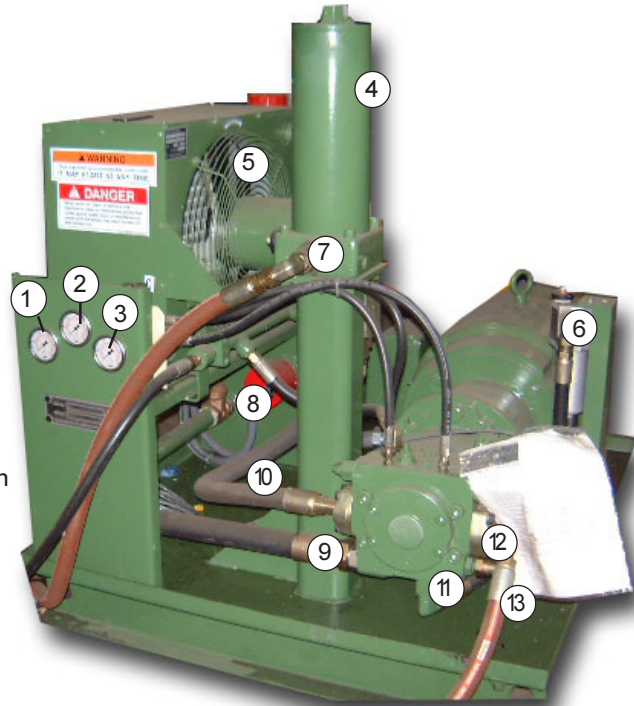
#### Items to check:

- Is the cooler on? If not, check the thermostat it may have failed. Also check the fuses. If the thermostat is good, check the oil cooler three phase lockout and the start overloads and fuses. If all are good then check the oil cooler motor.
- Is the heater set too high or not shutting off? Remove the heater cap and check to see what the temperature is set at.
- Acceleration or deceleration relief valves stuck? Check acceleration and deceleration relief gauges. The pressure should drop off once the vibrator has started or stopped.
- Pump starting to fail? Check case drain line from pump to return header. If it is hot to the touch, too much oil flow is passing through the case drain. Charge pump pressure will drop off. Check the vibrator motor case drain. Check the high-pressure filters. If plugged the filter indicators will show red. Change filters and reset filter indicators by pushing the reset on the filter indicator. Check the charge pump filter. If plugged, filter indicator will show red. Change filter and reset filter indicator. Check oil for contamination. If oil smells burnt, replace with AW46 oil and change all filters. If problem continues call the Columbia Service Department for assistance.

## HYDROSTATIC PUMP

### 40/50 HP Hydrostatic Pump Unit

1. Deceleration pressure (MA)
2. Charge pump pressure (G)
3. Acceleration pressure (MB)
4. Return filter high pressure
5. Heat exchanger
6. Charge pump filter
7. Return from hydraulic motor
8. Tank Heater element
9. Tank suction line
10. Return from high pressure filter deceleration
11. To filter from (FE port)
12. Return from filter to (FA port)
13. Pressure to vibrator motor (MA)

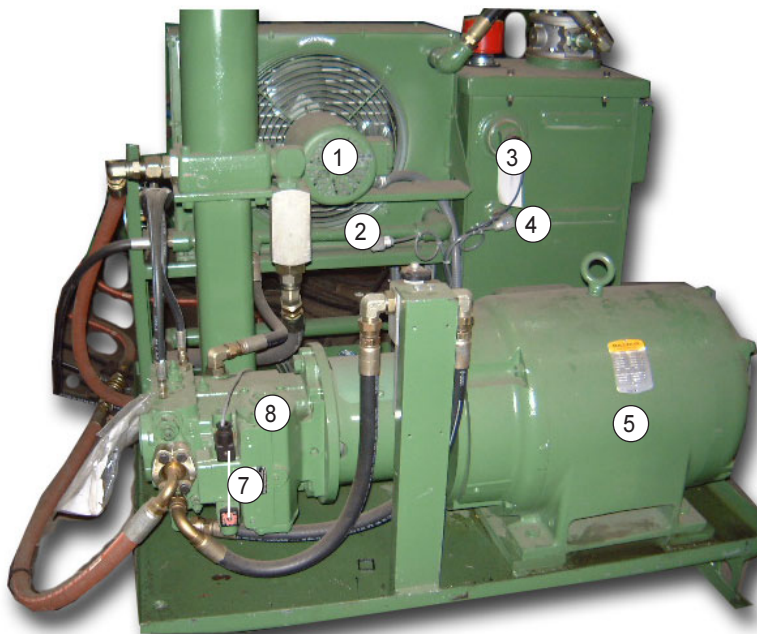
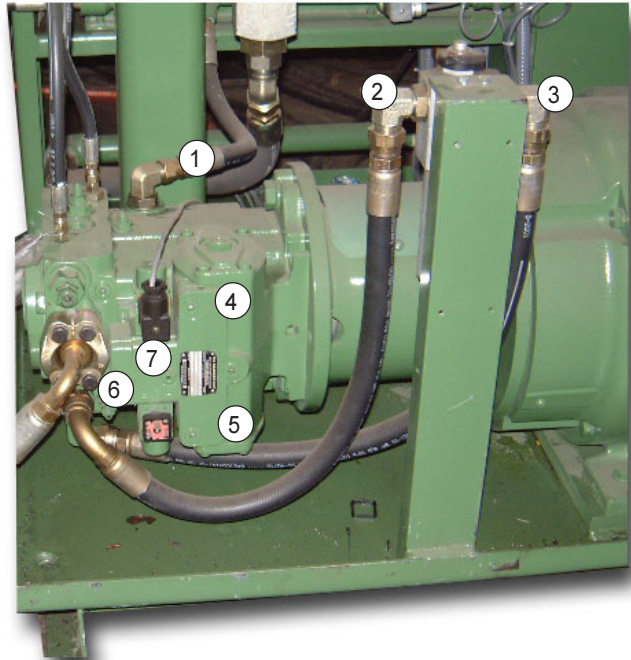


1. Oil Fill AW46
2. Tank Filter
3. Deceleration pressure return from hydraulic motor
4. Acceleration pressure out to hydraulic motor
5. Case drain return from hydraulic motor
6. Gate valve shut-off

## HYDROSTATIC PUMP

### 40/50 HP Hydrostatic Pump Unit

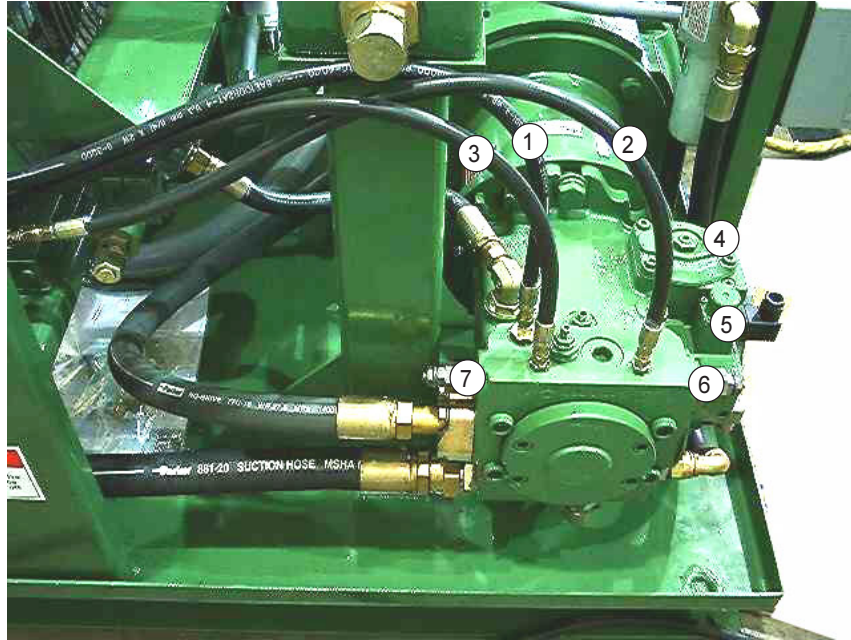
1. Pump case drain
2. Filter out to FA port
3. Filter in from FE port
4. X2 Port
5. X1 Port
6. POR Valve
7. Null fine adjustment



1. Fan motor
2. Fan switch
3. Low oil
4. Over temperature
5. Electric pump motor
6. EP controller coils
7. Null course adjustment

## HYDROSTATIC PUMP

### 40/50 HP Hydrostatic Pump Unit

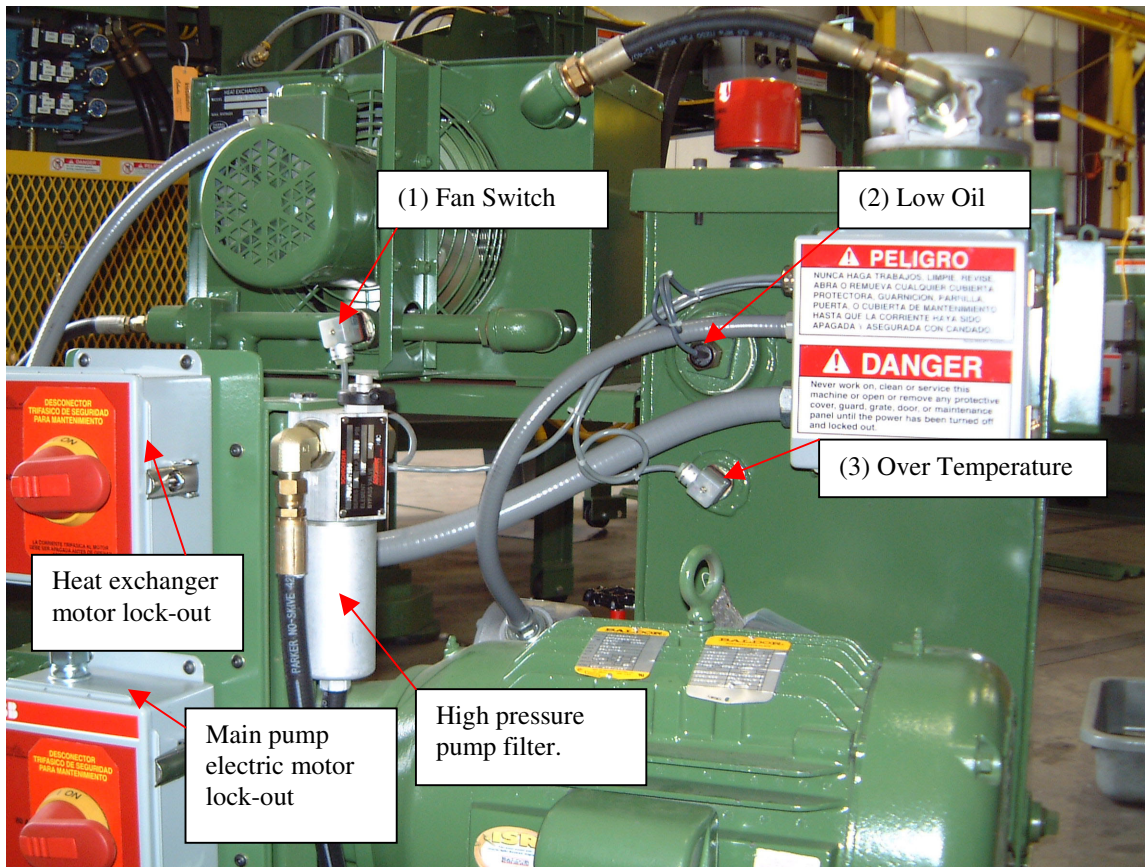


1. G port charge pump pressure
2. MB gauge port acceleration
3. MA gauge port deceleration
4. Null course adjustment
5. Detent pin override on EP controller valve
6. Acceleration relief cartridge
7. Deceleration relief cartridge

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## HYDROSTATIC PUMP

### 40/50 HP Hydrostatic Pump Unit



1. Fan switch 125 degrees - Part # 2327616
2. Low oil switch shut down - Part # 237089
3. Over temperature 150 degrees shut down - Part # 232618

HYDROSTATIC PUMP

40/50 HP Hydrostatic Pump Unit

