KNOWLEDGE BASE

Article Type: Instructions

Hydrostatic Pump, 15 HP for Models, 22HF, 16HF, 1600

Description:

Instructions on "How to" properly adjust the Hydrostatic Pump 15 HP, "AA4VG40". Adjusting relief valves, fine and course adjustments, checking oil temperature, and pump itemized breakdown.

WARNING

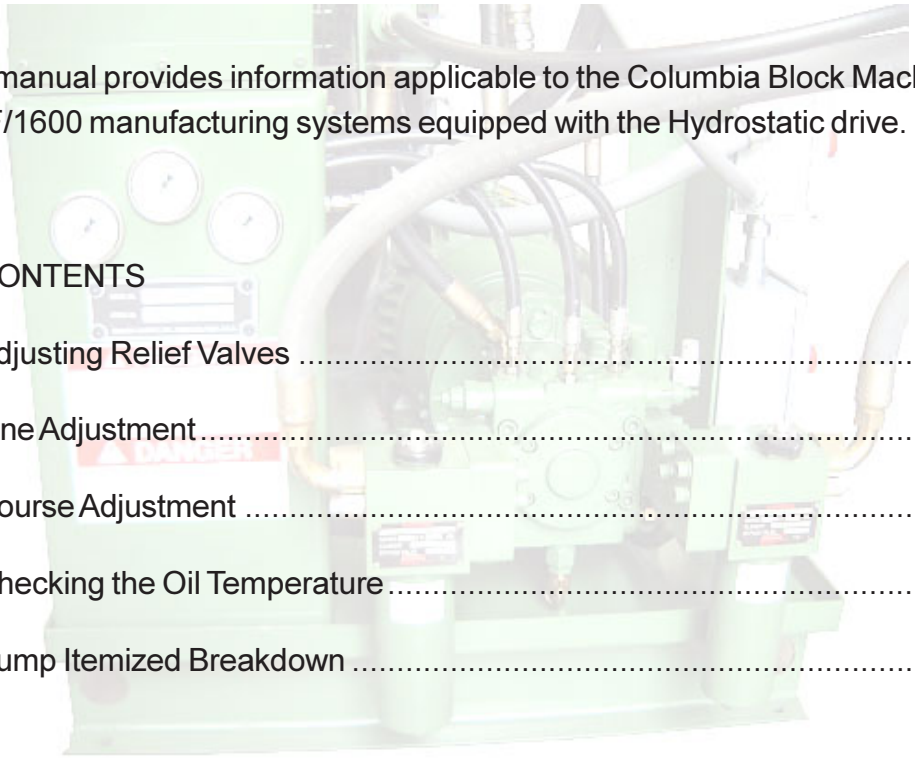
Never work on, clean or service this unit, control panel or any machine or open or remove any protective cover, guard, grate, door, or maintenance panel until the power or energy sources has been turned off, locked out / tagged out, and all moving parts have come to a complete stop and or blocked to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

HYDROSTATIC PUMP

HYDROSTATIC
15HP PUMP
AA4VG40

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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PROCEDURES FOR ADJUSTING THE HYDROSTATIC 15- 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 AA4VG40 pump, follow the steps below:

NOTE

All high pressure relief valve adjustments on size 40 to be done with a 3 mm allen wrench and a 5 mm box wrench.

A. Make sure you have a charge pump pressure of 350 psi on the center gauge (see picture for location.

B. Standing at the opposite end of the pump main shaft there is two relief cartridges. The one on the right is for acceleration and the one on the left is for deceleration. These cartridges must be removed to increase or decrease relief pressure. (See picture for location)

C. 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. We also do not want any electrical voltage leak influencing the E-P controller so we must remove the electrical pin connector from the E-P controller coil.

D. 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 picture for location). If you have no 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.) If gauge reading is above 3500 psi or below 3500 psi (Note pressure reading for adjustments later). You must turn pump off and lock out the three-phase power then relieve pressure on cartridge by breaking plug loose on high-pressure

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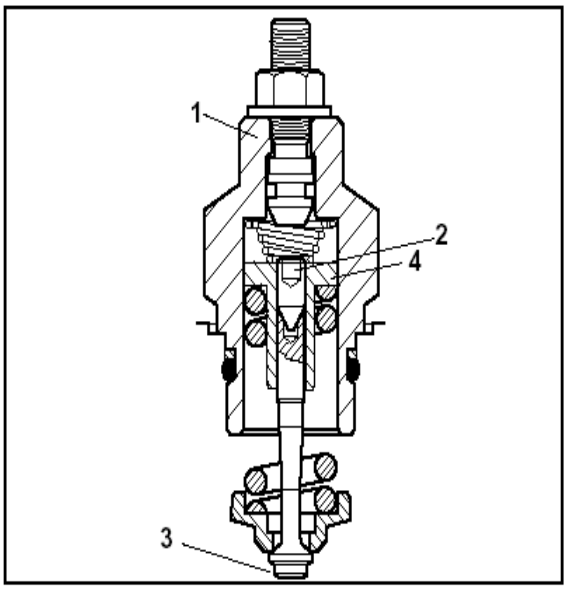
hose before removing the relief cartridge. This will allow you to remove the relief valve cartridge cover without damaging the o-ring and backup ring on the cartridge. Remove relief valve cartridge cover from pump being careful to keep spring assembly together with cartridge. Turn cartridge cover upside down and remove relief valve spring assembly. You will notice that there is another spring in the bottom of the cartridge cover do not remove this spring but set the cover aside. Holding spring loading nut and loosen jam screw (ref. Item 2). It may be necessary to hold loading nut with a pair of vice grips. Do not apply too much pressure just enough to hold nut to loosen jam screw. To adjust valve spindle (ref. Item 3). One turn clockwise will increase pressure to approx. 630 psi. Counterclockwise will decrease pressure approx. 630 psi. You noted the pressure reading earlier so make adjustment to achieve the 3500 psi pressure. Example: If acceleration pressure was noted at 2600 psi while holding loading nut you would turn valve spindle clockwise approx. one and one half turns. After adjustment is completed tighten jam screw (ref. Item 2) to 5ft-lbs. Remove vice grips. Install relief valve assembly into cover and install into pump. Tighten cover (ref. Item 1) to 66 ft-lbs.

High Pressure Relief Valve Adjustments

High Pressure Relief Valve Adjustment Procedure AA4VG40 & AA4VG56

1. Remove relief valve cover from pump (ref. item 1).
2. Loosen jam screw (ref. item 2).
3. Holding spring loading nut (ref. item 4) adjust valve spindle (ref. item 3). One turn equals approx. 630 psi (44 bar).
4. After adjustment is completed tighten jam screw (ref. item 2) to 5 ft-lbs. (7 Nm).
5. Install relief valve assembly into pump, tighten cover (ref. item 1) to 66 ft-lbs. (90 Nm).

Note: All high pressure relief valve adjustments on size 40 and 56 to be done with a 3 mm allen wrench and a 5 mm box wrench.



High pressure relief valve with tow option used in AA4VG40 and AA4VG56

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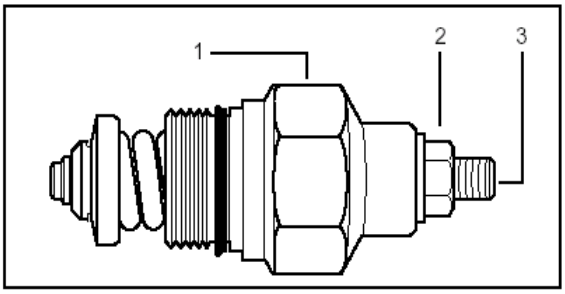
Engagement of Relief Valve Tow Option

Tow Option Engagement for AA4VG40 and AA4VG56
To actuate tow option loosen lock nut (ref. item 2). Turn tow option engagement screw (ref item 3) in six turns and tighten lock nut.

To disengage tow option loosen lock nut and turn tow option screw all the way out until it stops.

Note: Use a 4 mm allen wrench and a 13 mm box wrench to adjust.



Relief valve for AA4VG40 and AA4VG56.
1…Nut used to torque relief valve into port block.
2…Lock nut for tow option engagement.
3…Tow option engagement screw.

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FINE ADJUSTMENT

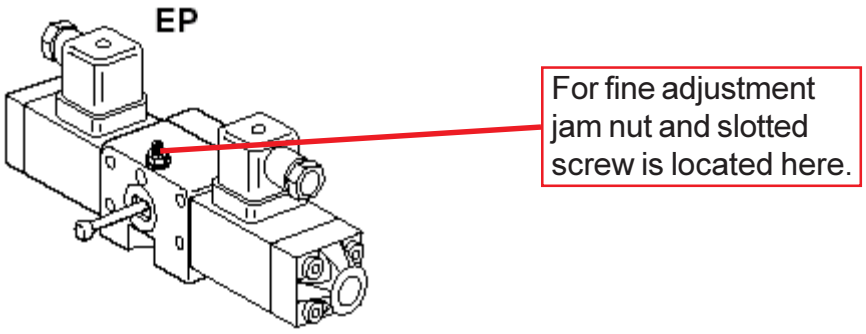
NOTE The only time fine adjustment would be made if electrical pin has been disconnected and vibrator is still slightly rolling over.

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 at this time.

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.



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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.

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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.

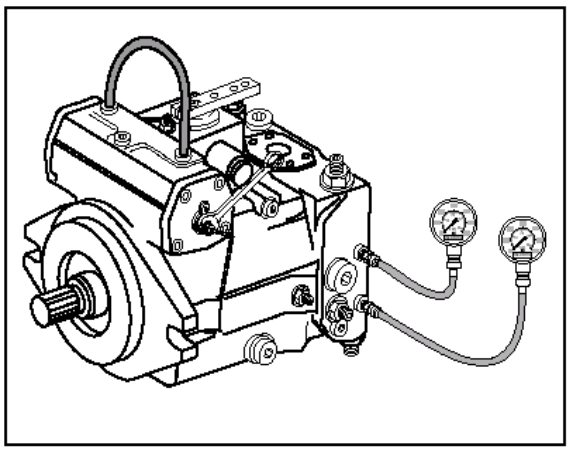
To ensure there is equal pressure on both sides of the control module during the centering operation, it is necessary to connect the X_1 and X_2 ports together by means of hose or tubing (No less than a 1/4 inch ID). The port sizes are as follows:

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 M_A and M_B, 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 M_A or M_B 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 M_A and M_B should be equal.

Tighten jam nut, stop the pump drive, remove the hose connecting ports X_1 and X_2.



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CHECKING THE OIL TEMPERATURE

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

NOTE 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 110ºF.
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 150ºF. 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.

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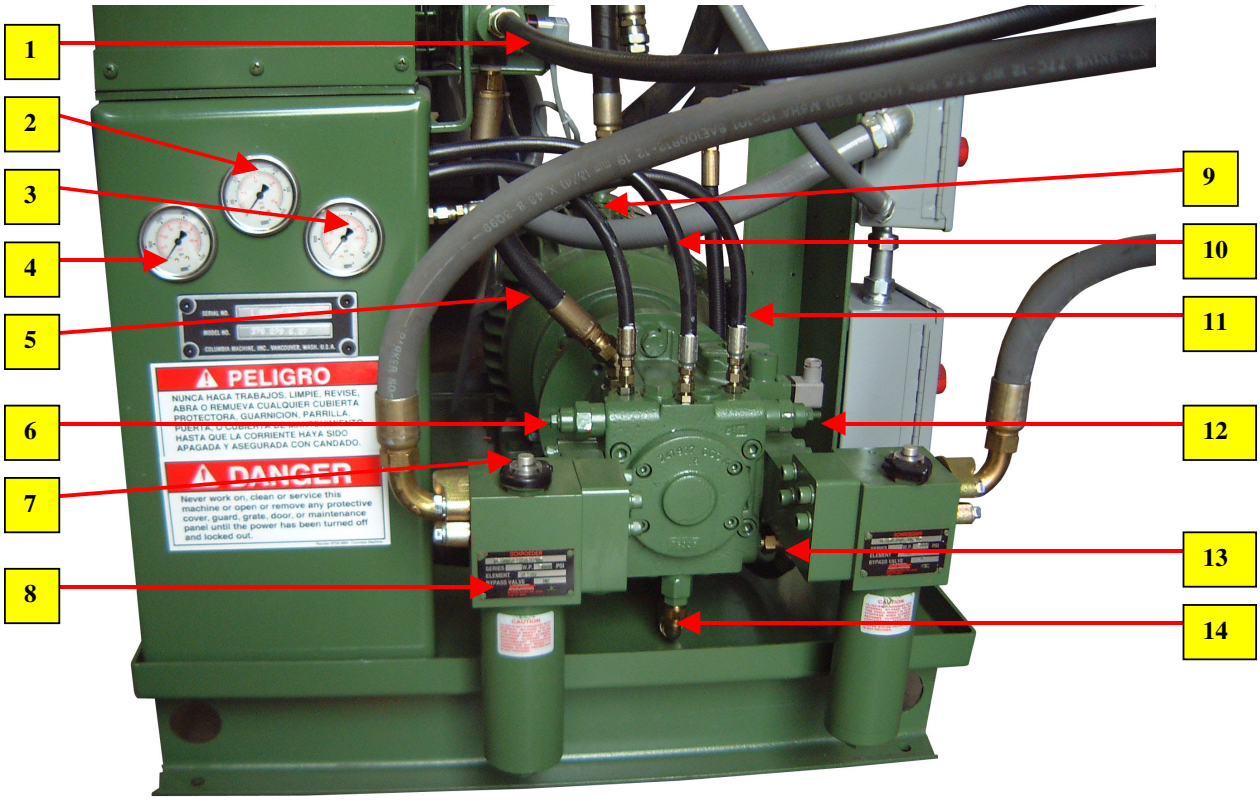
15 HP Hydrostatic Pump Unit



1)	Motor Case Drain	8)	High Pressure Filter
2)	Charge Gauge	9)	MA Decel pressure 2500 psi
3)	Acceleration Gauge	10)	Charge Pressure 350 psi
4)	Deceleration Gauge	11)	MB Accel Pressure 3500 psi
5)	Pump Case Drain	12)	Accel Relief Valve MB 3500 psi
6)	Decel Relief Valve set at 2500 psi	13)	FA Port out from charge filter
7)	Filter Indicator	14)	FE Port inlet to charge filter

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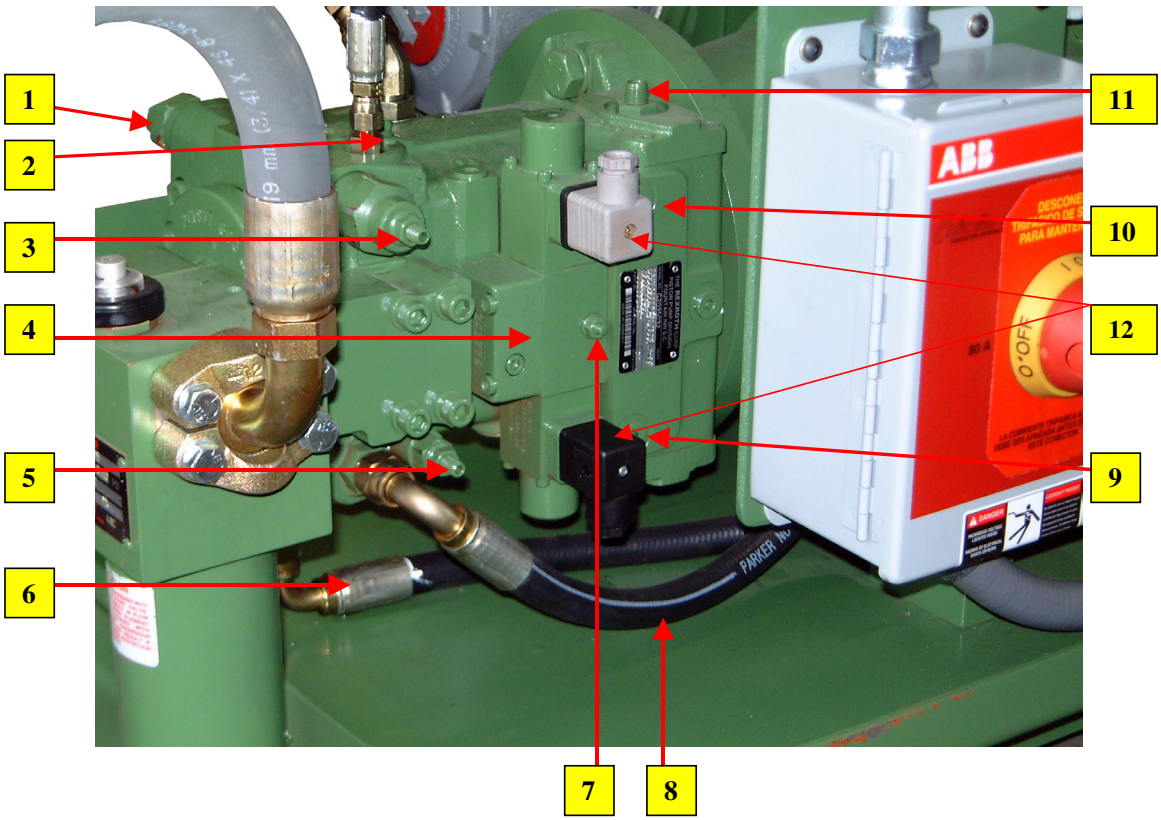
15 HP Hydrostatic Pump Unit



1)	Decel relief cartridge	7)	Null Fine Adjustment
2)	Do Not Adjust	8)	FA Port out from Charge Pump Filter
3)	Accel relief cartridge	9)	X1 Port
4)	EP Controller	10)	X2 Port
5)	P.O.R. Valve *	11)	Null Coarse Adjustment
6)	FE Port Inlet to Charge Pump Filter	12)	EP controller coils

* Turn set screw clockwise until movement stops. Turn counter-clockwise ½ turn. Lock set screw down.

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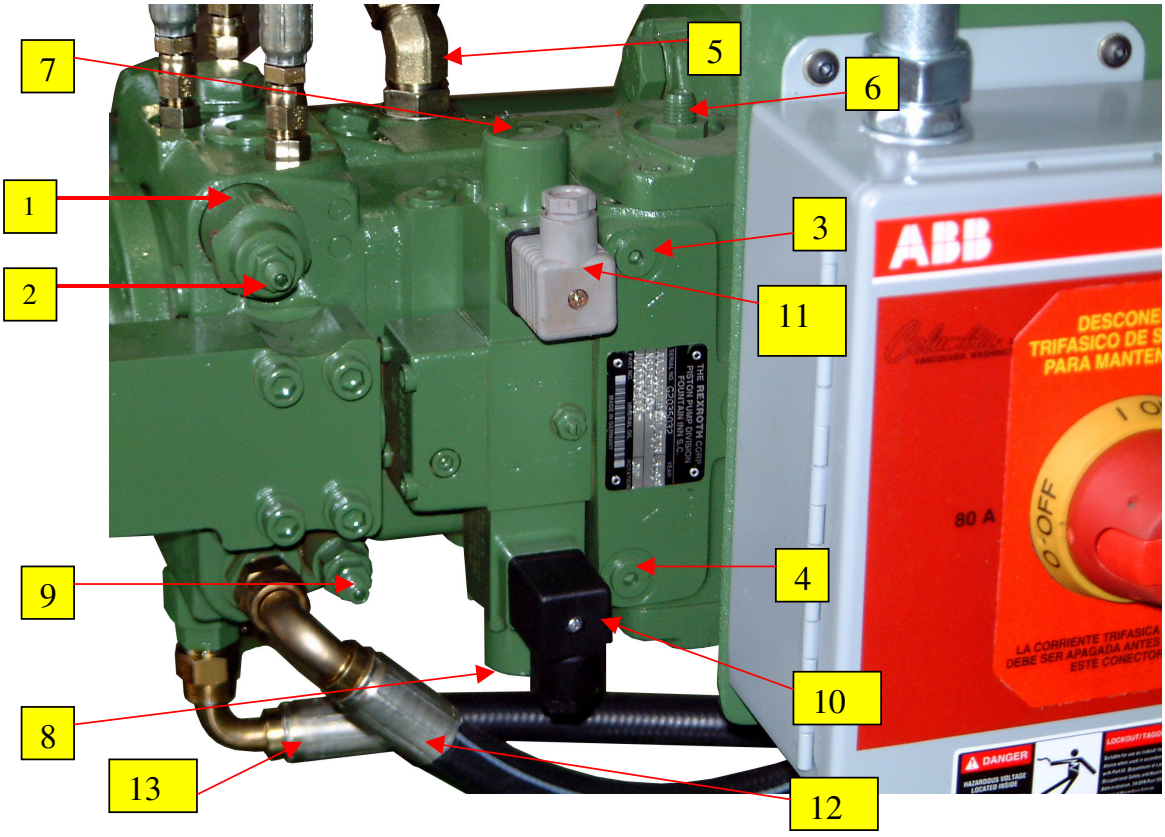
15 HP Hydrostatic Pump Unit



1) Relief Cartridge Cover Accel
2) Tow Package use
3) X2 Stroking Pressure Port *
4) X1 Stroking Pressure Port *
5) Case drain
6) Course adjustment
7) Valve detent pin deceleration side
8) Valve detent pin acceleration side
9) Pressure cutoff valve
10) Controller pin connector
11) Controller pin connector
12) FA port out from charge filter
13) FE port inlet to charge filter

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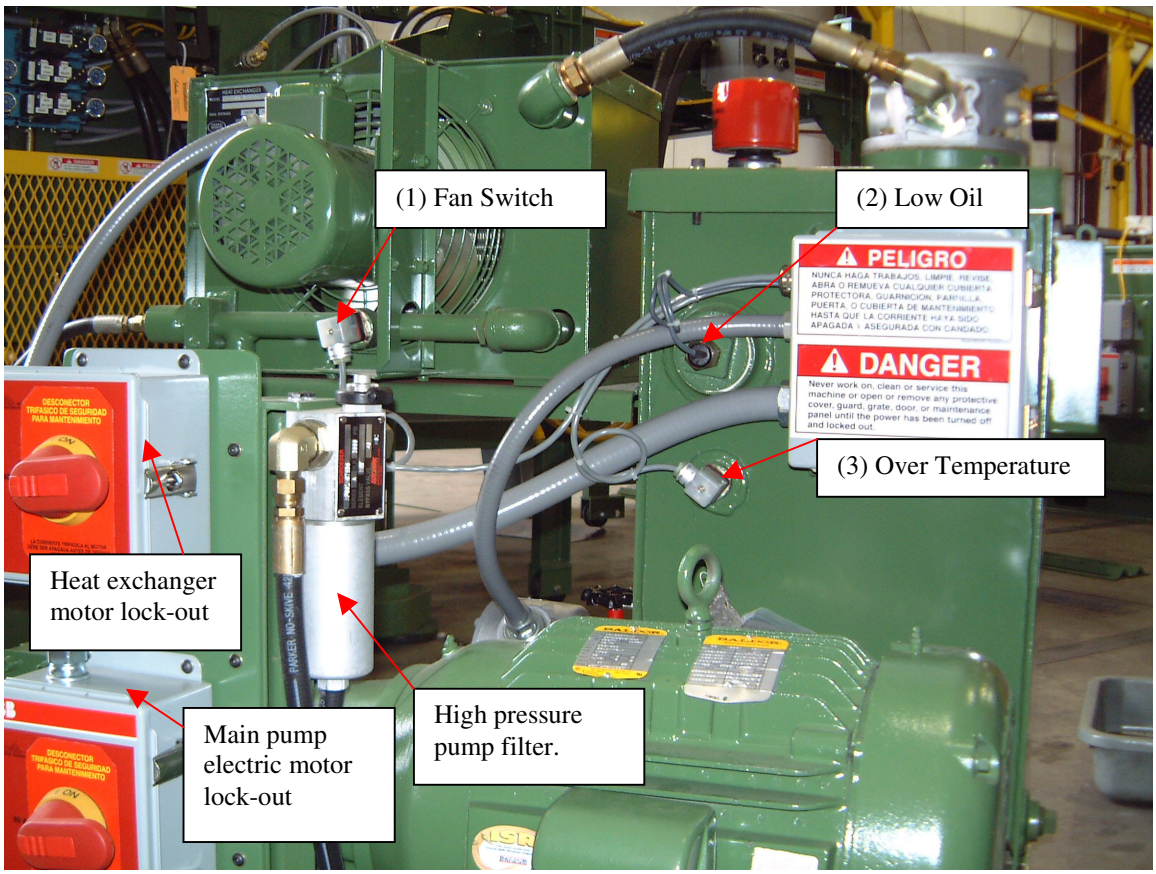
15 HP Hydrostatic Pump Unit



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

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15 HP Hydrostatic Pump Unit