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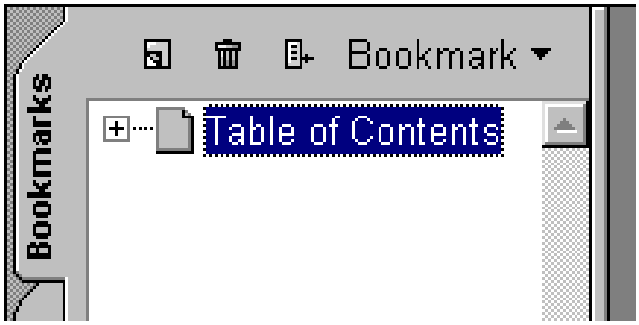

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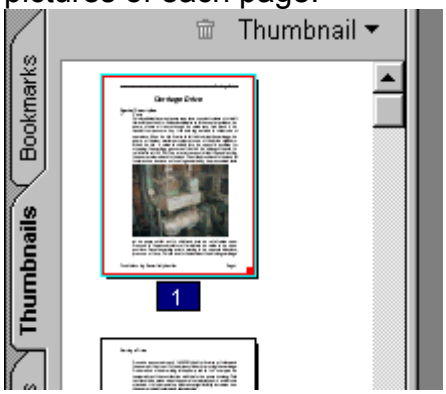

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Flaker

Symbol Description

CV1. ***Check Valve***

When the No. 8 directional valve is de-energized, the No. 1C pump volume will be directed through this check valve and back to the tank through the No. 3 cooler and No. 4 filter. The check valve will block the return flow from the disc rotator motor and locking cylinder back to the tank when the No. 8 solenoid is energized. This forces the return oil to flow through the cooler and filter before returning back to the tank.

CV2. ***Check Valve***

This check will block the No. 1C pump volume to the No. 13 and No. 14 valves when the No. 8 directional valve is de-energized. This forces the pump volume through the cooler and filter before returning back to the tank. The check valve will permit the oil that exhaust out of the motor and locking cylinder to flow back to the tank through the No. 3 cooler and No. 4 filter when changing the knives.

CV3. ***Check Valve***

The check valve will maintain oil in the lines when the hydraulics is turned off. At the same time, the check will block flow from the reservoir to the No. 12 directional valve and the rod sides of the clamping cylinders.

CV4. ***Check Valve***

If a pressure spike occurs while the logs are being cut, the cylinder rod may be momentarily retracted. The pressurized fluid in the full piston side of the cylinder will dump through the No. 2A relief valve. At the same time a vacuum will be created on the cylinder rod side. Oil will free flow from the tank, through the check valve and into the rod side of the cylinder. This is necessary to prevent cavitation of the cylinder. If the check were not used, air would be pulled out of the oil when the cylinder rod was forced back by the shock spike. The check is located in a block underneath the servo valve.

CV5. ***Check Valves***

The specific valve permits free flow from the outlet of the flow divider to the inlet of the No. 2B relief valve. At the same time, the check will block oil flow in the opposite direction.

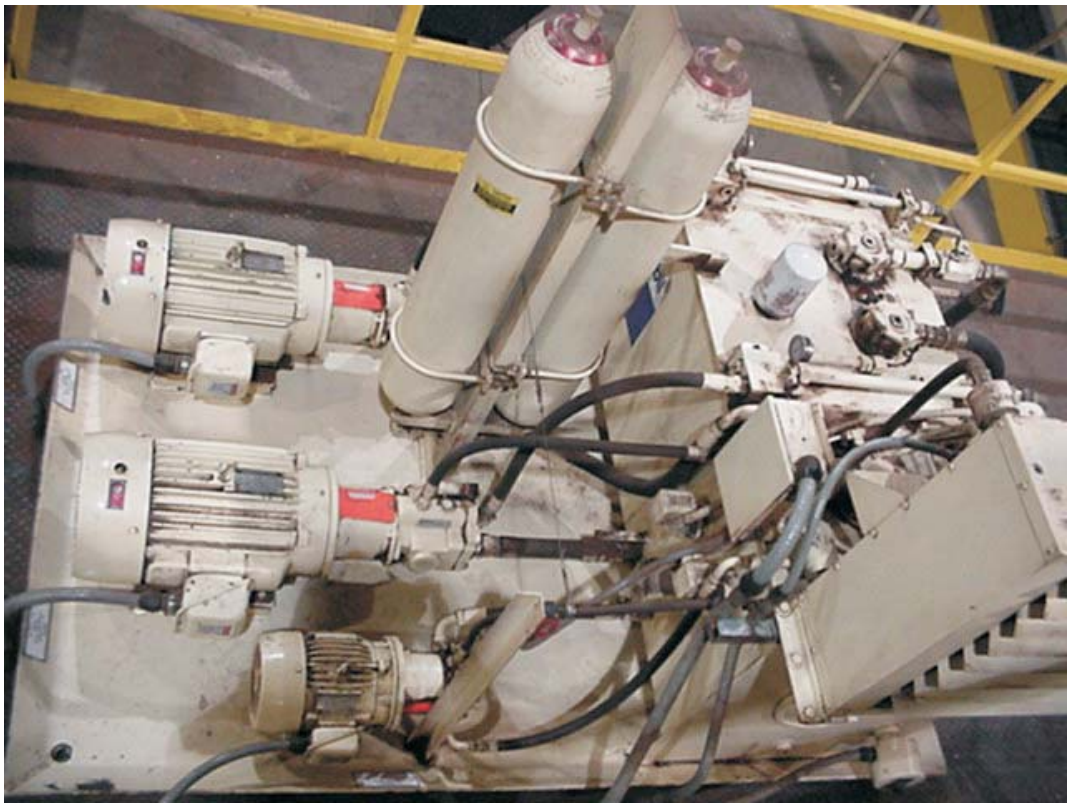
PS1. ***Pressure Switch***

On initial start up, the No. 10 valve shifts open. Oil is directed through the fixed orifice and to the P port of the servo valve. Pressure will gradually build up because the orifice size is very small. When the pressure builds to the pressure switch setting (approximately 500 PSI) valve No. 10 de-energizes and valve No. 11 energizes. Shock is prevented to the servo valve by starting the system in this sequence.

PS2. ***Pressure Switch***

The switch is used to indicate an overload or jammed condition. Although no specific information was given as to the switch function, it may turn the pump drive motor off when actuated.

1A. ***Pump***



29 GPM, variable displacement, pressure compensating, externally drained, piston pump. This pump supplies oil to drive the positioner. The pump will deliver maximum volume until the setting of the pressure compensator is reached. The recommended setting of the valve is 1500 PSI. The pump will then supply only the volume required by the system. The compensator setting determines the maximum system pressure. The flow out of the case drain line should be approximately 1/3 – 1 GPM when the pump is good.

1B. ***Pump***

29 GPM, variable displacement, pressure compensating, externally drained, piston pump. This pump supplies oil to raise the flaker clamps. The pump will deliver maximum volume when the system pressure is below the compensator setting. If the system calls for less than maximum volume, the pressure will build to the compensator setting. The recommended setting of the valve is 1500 PSI. The pump volume will then be reduced to only what the system requires. The compensator should be set 200 PSI above the maximum operating pressure. The maximum operating pressure can be found by opening any flow controls (as long as damage will not occur to the system) and observing the system pressure gauge.

The flow out of the case drain line can be checked if the pump is thought to be worn. Normal bypassing should be 1% to 3% of the maximum pump volume. On this pump the flow rate should be approximately 1/3 - 1 GPM. The case drain flow should be checked when the system pressure is at maximum.

1C. ***Pump***

8 GPM, variable displacement, pressure compensating, externally drained, piston pump. The pump re-circulates oil through the cooler and filter while the flaker is running. The volume is also used to lock and rotate the disc when changing knives. The pump will deliver maximum volume when the system pressure is below the compensator setting. If the system calls for less than maximum volume, the pressure will build to the compensator setting. The pump volume will then be reduced to only what the system requires. The

compensator should be set 200 PSI above the maximum operating pressure. The recommended setting is 750 PSI. The maximum operating pressure can be found by opening any flow controls (as long as damage will not occur to the system) and observing the system pressure gauge. The recommended compensator setting is 750 PSI.

2. ***Relief Valve***

The valve is used as an extreme safety device in this system. When the system directional valves are de-energized, a momentary pressure spike will occur. This relief will momentarily open and absorb the spike. In the event the pump compensator fails closed, the pump will deliver maximum volume at all times. In this case, when the oil is not being used in the system, the excess flow will return to tank through this relief. Heat will be created when this occurs. A good troubleshooting check to make is to feel the tank line of the relief valve. It should be cool at all times. If severe heat is felt then either the compensator has failed, the system is misadjusted, or the spool is stuck partially open. Proper setting of this relief is 250 PSI above the pump compensator setting.

2A. ***Relief Valve***

If a pressure spike occurs while the logs are being cut, the cylinder rod may be momentarily retracted. The pressurized fluid in the full piston side of the cylinder will dump through the No. 2A relief valve. If the relief were not used, air would be pulled out of the oil when the cylinder rod was forced back by the shock spike. The relief is located in a block underneath the servo valve.

2B. ***Relief Valve***

If one cylinder extends slightly before the other, pressure will build in the extended cylinder. Once the pressure builds to the relief setting (1750 PSI), the oil that is ported to the extended cylinder flows through the relief valve and back to tank. This allows the gears in the flow divider to continue rotating and port oil to the other cylinder.

3. ***Heat Exchanger***

The heat exchanger cools the fluid supplied by the disc rotator hydraulic pump. The pump constantly re-circulates 8 GPM through the cooler while the flaker is operating.

4. ***Filter***

The element continuously filters the oil supplied by the 8 GPM disc rotator pump. If the element becomes contaminated, the pressure switch will actuate, indicating the condition. If the element is not changed and the pressure at the inlet builds to the check valve spring rating, the oil will bypass the filter.

5. ***Return Filter***

The element filters the oil the exhaust out of the servo valve tank port. If the element becomes contaminated, a gauge will indicate the condition. If the pressure at the inlet port builds to the check valve spring rating, the oil will bypass the element.

5A. ***Filter***

There are two filter elements in the assembly. If the elements become contaminated and the inlet pressure reaches the internal check valve spring pressure, the oil will bypass the filter.

6. ***Pilot Operated Check Valve***

The valve is used as an automatic accumulator dump valve in this circuit. When the pump is first started, pilot pressure will shift the check valve to the closed position. After the pump is turned off, pressure in the pilot line will belled down through the clearances in the pump. The pressurized fluid in the accumulator will then discharge through the valve and back to tank. The pressure gauge should be checked to verify that the valve is opening prior to working on or around the machine. The valve is located on the same block as the air bleed, check and relief valves.

7. ***Air Bleed Valve***

The valve automatically bleeds any air in the pump on initial start up back to tank. Once the pressure builds to the spring setting (approximately 12 PSI) the valve will shift closed for the remainder of the machine cycle. The valve is located in the same block as the accumulator dump, check and relief valves.

8. ***Directional Valve***

When the flaker is operating, the valve is de-energized. The No.1C pump flow is ported through the valve and to the cooler and filter. When changing the flaker knives the solenoid is energized. The valve spool then shifts into the B position, porting oil to the No. 13 and No. 14 directional valves. No. 8 is a two position, four way, single solenoid, spring return, directional valve.

9. ***Accumulator***

Dry nitrogen pre-charged accumulator that is used to supply additional oil flow to the positioner at a high flow rate. The recommended pre-charge is 1000 PSI. The accumulator has a 10-gallon gas capacity. The accumulator should be warmer in the lower half of the shell when operating properly.

9A.

9B. ***Accumulator***

10-gallon, dry nitrogen pre-charged accumulator that is used to supply oil at a high flow rate to the clamp cylinders when the No. 12 directional valve is energized. The recommended nitrogen pre-charge is 1000 PSI when the compensator is set for 1500 PSI.

10. ***Directional Valve***

The solenoid is energized when in the initial start up cycle. Flow from the pump is ported through the valve, then through the fixed orifice, and to the servo valve P port. Shock is prevented to the servo valve by gradually allowing the pressure to build up. When the PS1 switch setting is reached, the No. 10 valve de-energizes and the No. 11

valve energizes. No. 10 is a normally closed, two position, two way, single solenoid, spring return, directional valve.

11. ***Directional Valve***
Once the PS1 pressure switch actuates, the No. 10 valve de-energizes and the No. 11 solenoid energizes. Flow from the pump is then directed to the P port of the servo valve. The valve remains in the “open” condition for the remainder of the machine cycle. The valve is a normally closed, two position, two way, single solenoid, hydraulic piloted, externally drained, directional valve.

12. ***Directional Valve***
Flow is blocked through the valve when both solenoids are de-energized. The A solenoid is energized to direct internal pilot pressure to hydraulically shift the main spool into the A position. The flow from the pump and accumulators are then ported to the full piston side of the cylinders for raising the clamps. Energizing the B solenoid directs pilot pressure to shift the main spool into the B position. Flow from the pump is blocked through the valve since the B port is plugged. Oil in the full piston side of the cylinders is ported through the A to T ports and back to the tank. No. 12 is a closed center, three position, four way (with the B port plugged), solenoid controlled, hydraulic piloted, spring centered, directional valve.

13. ***Directional Valve***
Flow is blocked through the valve when both solenoids are de-energized. The A or B solenoid is energized to shift the valve spool to direct fluid to the disc rotator hydraulic motor. No. 13 is a closed center, three position, four way, double solenoid, spring centered, directional valve.

14. ***Directional Valve***
The valve has a tandem center which directs oil from the P port back to tank when both solenoids are de-energized. This position is used so that the motor cannot be rotated unless the valve is shifted. The A solenoid is energized to extend the cylinder, the B solenoid energizes

to direct oil to retract the cylinder. No. 14 is a tandem center, three position, four way, double solenoid, spring centered, directional valve.

15. ***Crossport Relief Valves***

The valves perform two functions in the system. 1.) When the No. 4 directional valve is initially energized to drive the motor, an initial pressure spike will occur. The valve in the high pressure line will momentarily open and dump the spike back to tank. 2.) When the valve is de-energized after rotating the motor, the disc will tend to continue driving the motor shaft. The valve in the motor outlet line will open once the pressure setting is reached. The oil flows through the valve and back to the motor inlet as the motor is braking to a stop. Both valves are located in the same block and are set at 1000 PSI.

16. ***Needle Valve***

The setting of the valve determines the speed of the motor in both directions. The valve will meter the oil in to the motor in one direction and meter it out in the opposite direction.

16A. ***Needle Valve***

The valve controls the speed of the cylinder in both directions. The valve will meter the oil in to the cylinder when extending the rod and meter the oil out when retracting.

17. ***Filter Assembly***

3-micron, non-bypassing pressure filter that filters the fluid prior to the drive cylinder servo valve. The check valves are located in the filter assembly. The check downstream of the filter prevents reverse flow through the element. The other check permits pressure from the servo valve to return to tank through the No. 6 dump valve when the system is turned off.

18. ***Servo Valve***

The valve operates off of a positive and negative DC voltage. The voltage is usually 10 volts or less. A positive signal is normally used

to shift the valve spool into the A position. The amount the spool shifts is directly proportional to the strength of the applied voltage. A negative voltage will shift the valve spool proportionally into the B position. The voltage to the valve will be controlled as necessary to maintain the flaker disc at the desired speed.

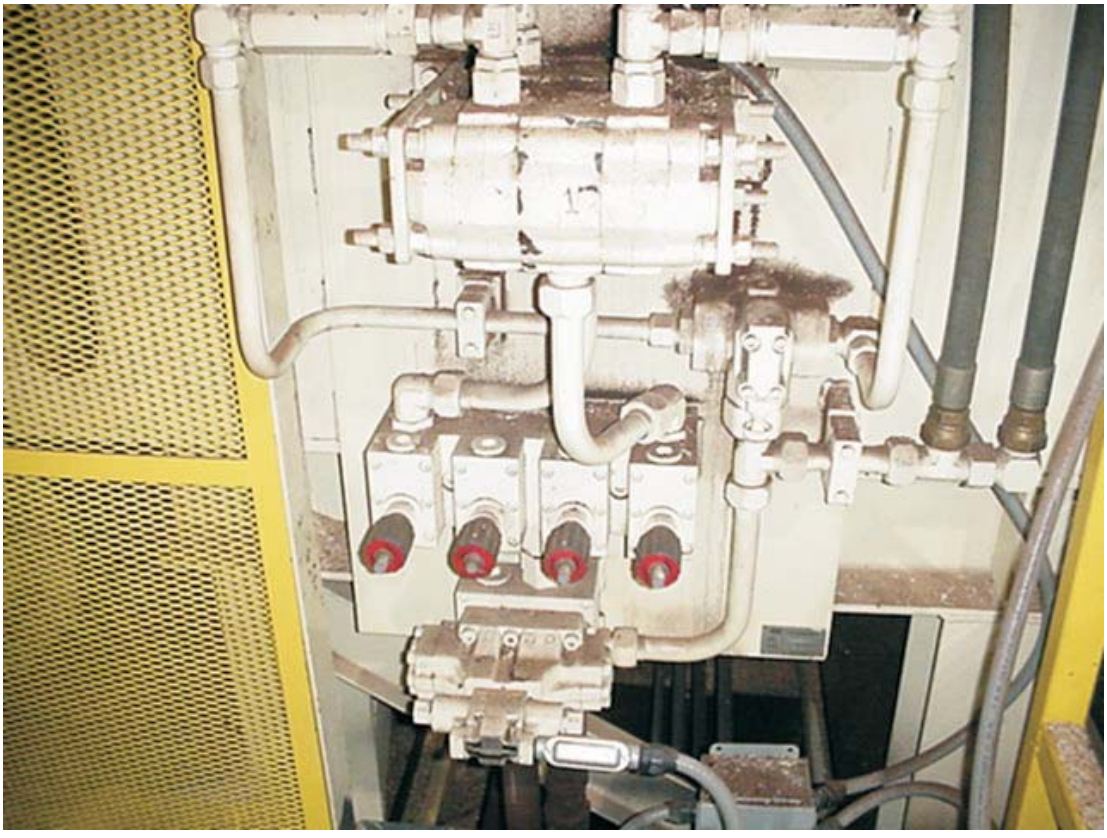
19. ***Flow Control***

The valve setting determines the rate that the cylinders extend and raise the clamps. The valve is connected in a meter-in arrangement. Oil will free flow through the internal check valve when the cylinders are lowering.

20. ***Flow Control***

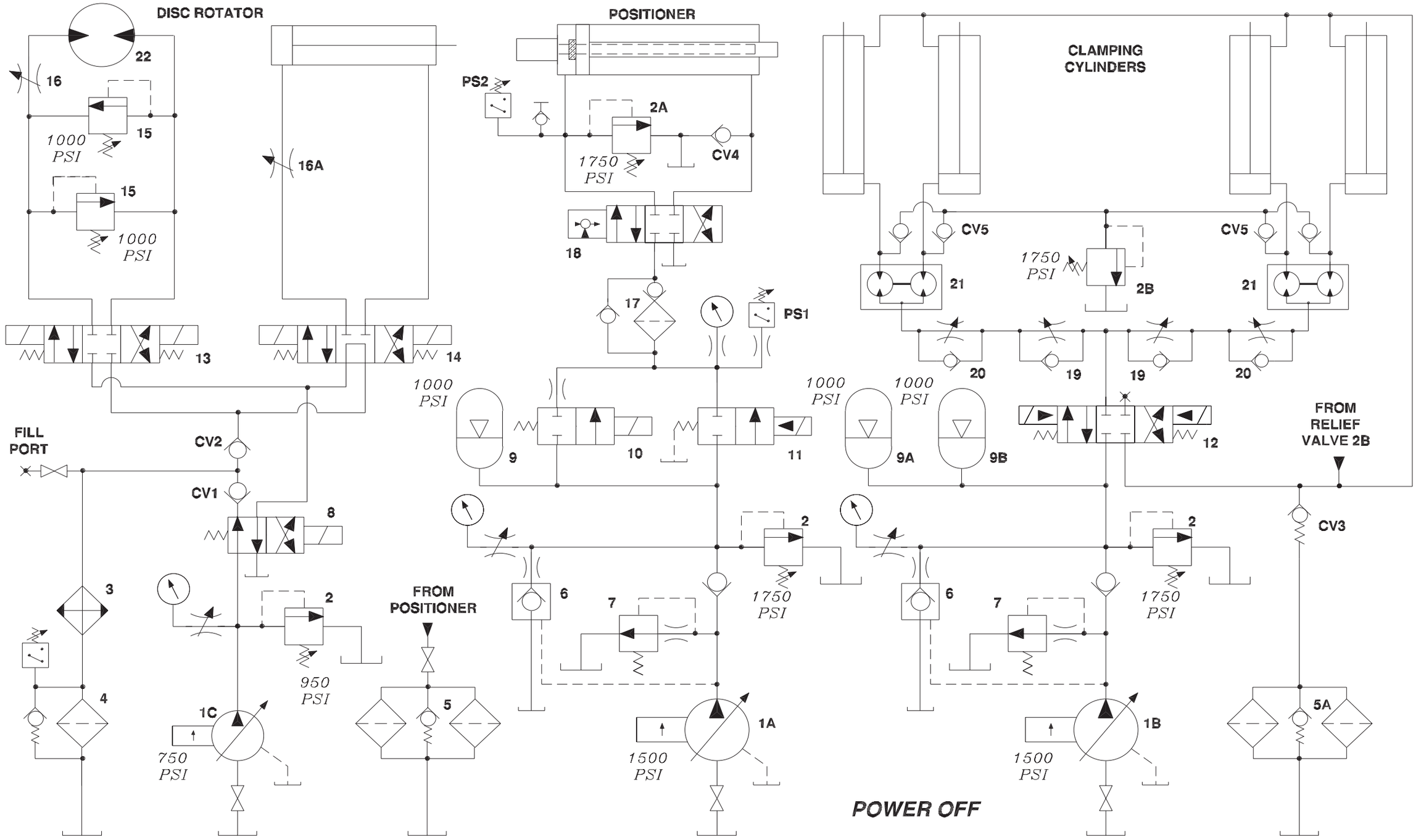
The valve setting controls the lowering speed of the clamps. The valve is connected in a meter-out arrangement. Oil will free flow through the internal check valve when raising the clamps.

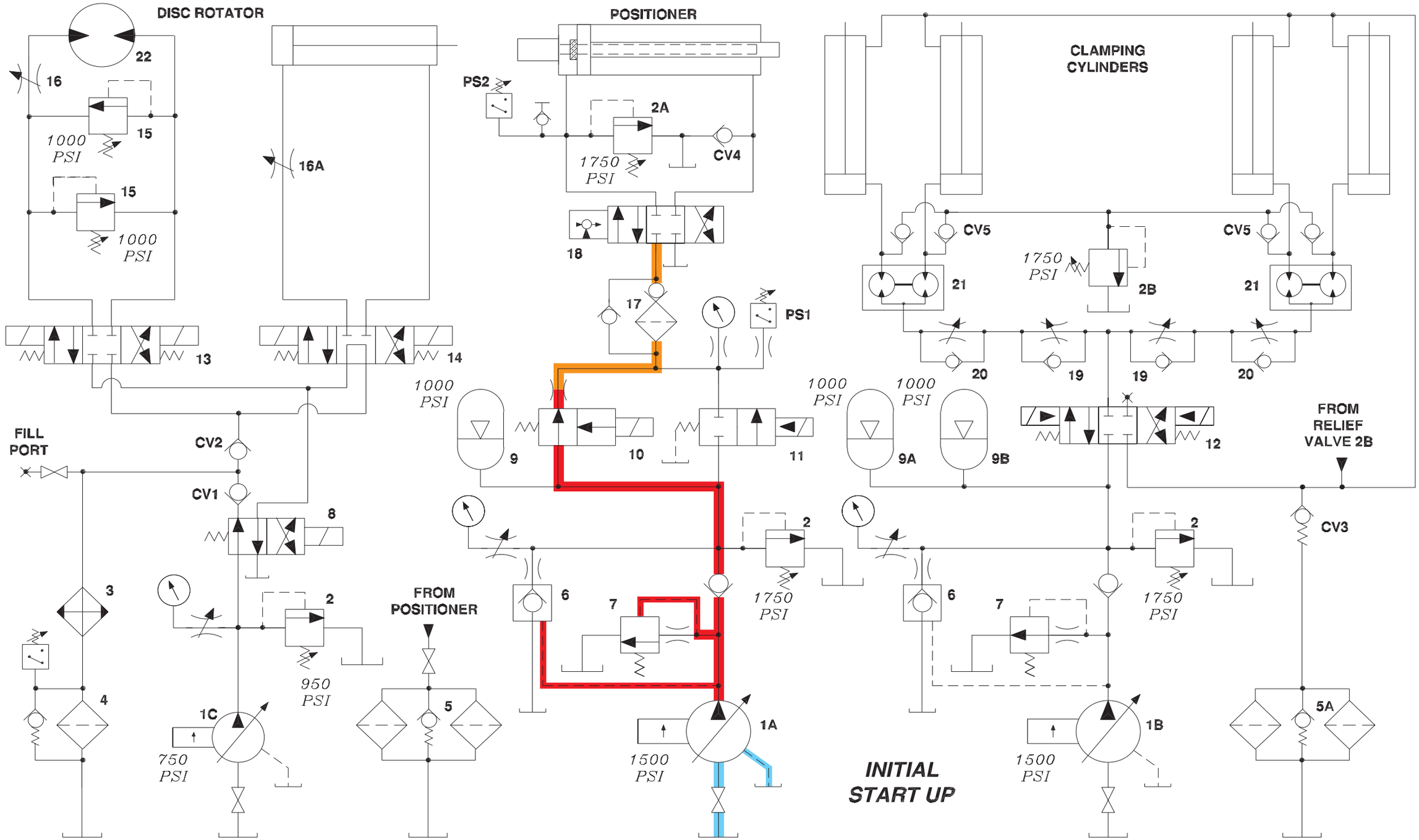
21. ***Flow Divider***



The divider splits the inlet oil equally to each outlet port. This provides for an equal raise speed of the clamps.

22. ***Hydraulic Motor***
Bi-directional, internally drained motor that rotates the disc in both directions.


DISC ROTATOR
POSITIONER
CLAMPING CYLINDERS
22
16
15
1000 PSI
15
1000 PSI
16A
PS2
2A
1750 PSI
CV4
18
17
PS1
CV5
21
1750 PSI
2B
CV5
21
13
14
20
19
19
20
1000 PSI
1000 PSI
1000 PSI
9
10
11
9A
9B
12
FROM RELIEF VALVE 2B
FILL PORT
CV2
CV1
8
2
2
2
CV3
3
FROM POSITIONER
6
7
1750 PSI
6
7
1750 PSI
4
950 PSI
1C
5
1A
1B
5A
750 PSI
1500 PSI
1500 PSI
POWER OFF


DISC ROTATOR
POSITIONER
CLAMPING CYLINDERS
22
16
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1000 PSI
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1000 PSI
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PS2
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1750 PSI
CV4
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17
PS1
CV5
21
1750 PSI
2B
CV5
21
13
14
1000 PSI
1000 PSI
1000 PSI
20
19
19
20
FILL PORT
CV2
CV1
8
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10
11
9A
9B
12
FROM RELIEF VALVE 2B
3
2
FROM POSITIONER
2
CV3
6
7
1750 PSI
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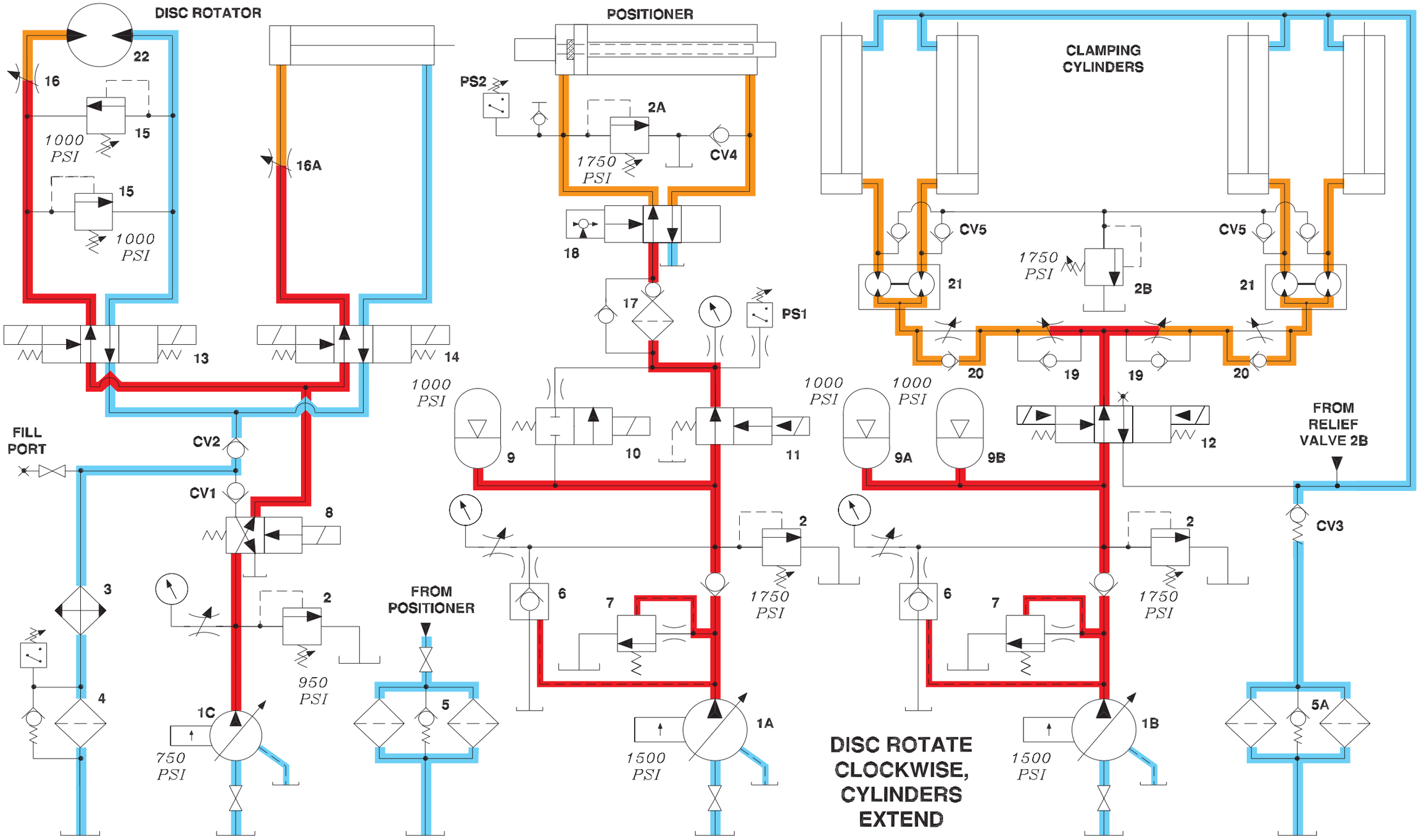
4
1C
950 PSI
5
1A
1500 PSI
1B
1500 PSI
5A
750 PSI
INITIAL START UP


DISC ROTATOR
POSITIONER
CLAMPING CYLINDERS
22
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15
1000 PSI
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1000 PSI
16A
PS2
2A
1750 PSI
CV4
18
17
PS1
CV5
21
1750 PSI
2B
CV5
21
20
19
19
20
1000 PSI
1000 PSI
1000 PSI
9
10
11
9A
9B
12
FROM RELIEF VALVE 2B
13
14
FILL PORT
CV2
CV1
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CV3
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2
FROM POSITIONER
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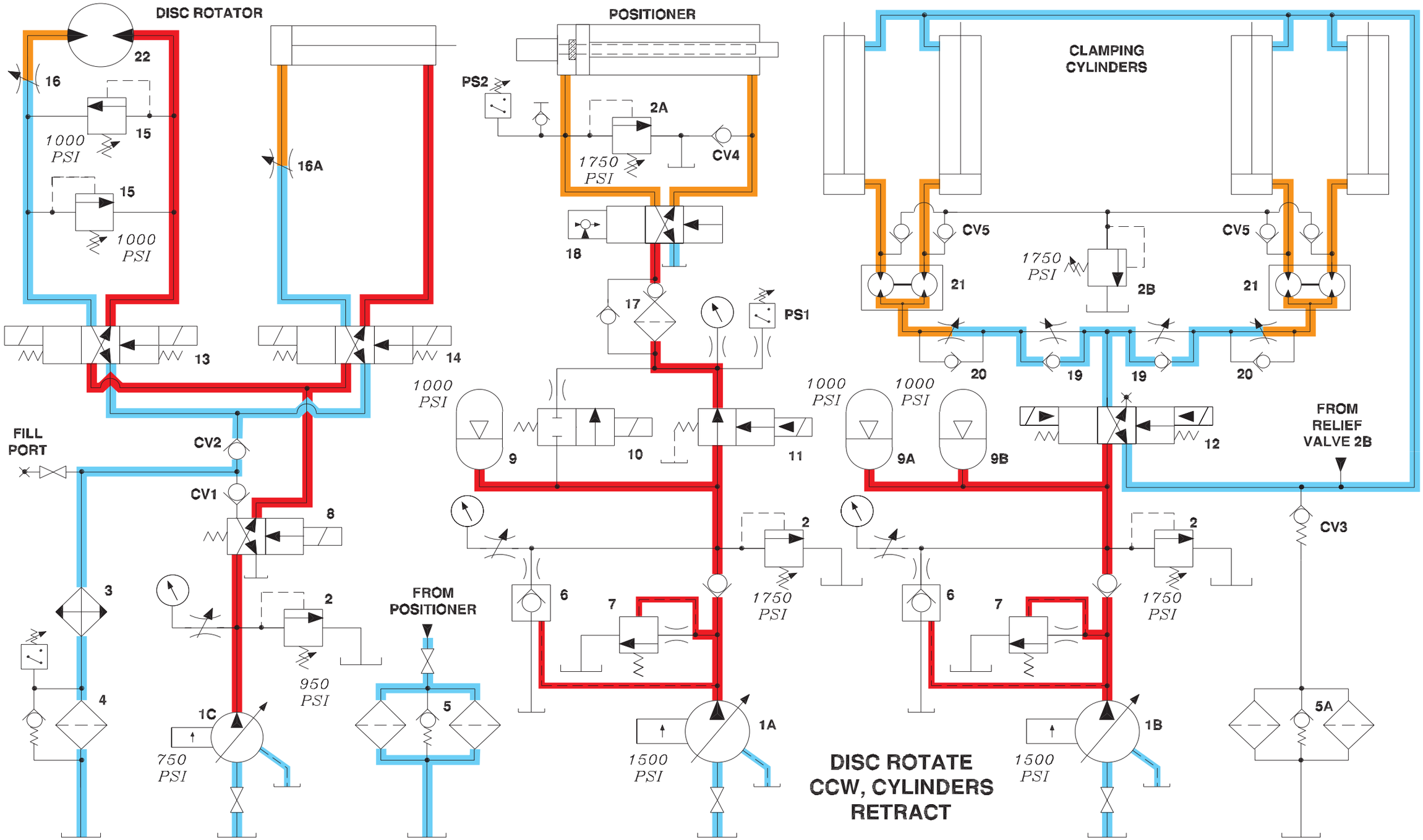
7
4
950 PSI
1750 PSI
1750 PSI
5
1C
1A
1B
5A
750 PSI
1500 PSI
1500 PSI
DISC ROTATE CLOCKWISE, CYLINDERS EXTEND


DISC ROTATOR
POSITIONER
CLAMPING CYLINDERS
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1000 PSI
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1000 PSI
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2A
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CV4
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PS1
CV5
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1750 PSI
2B
CV5
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1000 PSI
1000 PSI
FILL PORT
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FROM RELIEF VALVE 2B
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1750 PSI
1750 PSI
FROM POSITIONER
4
1C
950 PSI
5
1A
1B
5A
750 PSI
1500 PSI
1500 PSI
DISC ROTATE CCW, CYLINDERS RETRACT