

HYDRAULICS

Hydraulics Section

Hydraulic Equipment Layout

Function List

Negative Control Circuits

- 1.Negative Control Circuit (power save solenoid OFF)
- 2.Negative Control Circuit (bucket close, power save solenoid OFF)

Travel Circuits

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- 3.Straight Travel Circuit.
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- 2.Boom-Up Circuit (compound boom-up + arm-in)
- 3.Boom Down Regenerative Circuit.
- 4.Boom Down Tilting Prevention Circuit
- 5.Boom Down Load Hold Valve Circuit

Arm Circuits

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Auto Power Boost Circuit (bucket close)

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- 1.Swing Parking Circuit (machine stop).
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- 5.Swing Brake Circuit.
- 6.Swing Parking Circuit (lever in neutral)
- 7.Swing Parking Circuit (brake release).

Option Circuits

- 1.Breaker Circuit (single operation)
- 2.Shuttle Circuit (hydraulic fork).
- 3.Combined Circuit
 - (1) Breaker Q control
 - (2) 2nd confluence crusher
- 4.Second Option Circuit (hydraulic rotation fork)

Hydraulic Components

Pump

- 1.Hydraulic Pump.
- 2.Regulator.
- 3.Gear Pump.

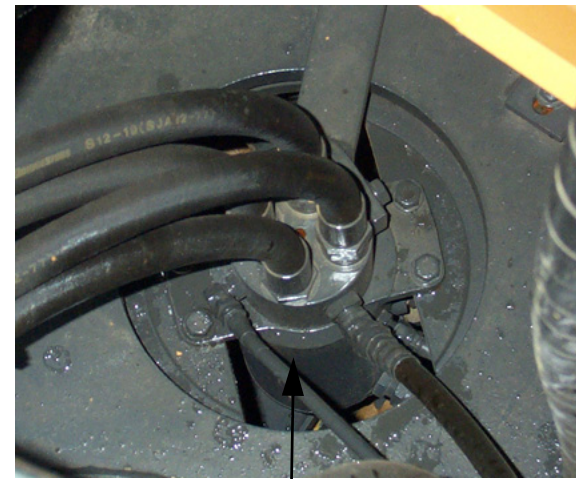
Motor

- 1.Travel Motor.
- 2.Swing Motor

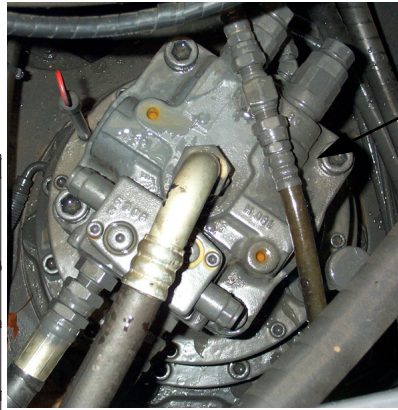
Valve

- 1.Control Valve.
- 2.5-way Solenoid Valve Operation Explanation
- 3.Upper Side Pilot Valve (remote control valve)
- 4.Travel Pilot Valve (remote control valve)
- 5.Cushion Valve
- 7.Selector Valve (3-way)

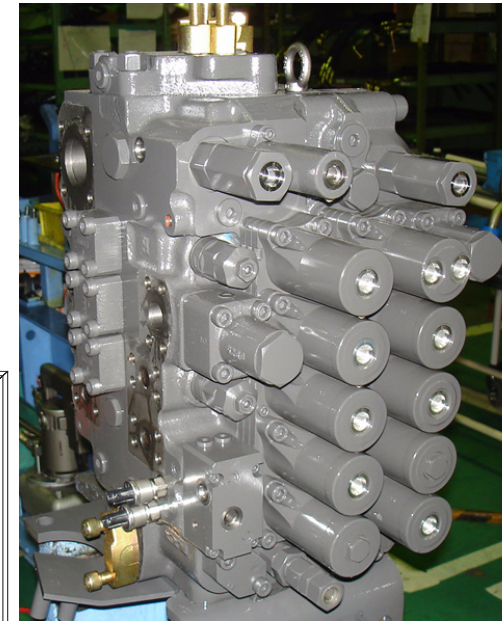
Hydraulic components layout



Swivel



Swing motor



Main control valve



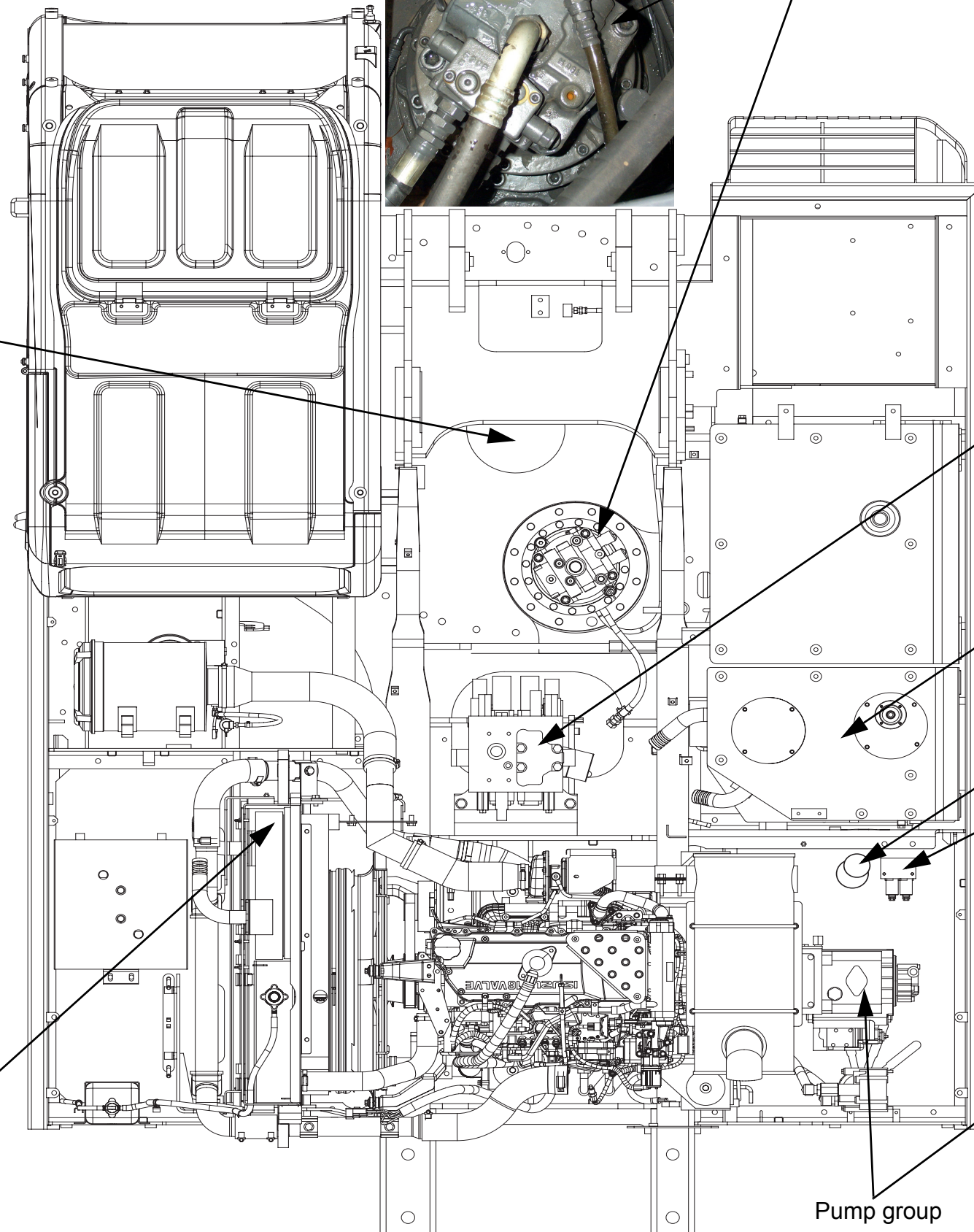
Hydraulic tank

Pilot pressure manifold

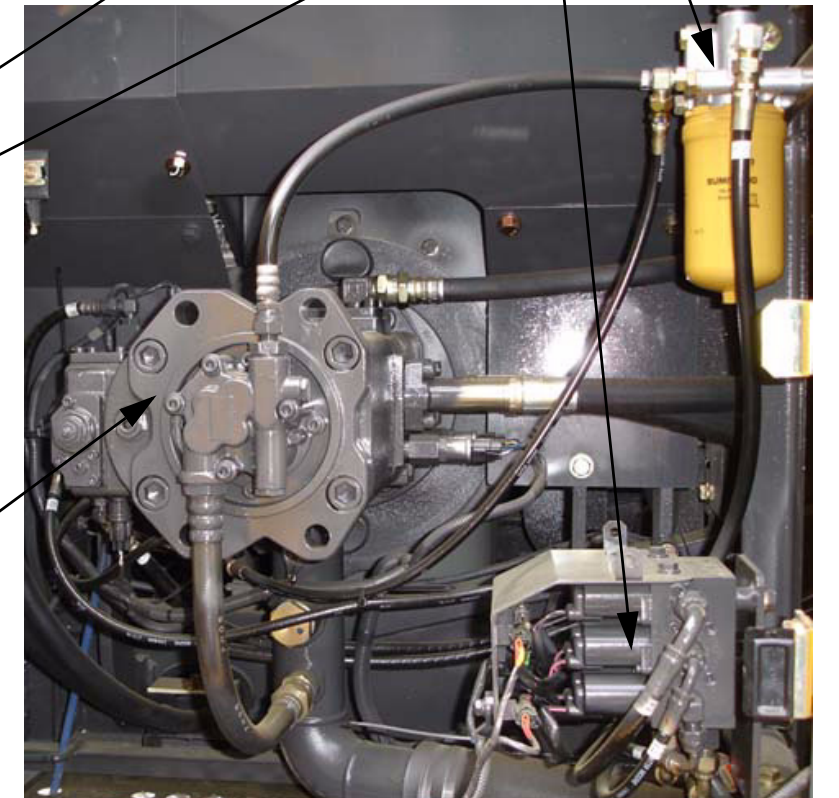
5 solenoids block



Hydraulic oil cooler



Pump group



Negative control circuits

Negative Control Circuit:

For no load operation, this circuit sets the hydraulic pump discharge quantity to minimum to reduce horsepower consumption.

Negative Control Circuit (power save solenoid OFF)

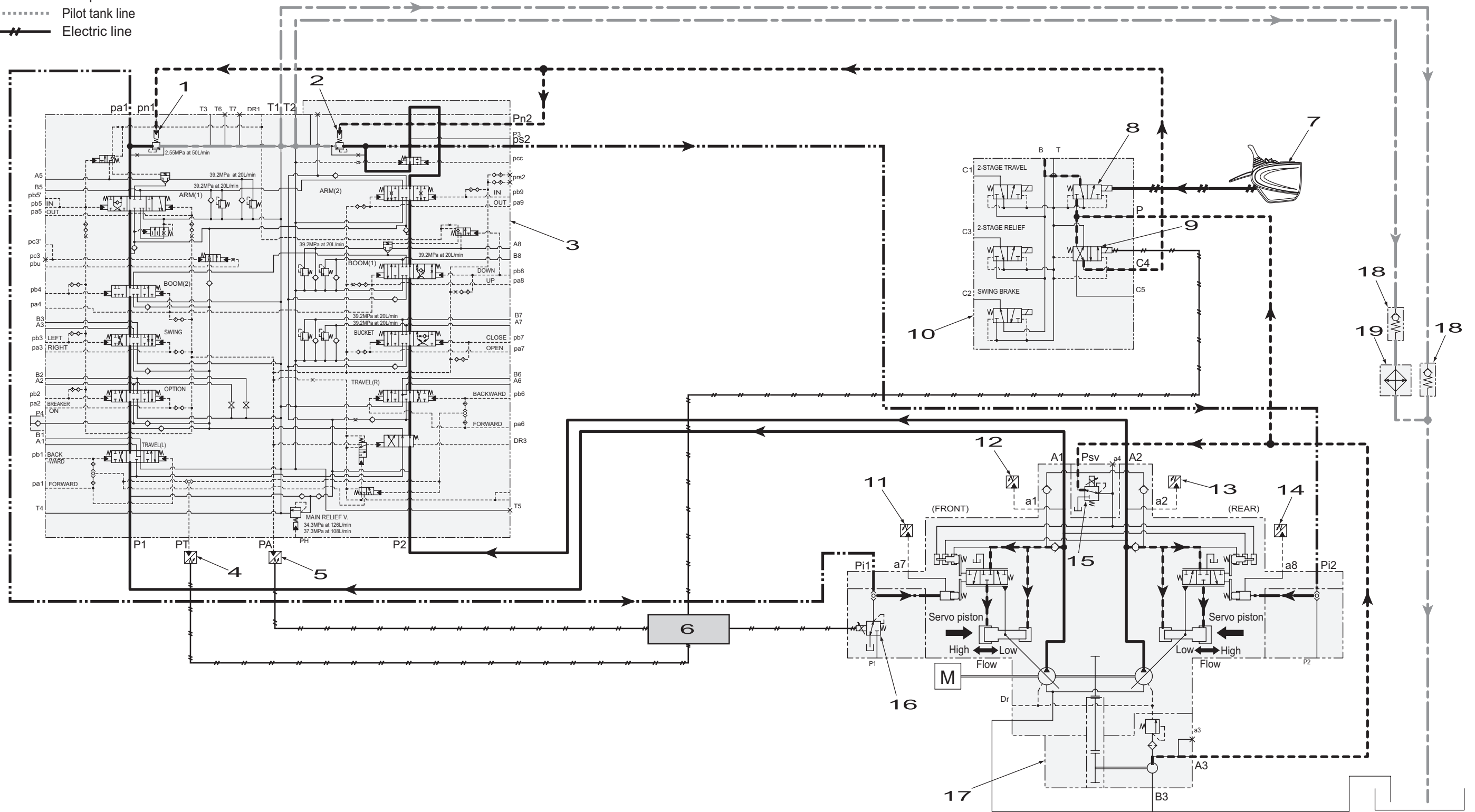
When the remote control valve operation lever is set to neutral, the discharged oil from hydraulic pumps A1 and A2 goes from the control valve P1 and P2 ports through the center bypass passage, and through the most downstream negative control variable relief valve, and returns to the hydraulic oil tank.

The discharged oil from hydraulic pump A3 enters the 5-stack solenoid valve P port, flows through the power save solenoid valve, is fed to the control valve Pn1 and Pn2 ports, and holds the P1 and P2 negative control relief valves at the set pressure of 2.55 MPa.

The negative control pressure oil separated from the center bypass passage is fed from the Ps1 and Ps2 ports to the hydraulic pump P11 and Pi2 ports, moves the pump tilt revolution to the low flow side, and reduces the discharge flow.

1	P1 negative control relief	11	N1 negative control pressure sensor
2	P2 negative control relief	12	P1 pressure sensor
3	Control valve	13	P2 pressure sensor
4	Travel pilot pressure sensor	14	N2 negative control pressure sensor
5	Upper side pilot pressure sensor	15	Horsepower control proportional valve
6	Computer A	16	P1 flow control proportional valve
7	Console lever lock switch	17	Hydraulic pump
8	Lever lock	18	Check
9	Power save	19	Oil cooler
10	5-stack solenoid valve		

- Pressure line
- - - Tank line
- · — Negative control line
- · - · Pilot pressure line
- · · · · Pilot tank line
- // — Electric line



RST-04-04-001u

Negative Control Circuit

Negative Control Power Save Circuit (power save solenoid ON):

The purpose of this control is to reduce fuel consumption during standby by reducing the back pressure for the negative control signal.

When the remote control valve is set to neutral, the non-operation state signal enters the computer A from the upper side pilot pressure sensor and the travel pilot pressure sensor installed on the control valve PT port and PA port.

After about one second, the power save solenoid valve is switched ON by the signal output from the computer A.

The pressurized oil from the control valve negative control relief valve Pn1 and Pn2 ports goes through the power save solenoid valve and returns to the hydraulic oil tank.

Therefore, the negative control relief valve set pressure is switched to low pressure to further reduce the A1 and A2 pump discharge pressure.

With the system running this way, the negative control signal is cut off and the P1 and P2 pump discharged volume quantity increases.

The discharged oil from pilot pump A3 enters the 5-stack solenoid valve P port, flows through the power save solenoid valve, is fed to the hydraulic pump P2 port from the C5 port, moves the pump tilt revolution to the minimum flow side, and reduces the discharge flow.

At the same time, the discharged oil from the A3 pilot pump is fed to the hydraulic pump P1 port by the signal from the computer A to the hydraulic pump P1 flow restriction proportional valve, moves the A1 side pump tilt revolution to the minimum flow side, and reduces the discharge flow.

1	Control valve	10	P1 pressure sensor
2	Travel pilot pressure sensor	11	P2 pressure sensor
3	Upper side pilot pressure sensor	12	N2 negative control pressure sensor
4	Computer A	13	Horsepower control proportional valve
5	Console lever lock switch	14	P1 flow control proportional valve
6	Lever lock	15	Hydraulic pump
7	Power save	16	Check
8	5-stack solenoid valve	17	Oil cooler
9	N1 negative control pressure sensor		

Negative Control Circuit

Negative Control Circuit (bucket close, power save solenoid OFF):

As an example, this section explains the bucket close operations.

By moving the remote control valve to the bucket close side, the pilot pressure oil is fed via the cushion valve to the control valve Pb7 port and switches the bucket spool to the close side.

The discharged oil from the hydraulic pump A2 enters the control valve P2 port, is fed to the bucket spool, flows into the bucket cylinder bottom side because of the spool switching and carries out the bucket close operation.

At the same time, the upper side pilot pressure sensor signal is detected and through the signal output from the computer A to switch OFF the power save solenoid valve, pilot pressure enters the negative control relief valve, and the pressure becomes the set 2.55 MPa pressure.

Because the bucket spool switches and the pressurized oil on the center bypass is cut off, the Pi2 pump negative control pressure oil from the Ps2 port is eliminated, the pump revolution tilt moves to the increase side, and the flow is increased.

Also, the command current to the pump P1 flow control proportional valve is lowered and the pressurized oil from the A3 hydraulic pump is cut off, but the negative control pressure is fed from the control valve Ps1 port to the Pi1 port to reduce the A1 hydraulic pump discharged volume quantity.

1	Control valve	12	Power save
2	Travel pilot pressure sensor	13	5-stack solenoid valve
3	Upper side pilot pressure sensor	14	P1 pressure sensor
4	Cushion valve	15	P2 pressure sensor
5	Bucket (close)	16	N1 negative control pressure sensor
6	Bucket (open)	17	N2 negative control pressure sensor
7	Bucket cylinder	18	P1 flow control proportional valve
8	Computer A	19	Hydraulic pump
9	Remote control valve (boom, bucket)	20	Check
10	Console lever lock switch	21	Oil cooler
11	Lever lock		