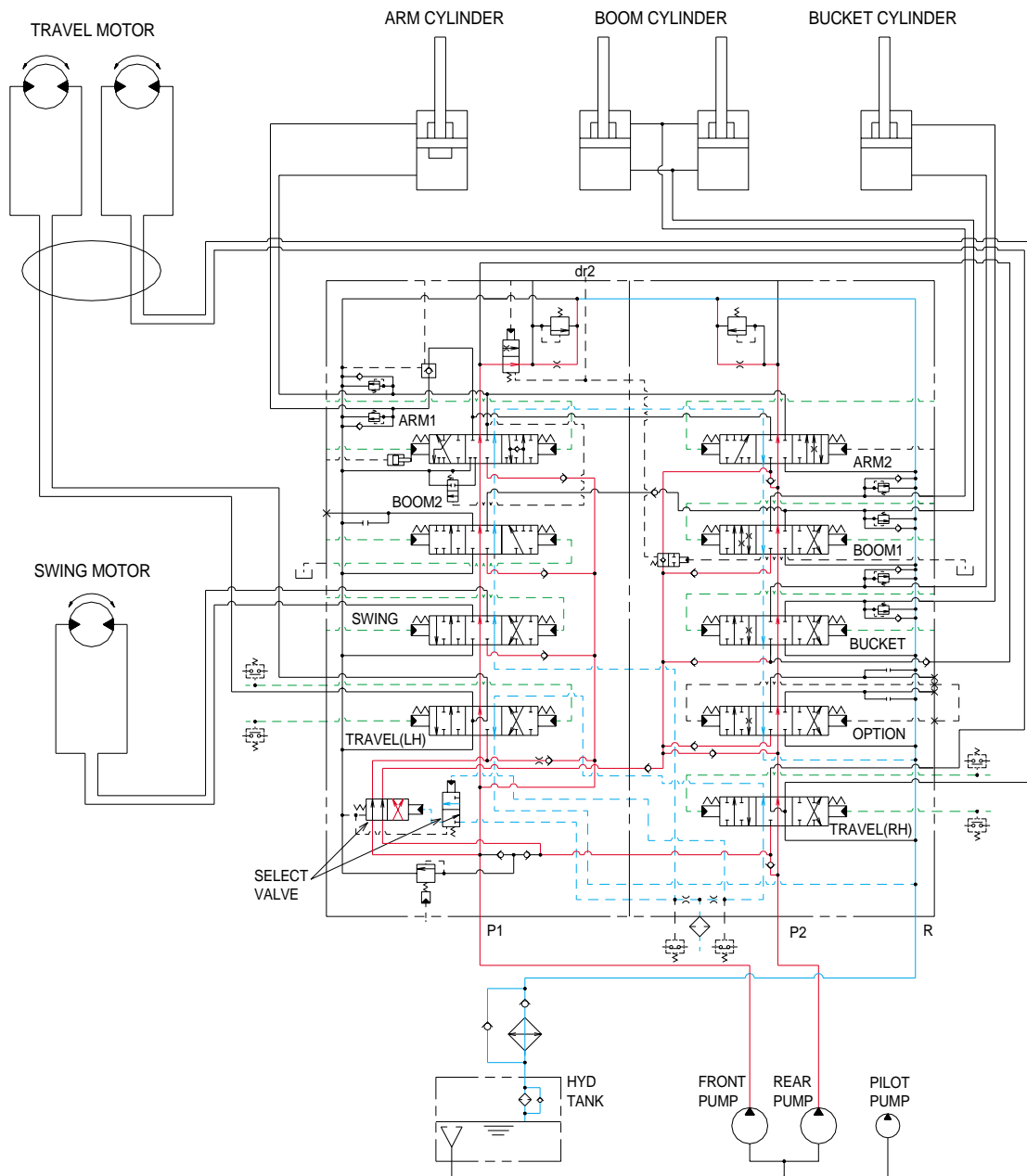


GROUP 5 COMBINED OPERATION

1. OUTLINE



In case operation, the oil flows from both main pumps through the neutral oil passage to bypass oil passage and confluence oil passage. Then the oil is supplied to each actuator and function them. Check valves and orifices are provided with on these flow passage. These control the oil flows from the pump corresponding to the each actuator's state of functioning and smooth the combined operation.

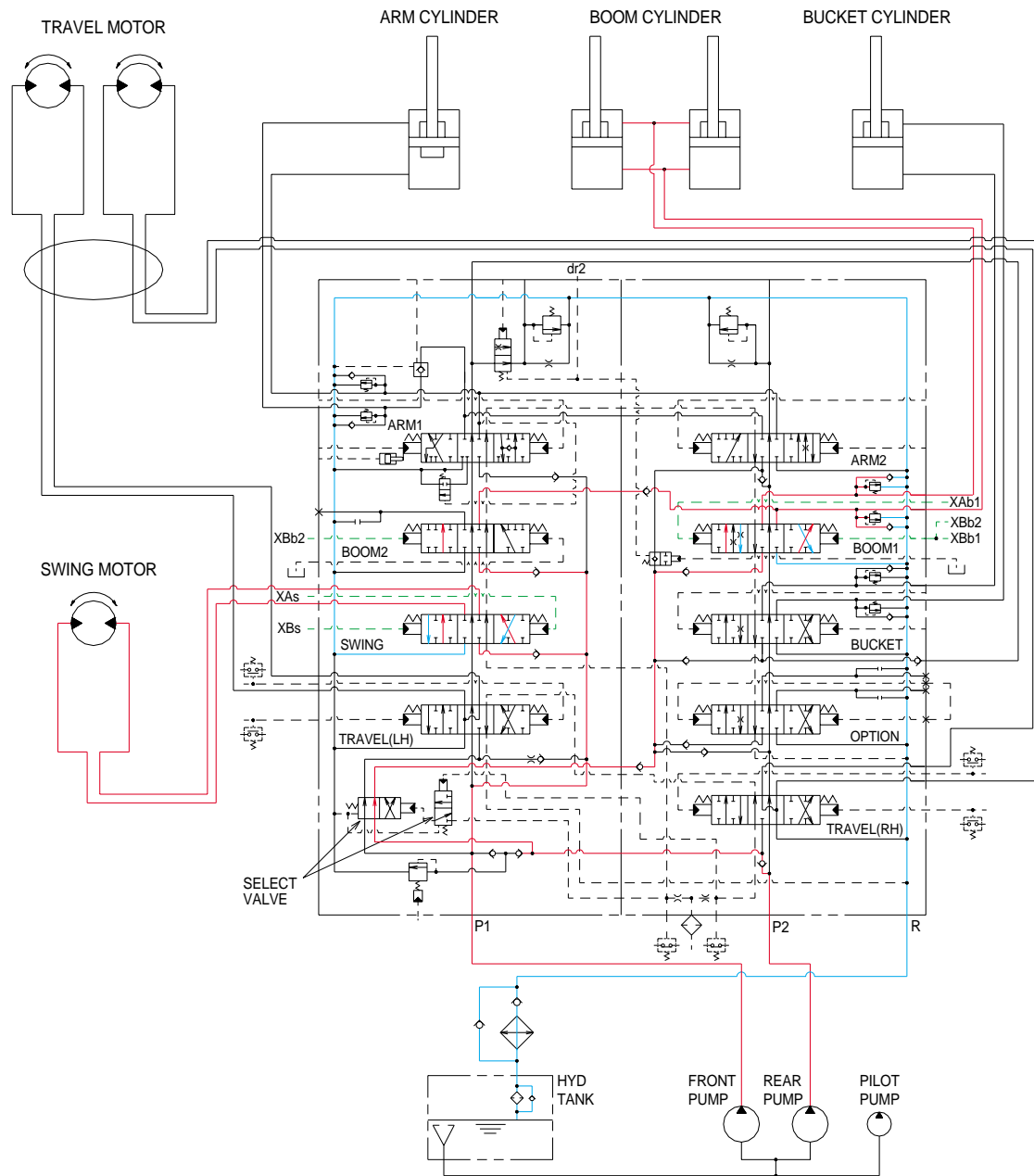
SELECT VALVE

This select valve is provided in the main control valve.

If any actuator is operated when traveling, the pilot oil from the pilot pump is closed by its spool.

Consequently, the pilot pressure port of the select valve rised and its spool is moved. Then the left and right travel oil is supplied only rear pump, and the machine straight traveling.

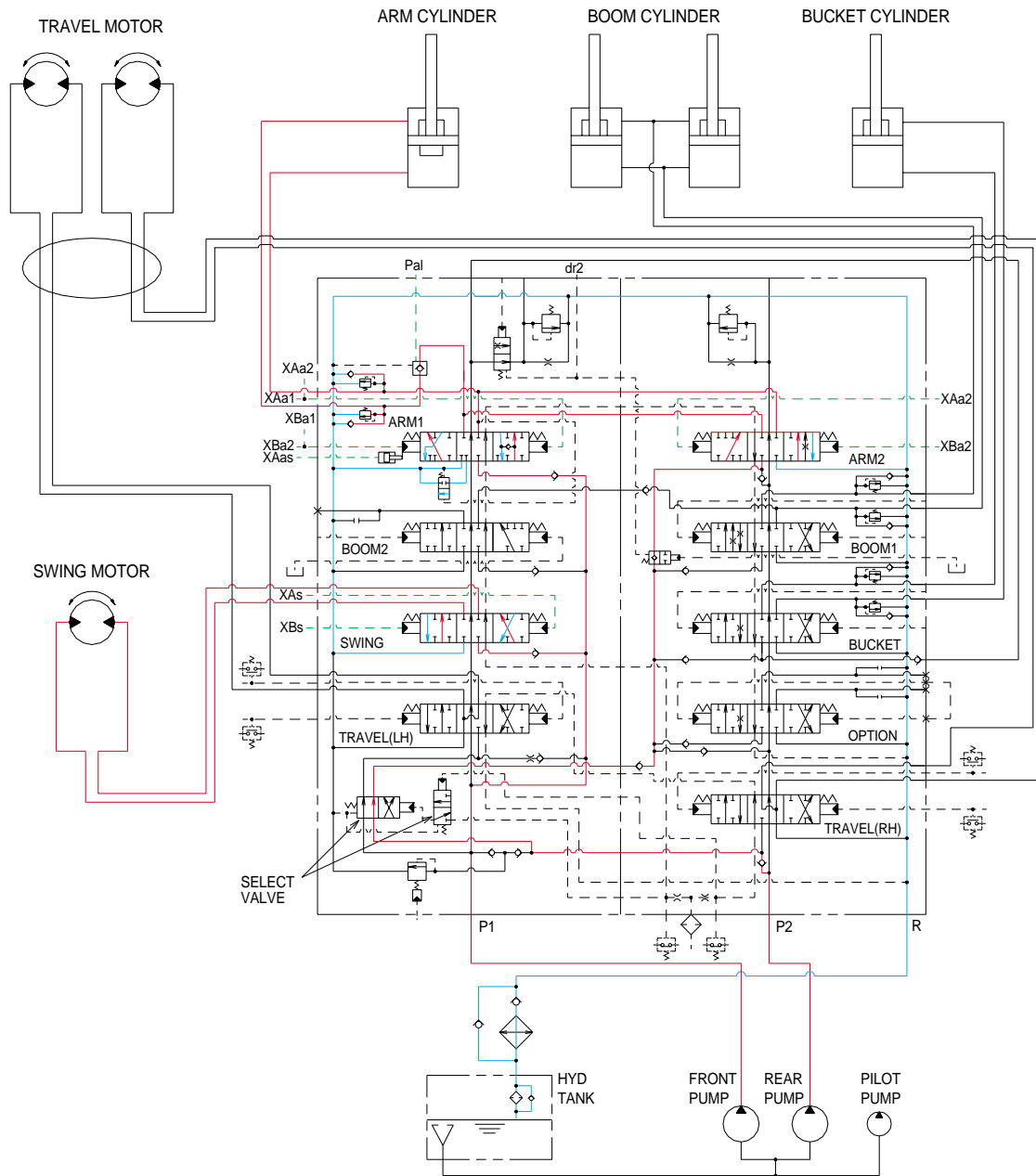
2. COMBINED SWING AND BOOM OPERATION



When the swing and boom functions are operated, simultaneously the swing spool and boom spools changed. The oil flows from the rear pump through boom1 section of the main control valve to boom cylinders and the boom functions.

The oil flows from front pump through swing section to swing motor. At the same time the pressure in the boom circuits can be high while the swing pressure is low therefore the oil flows from front pump to boom cylinders through boom2 section via confluence passage in case boom raise operation.

3. COMBINED SWING AND ARM OPERATION

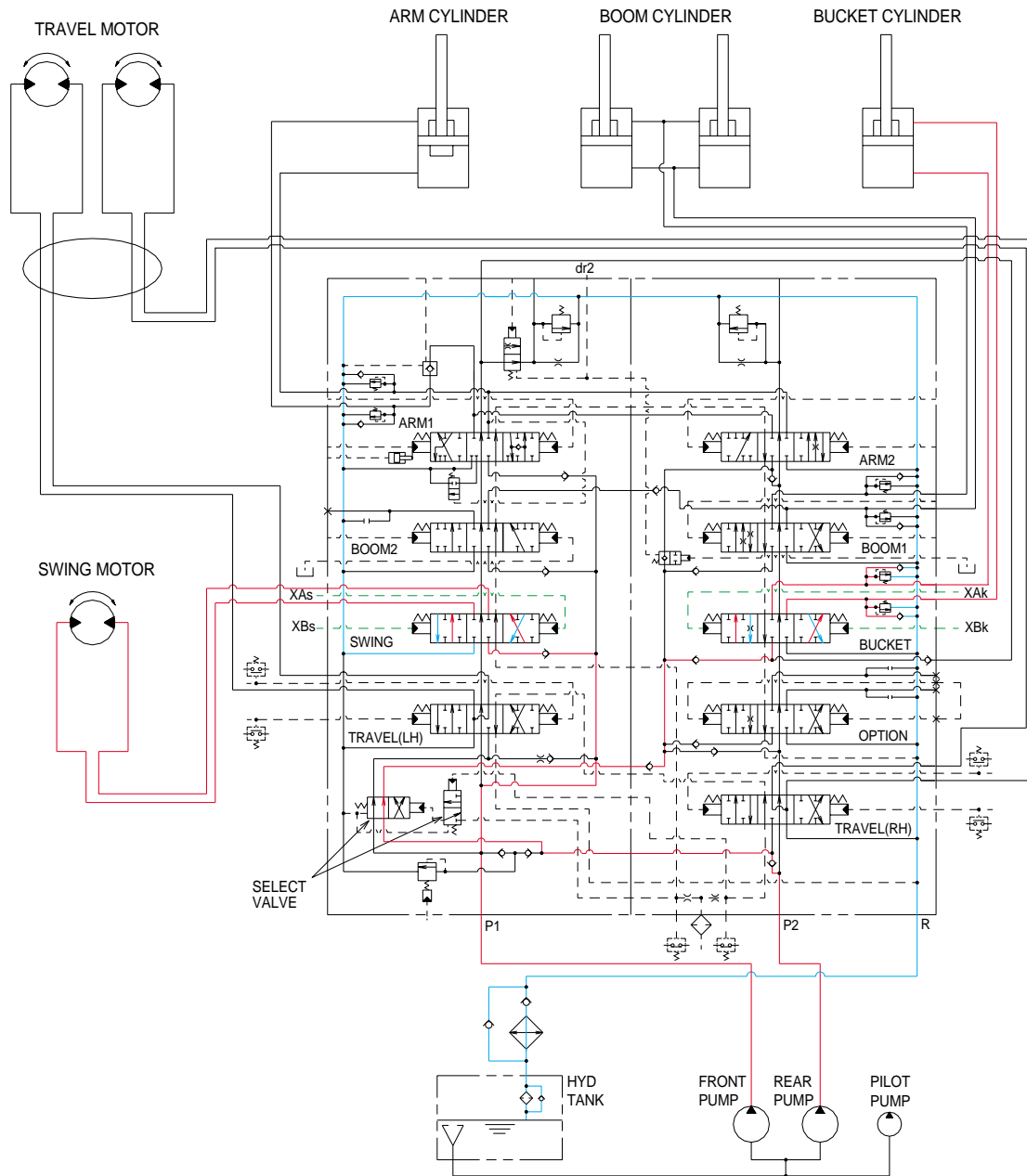


When the swing and arm functions are operated, simultaneously the swing and arm spools changed. The oil flows from the front pump through arm1 and swing section of the main control valve to arm cylinder and swing motor, and the arm and swing functions.

At the same time, the pressure in the arm circuit can be high cylinder through arm2 section via confluence passage.

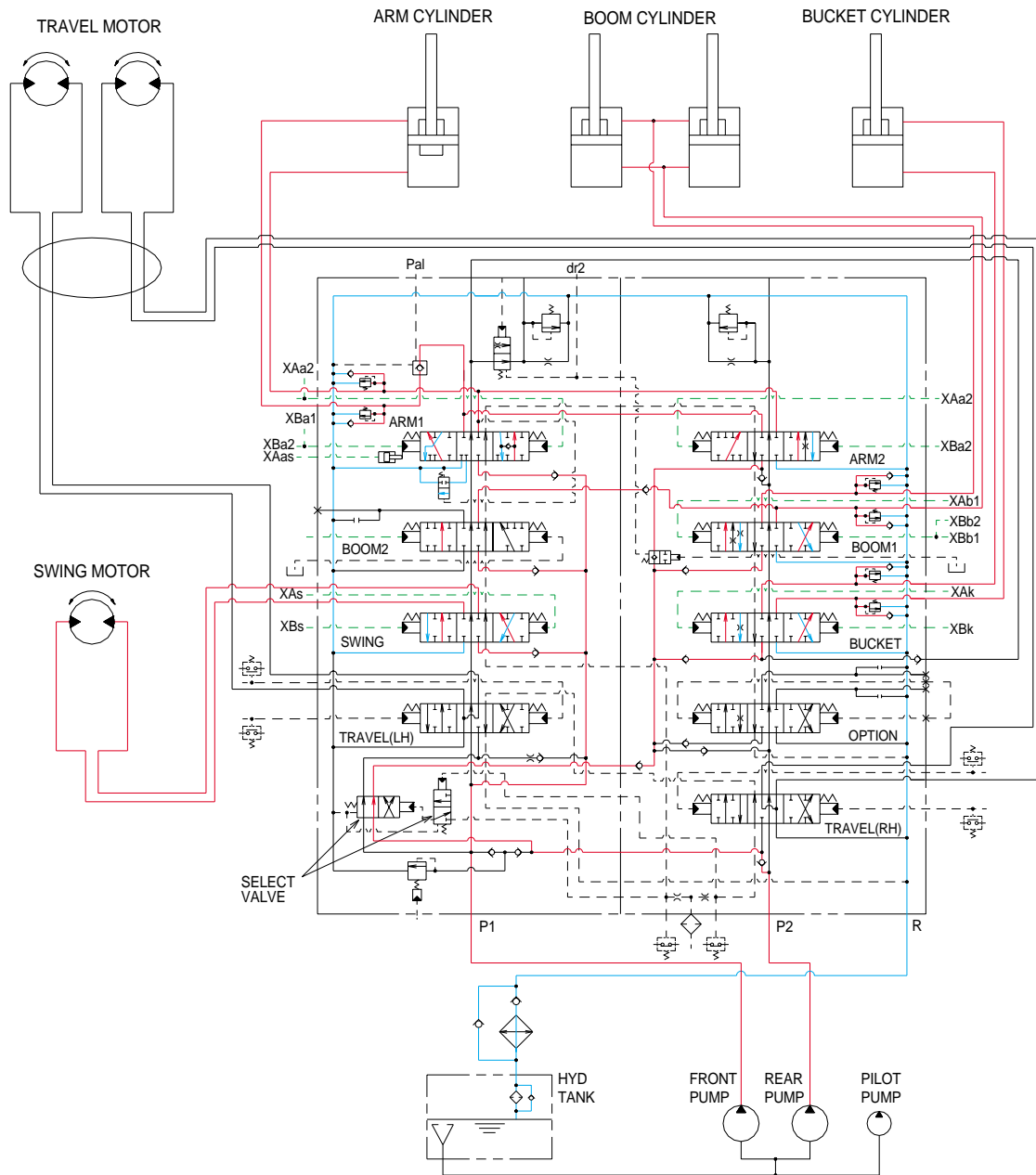
Mean while the pilot oil pressure(XAas) of swing shuttle valve flows into the stroke limiter of arm spool, then the swing priority is maintained.

4. COMBINED SWING AND BUCKET OPERATION



When the swing and bucket functions are operated, the swing and bucket spools changed. The oil flows from the rear pump through the bucket section of the main control valve to the bucket cylinder and the bucket function. The oil flows from front pump through swing section of the main control valve to the swing motor and swing the superstructure.

5. COMBINED SWING, BOOM, ARM AND BUCKET OPERATION

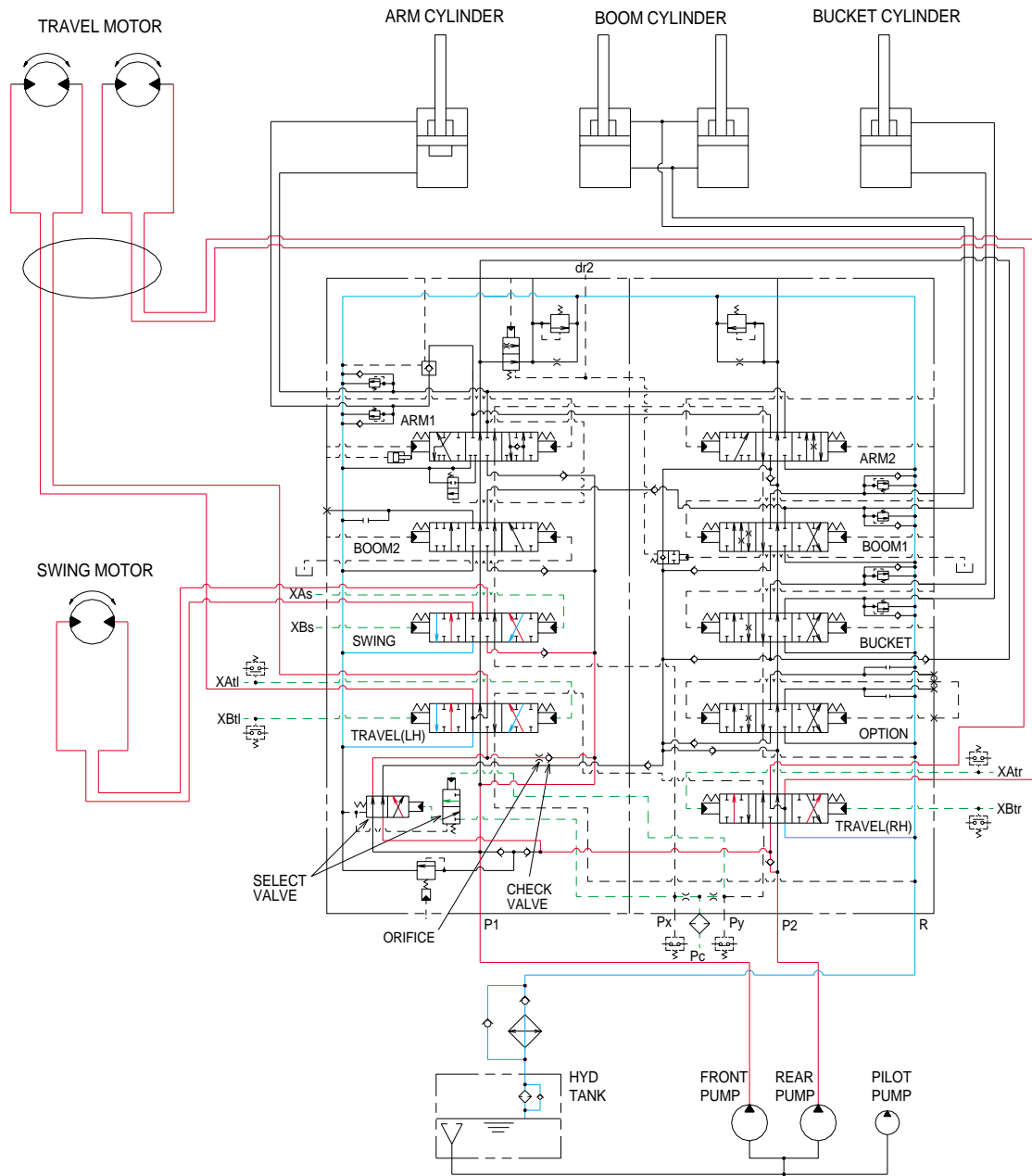


When the swing, boom, arm and bucket functions are operated, the each spools of the main control valve changed.

The oil flows from rear pump through arm2, boom1 and bucket section to boom, arm and bucket cylinders. The oil flows from front pump through swing, boom2 and arm1 section to swing motor, boom and arm cylinder. Then the functions to each actuators.

According to the state of each actuators functioning, the oil flows from front and rear pump through the confluence oil passage to the each actuators.

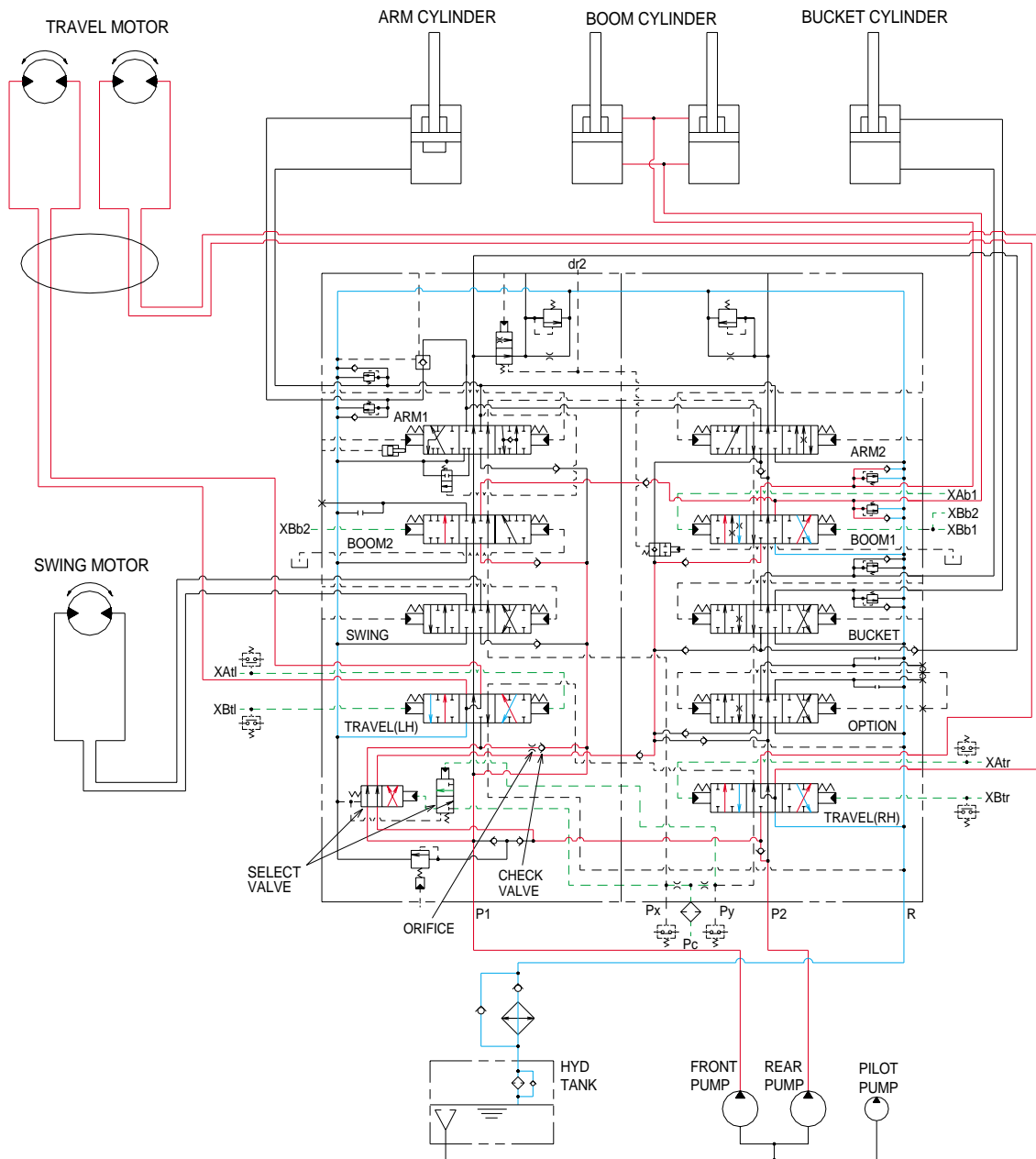
6. COMBINED SWING AND TRAVEL OPERATION



When the swing and right and left travel functions are operated, the swing and travel (RH,LH) spools and the select valve changed. The oil flows from rear pump through the travel(RH,LH) section of the main control valve to the right and left travel motor.

And the oil flows from front pump through swing section of the main control valve to the swing motor. Check valve the pressure in the travel circuit can be high while the swing pressure is low. When the smoothness are maintained because of the orifice. In either case, the machine will continue to travel straight.

7. COMBINED BOOM AND TRAVEL OPERATION

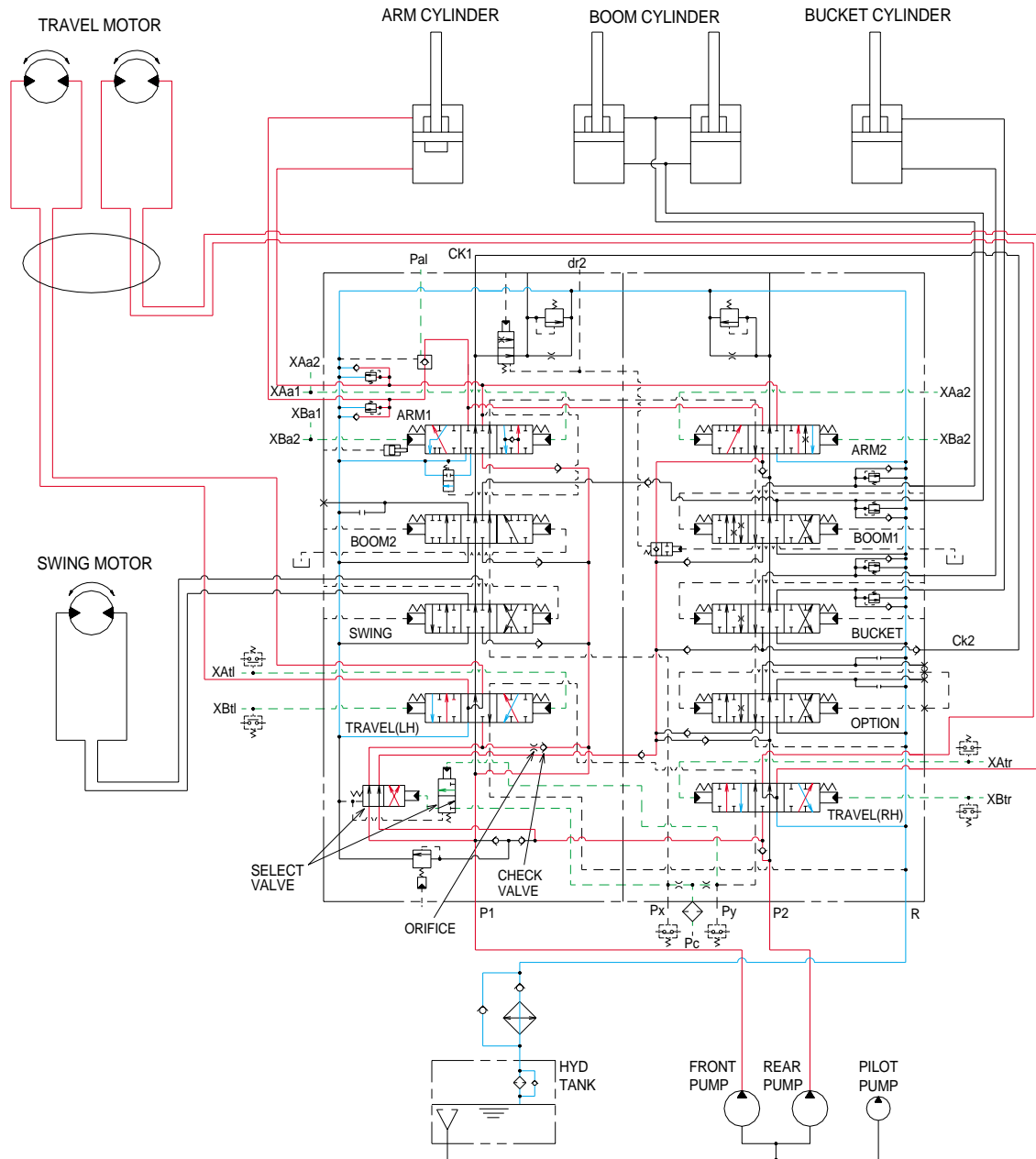


When the boom and travel (RH,LH) functions are operated, the boom and travel (RH,LH) spools and the select valve changed. The oil flows from rear pump through the travel (RH,LH) section of the main control valve to the right and left travel motor.

And the oil flows front pump through boom1 and 2 section of the main control valve to the boom cylinders.

Check valve the pressure in the travel circuit can be high while the boom pressure is low. When the travel circuit pressure drops lower than boom pressure, as when traveling downhill. boom priority and smoothness are maintained because of the orifice. In either case, the machine will continue to travel straight.

8. COMBINED ARM AND TRAVEL OPERATION

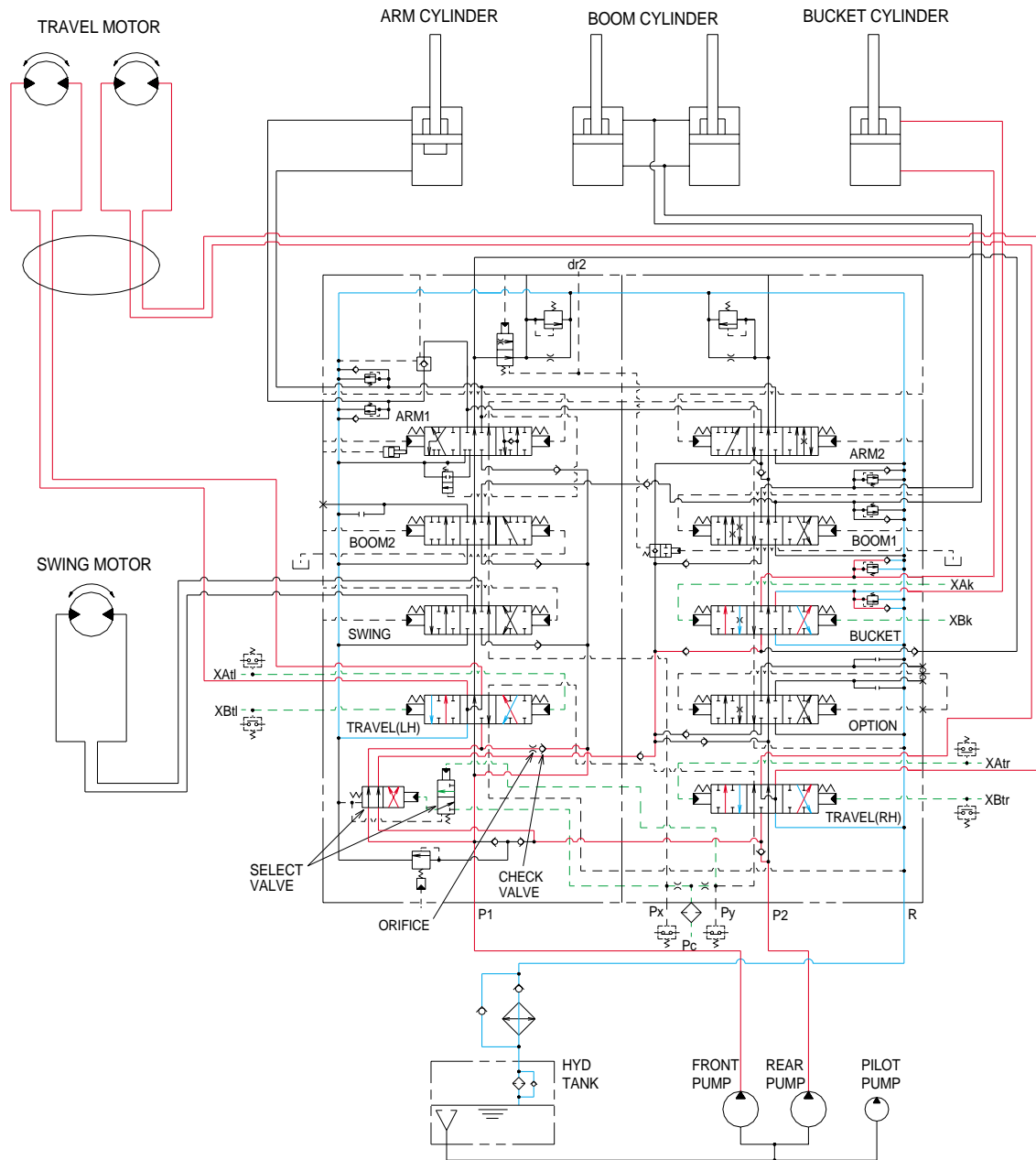


When the arm and travel (RH,LH) functions are operated, the arm and travel (RH,LH) spools and the select valve changed. The oil flows from rear pump through the travel(RH,LH) section of the main control valve to the right and left travel motor.

And the oil flows from front pump through arm1 and 2 sections of the main control valve to the arm cylinder.

Check valve the pressure in the travel circuit can be high while the arm pressure is low. When the travel circuit pressure drops lower than arm pressure, as when traveling downhill, arm priority and smoothness are maintained because of the orifice. In either case, the machine will continue to travel straight.

9. COMBINED BUCKET AND TRAVEL OPERATION



When the bucket and travel (RH,LH) functions are operated, the bucket and travel (RH,LH) spools and the select valve changed. The oil flows from rear pump through the travel(RH,LH) section of the main control valve to right and left travel motor and the machine traveling.

The oil flows from front pump through bucket section of the main control valve to the bucket cylinder and the bucket functions.

Check valve the pressure in the travel circuit can be high while the bucket pressure is low. When the travel circuit pressure drops lower than bucket pressure, as when traveling downhill, bucket priority and smoothness are maintained because of the orifice.

In either case, the machine will continue to travel straight.