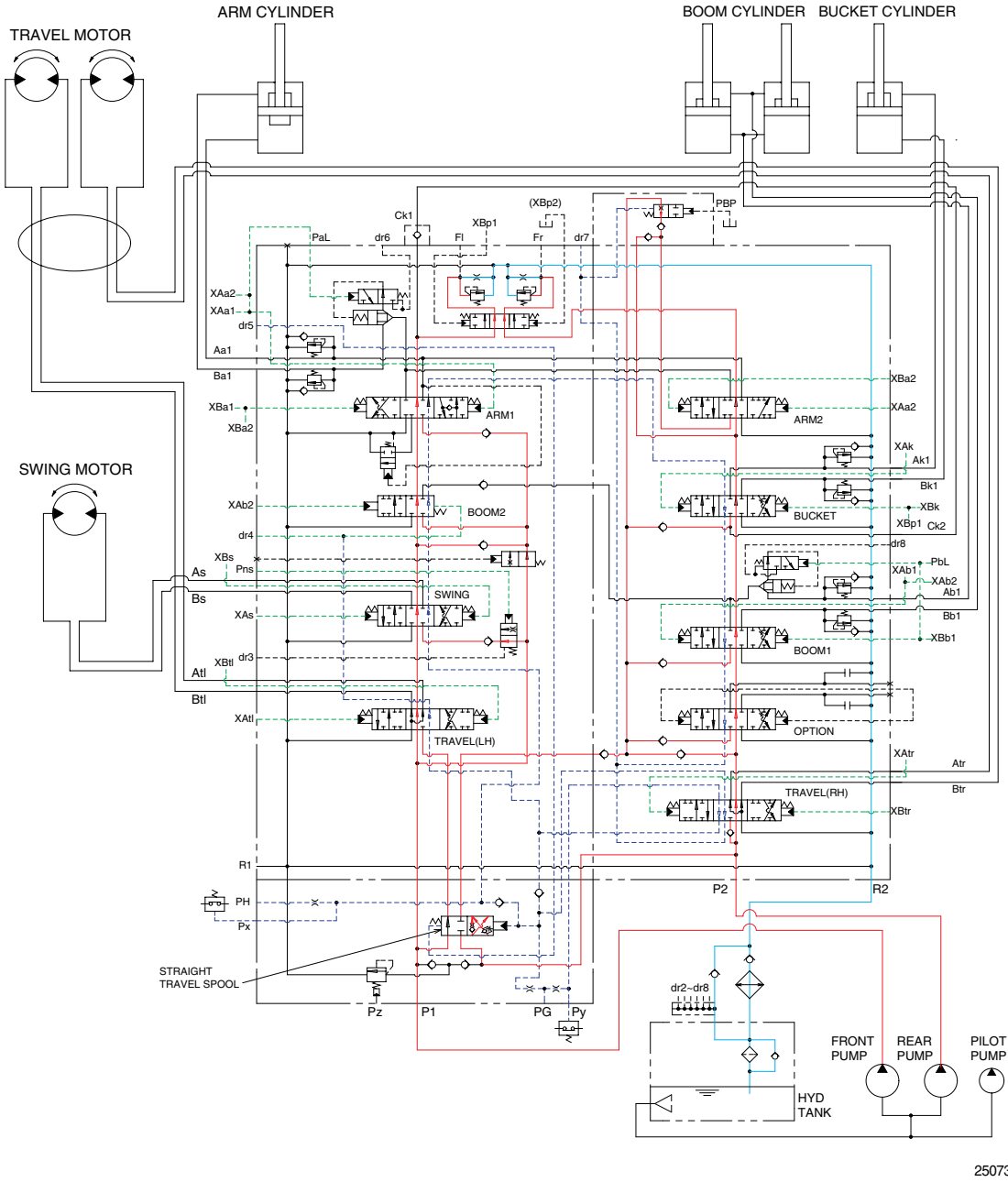
GROUP 5 COMBINED OPERATION

1. OUTLINE



The oil from the front and rear pump flows through the neutral oil passage, bypass oil passage and confluence oil passage in the main control valve. Then the oil goes to each actuator and operates them. Check valves and orifices are located on these oil passage in the main control valve. These control the oil from the main pumps so as to correspond to the operation of each actuator and smooth the combined operation.

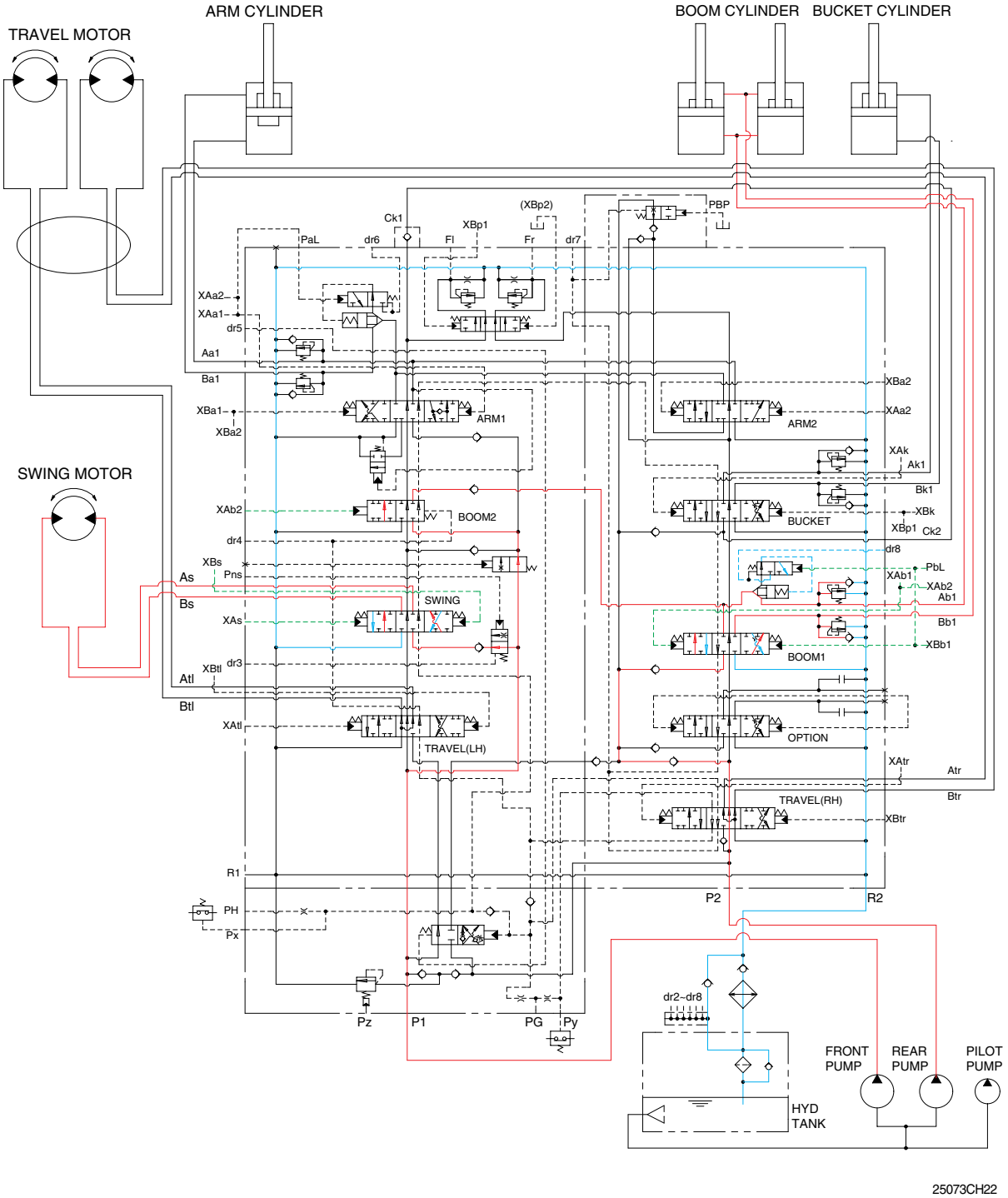
STRAIGHT TRAVEL SPOOL

This straight travel spool is provided in the main control valve.

If any actuator is operated when traveling, the straight travel spool is pushed to the left by the pilot oil pressure from the pilot pump.

Consequently, the left and right travel oil supply passage are connected, and equivalent amount of oil flows into the left and right travel motors. This keeps the straight travel.

2. COMBINED SWING AND BOOM OPERATION

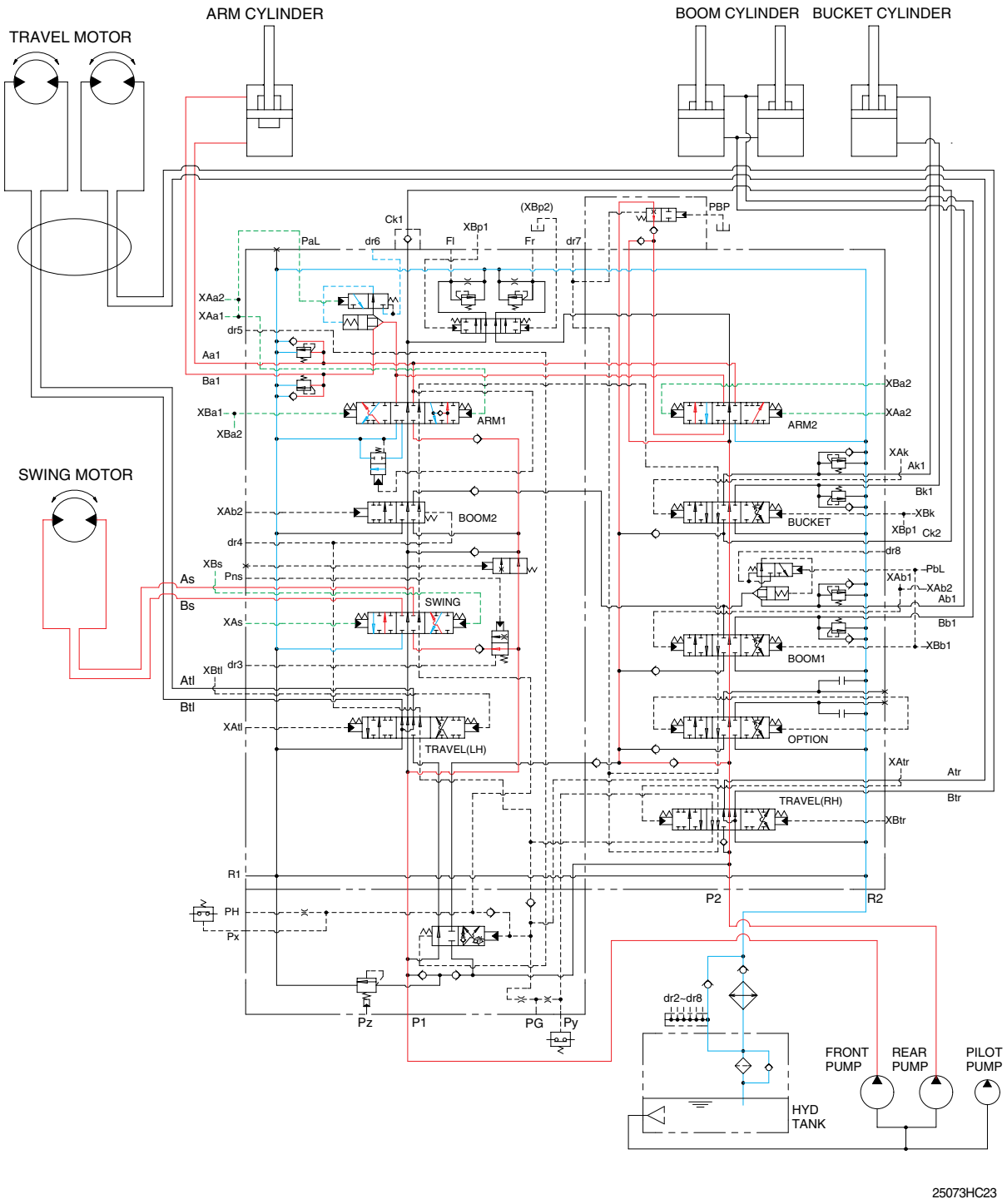


When the swing and boom functions are operated, simultaneously the swing spool and boom spools changed. The oil flows from the rear pump through boom1 section of the main control valve to boom cylinders and the boom functions.

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.

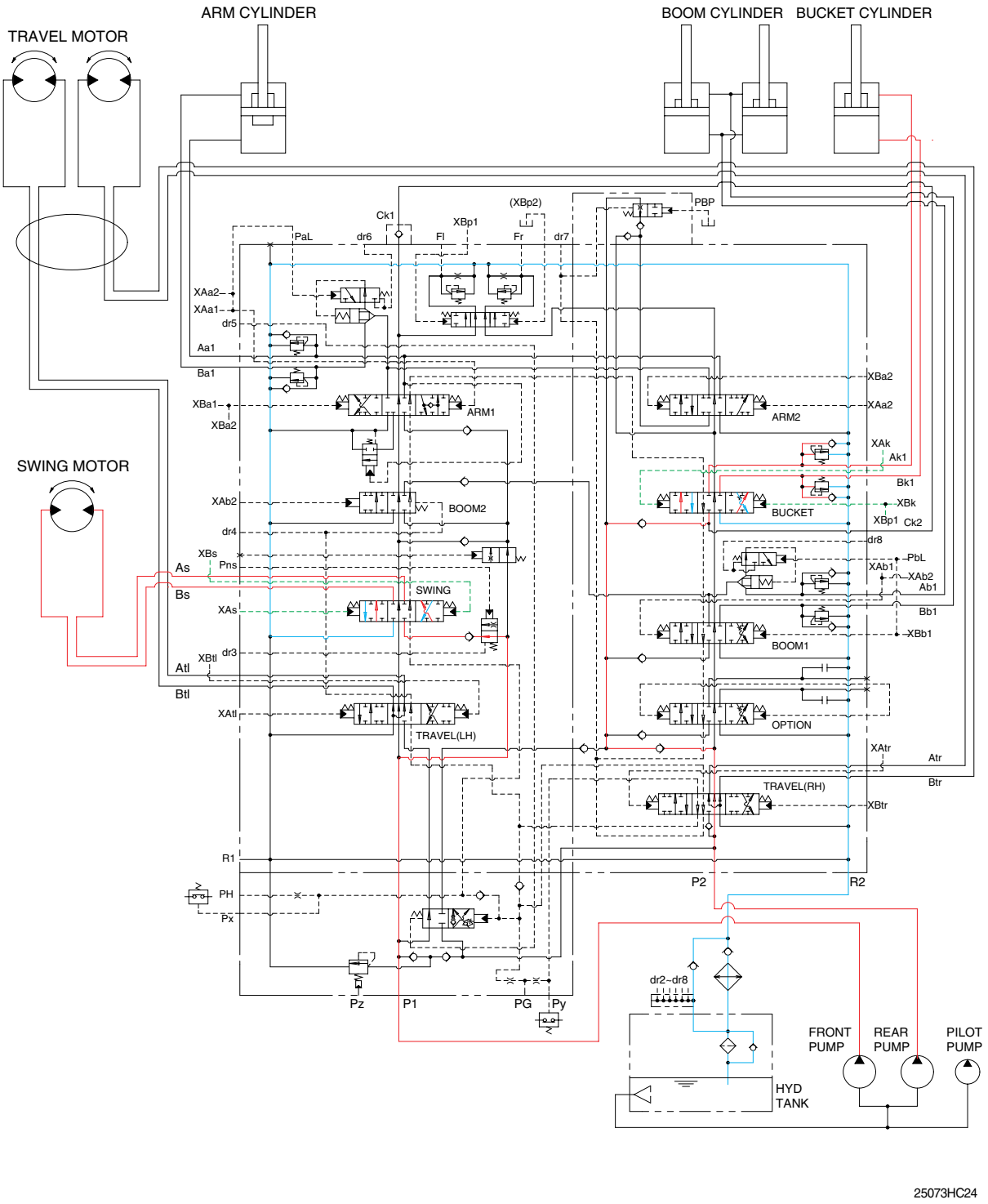
3. COMBINED SWING AND ARM OPERATION



When the swing and arm functions are operated, simultaneously the swing spool 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.

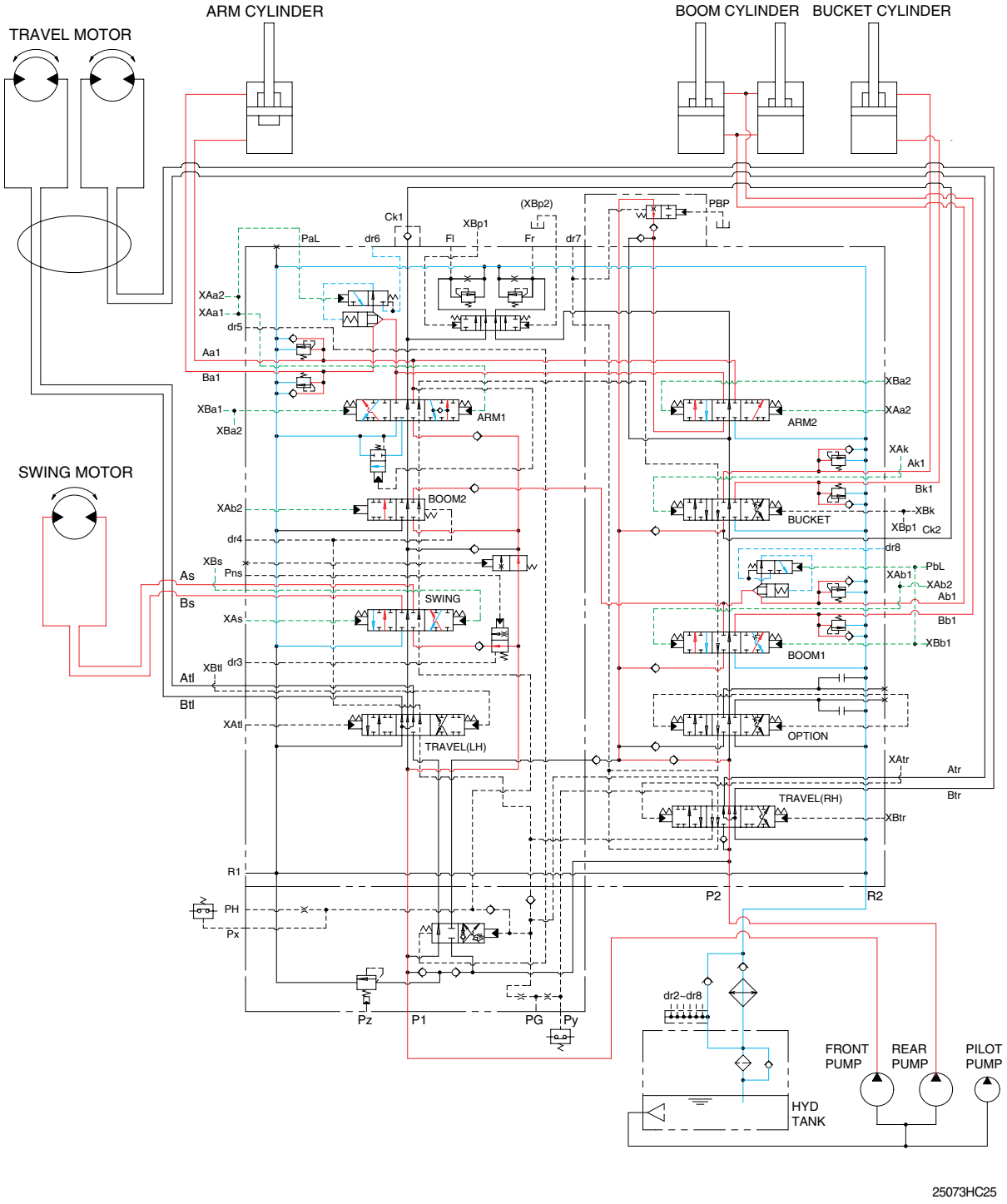
At the same time, the pressure in the arm circuit can be high while the swing pressure is low, therefore the oil flows from rear pump to arm cylinder through arm2 section via confluence passage.

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 functions. 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

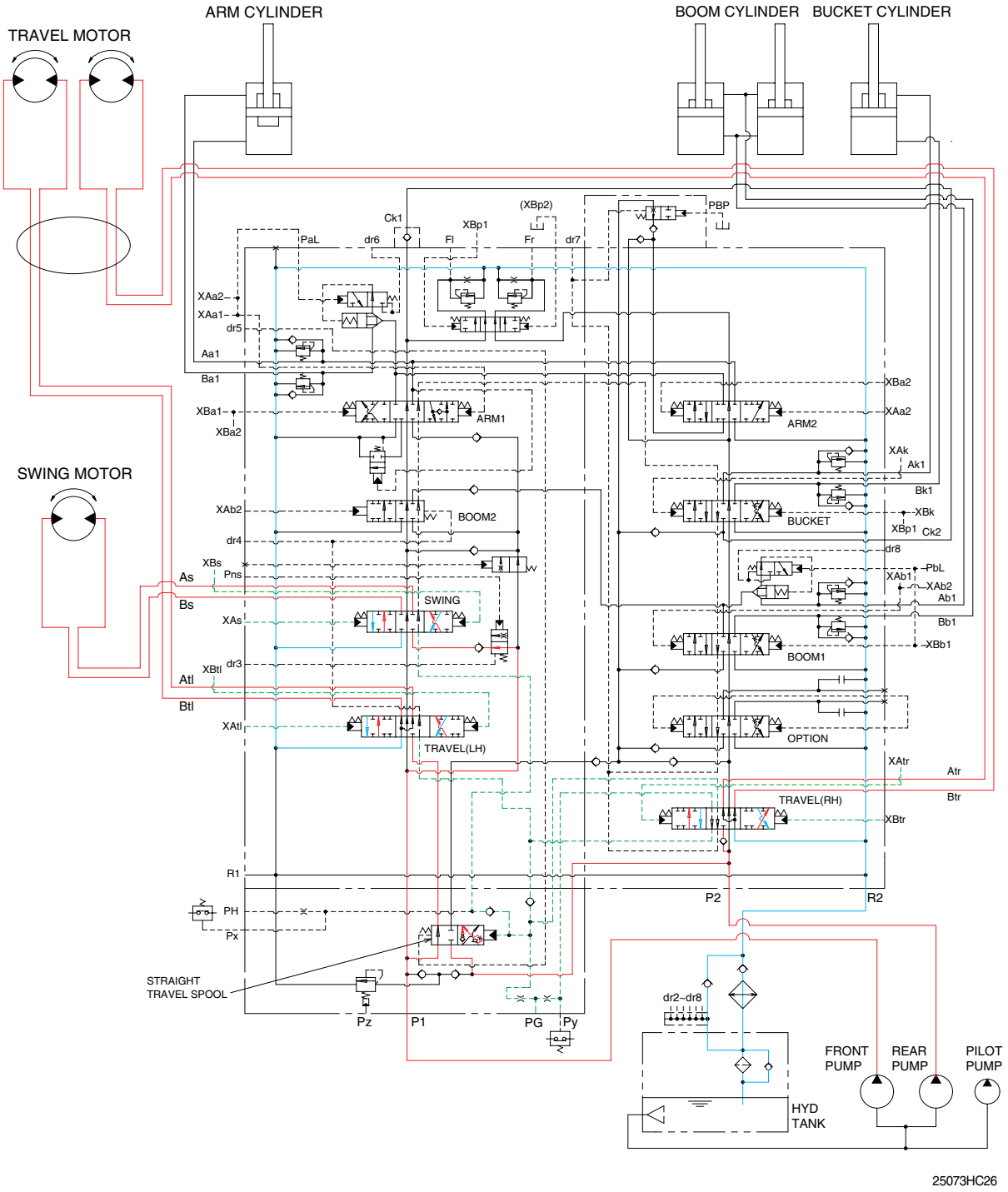


When the swing, boom, arm and bucket functions are operated, the each spools of the main control valve changed.

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

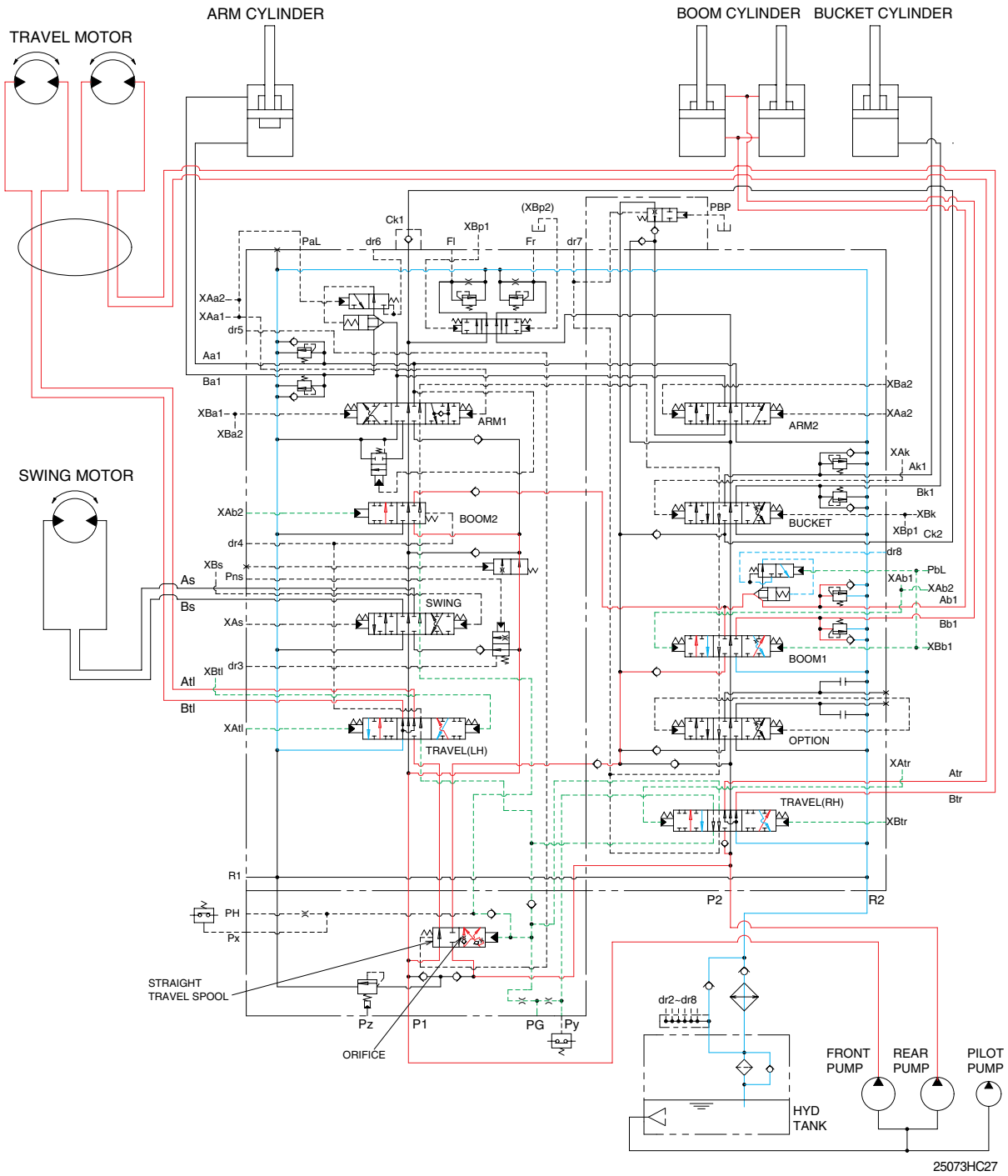


When the swing and travel functions are operated, simultaneously the swing spool and travel spools in the main control valve are moved to the functional position by the pilot oil pressure from the remote control valve. At the same time, the straight travel spool is pushed to the left by the pilot oil pressure from the pilot pump.

The oil from the front pump flows into the swing motor through the swing spool. The oil from the rear pump flows into the travel motor through the RH travel spool of the right control valve and the LH travel spool of the left control valve via the straight travel spool.

The superstructure swings and the machine travels straight.

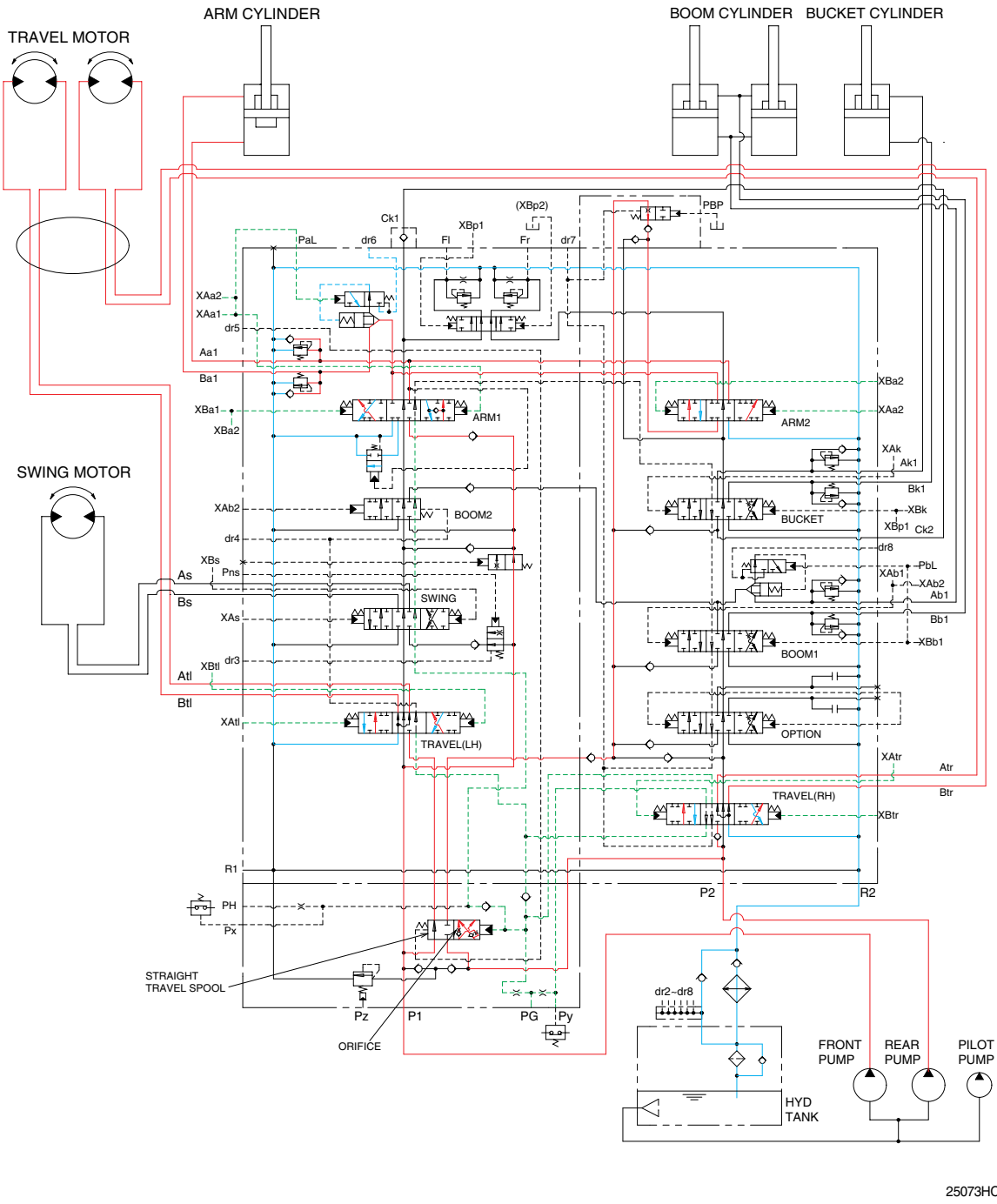
7. COMBINED BOOM AND TRAVEL OPERATION



When the boom and travel functions are operated, simultaneously the boom spools and travel spools in the main control valve are moved to the functional position by the pilot oil pressure from the remote control valve. At the same time, the straight travel spool is pushed to the left by the pilot oil pressure from the pilot pump. The oil from the front pump flows into the boom cylinders through the boom 2 spool and boom 1 spool via the parallel and confluence passage in case boom up operation. The oil from the rear pump flows into the travel motors through the RH travel spool of the right control valve and the LH travel spool of the left control valve via the straight travel spool.

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 the straight travel spool. Thus the machine will continue to travel straight.

8. COMBINED ARM AND TRAVEL OPERATION



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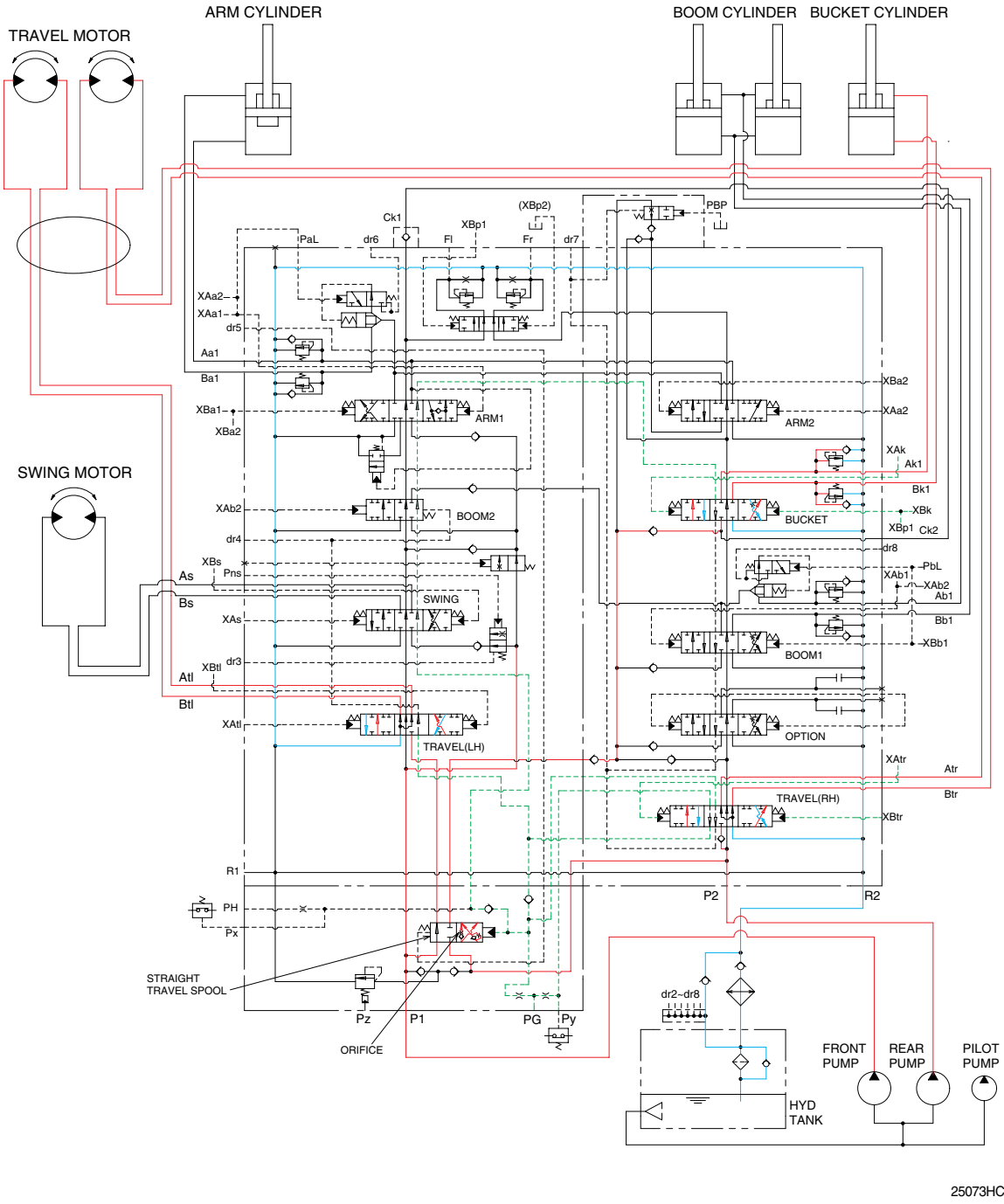
When the arm and travel functions are operated, simultaneously the arm spools and travel spools in the main control valve are moved to the functional position by the pilot oil pressure from the remote control valve. At the same time, the straight travel spool is pushed to the left by the pilot oil pressure from the pilot pump. The oil from the front pump flows into the arm cylinders through the arm 1 spool and arm 2 spool via the parallel and confluence oil passage. The oil from the rear pump flows into the travel motors through the RH travel spool of the right control valve and the LH travel spool of the left control valve via the straight travel spool.

When the travel circuit pressure drops lower than arm pressure, as when traveling downhill, arm priority and smoothness are maintained because of the orifice. Thus the machine will continue to travel straight.

9. COMBINED BUCKET AND TRAVEL OPERATION



When the bucket and travel functions are operated, simultaneously the bucket spool and travel spools in the main control valve are moved to the functional position by the pilot oil pressure from the remote control valve. At the same time, the straight travel spool is pushed to the left by the pilot oil pressure from the pilot pump. The oil from the front pump flows into the bucket cylinder through the bucket spool via the confluence oil passage. The oil from the rear pump flows into the travel motors through the RH travel spool of the right control valve and the LH travel spool of the left control valve via the straight travel spool of the control valve.

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.