

## GROUP 2 HYDRAULIC COMPONENT TESTING

All of the test procedures in this section are to be performed with the ROPS in the service position (Tilted up).

- ▲ **Relieve hydraulic pressure before servicing any hydraulic component. Escaping hydraulic fluid under pressure can penetrate the skin causing serious injury.**
- ▲ **Wait for the hydraulic fluid to cool before servicing any hydraulic component. Hot hydraulic fluid can cause severe burns.**

### GAUGES AND METERS REQUIRED

A 6000psi(413bar) and 1000psi(70bar) hydraulic pressure gauge to perform the hydraulic pressures tests in this section.

A hydraulic flow meter capable of measuring 50gpm to measure the gallons per minute(gpm) or liters per second(3.2 l /sec) to perform the hydraulic flow tests.

A hydraulic load valve capable of 6000psi(413bar) and 50gpm(3.2 l /sec) to load the hydraulic circuit when performing the hydraulic flow tests.

### HYDRAULIC COMPONENTS

The following hydraulic components can be tested for either pressure setting or component flow displacement.

#### Pressure testing

- Main control valve system relief
- Hydrostatic control pump drive reliefs
- Charge pump charge relief

After pressure tests have been performed you will be instructed to either adjust or replace the relief cartridge.

#### Flow displacement testing

- Hydrostatic control pumps
- Hydrostatic travel motors
- Auxiliary pump

After the component flow displacement tests have been performed and if the components flow displacement is less than 80% of it's theoretical displacement, the component is showing considerable wear and should be repaired or replaced.

※ **Engine full throttle : 2700 rpm**

※ **To properly identify a damaged or faulty hydraulic component, the tests should be performed in the following sequence.**

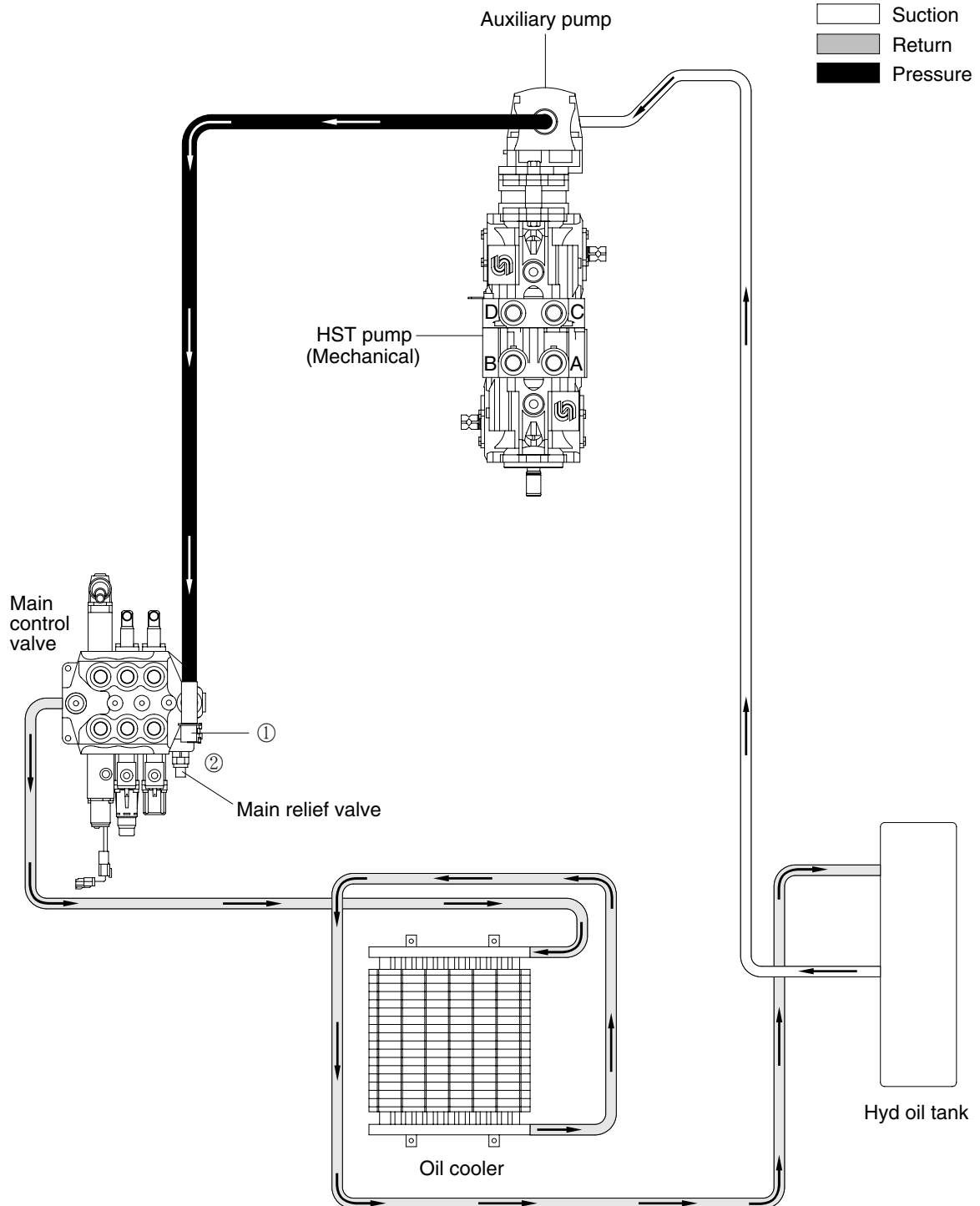
1. Main control valve system relief test
2. Charge / Auxiliary pump relief test
3. Auxiliary pump flow displacement test
4. Hydrostatic control pump drive relief tests
5. Hydrostatic control pump flow displacement tests

# 1. MECHANICAL TYPE

## 1) MAIN CONTROL VALVE SYSTEM PRESSURE

With a pressure gauge installed at test location ① and engine at 2700rpm ; Move the right control lever toward the right. The pressure reading should be 2490psi(175bar). If pressure is not correct, replace or adjust the main relief valve cartridge at location ②.

(Test port size ① : M16×2.0)

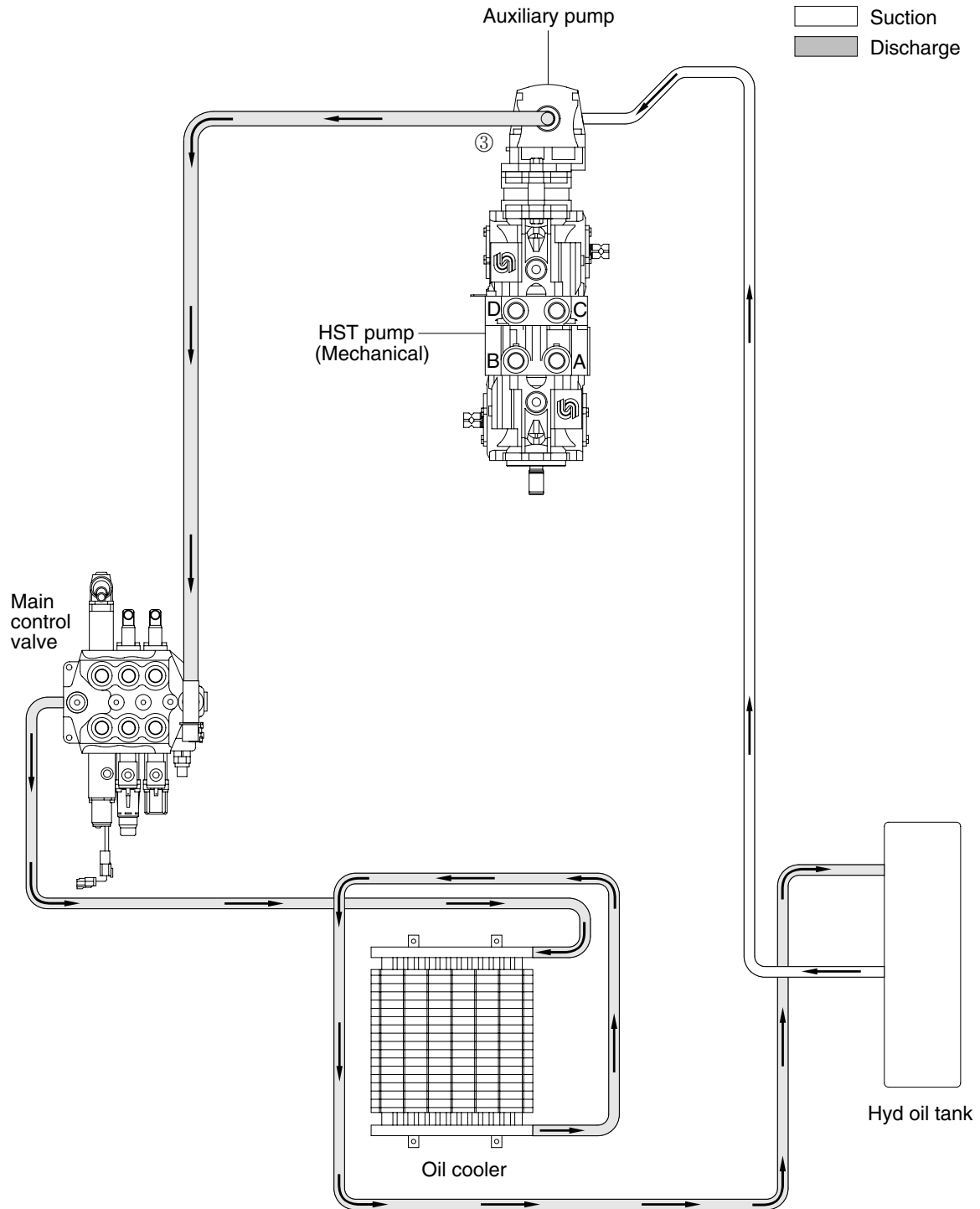


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## 2) AUXILIARY PUMP FLOW

With a flow meter and a load valve installed at location ③ and engine at 2700rpm under a 500psi(34.5bar) load; The flow meter reading should be 17.4gpm (66lpm). If the reading is approximately 13.9gpm (52.8lpm) or less, the auxiliary pump is showing considerable wear and should be repaired or replaced.

(Test port size ③ : O-ring boss elbow SAE 12-12S)

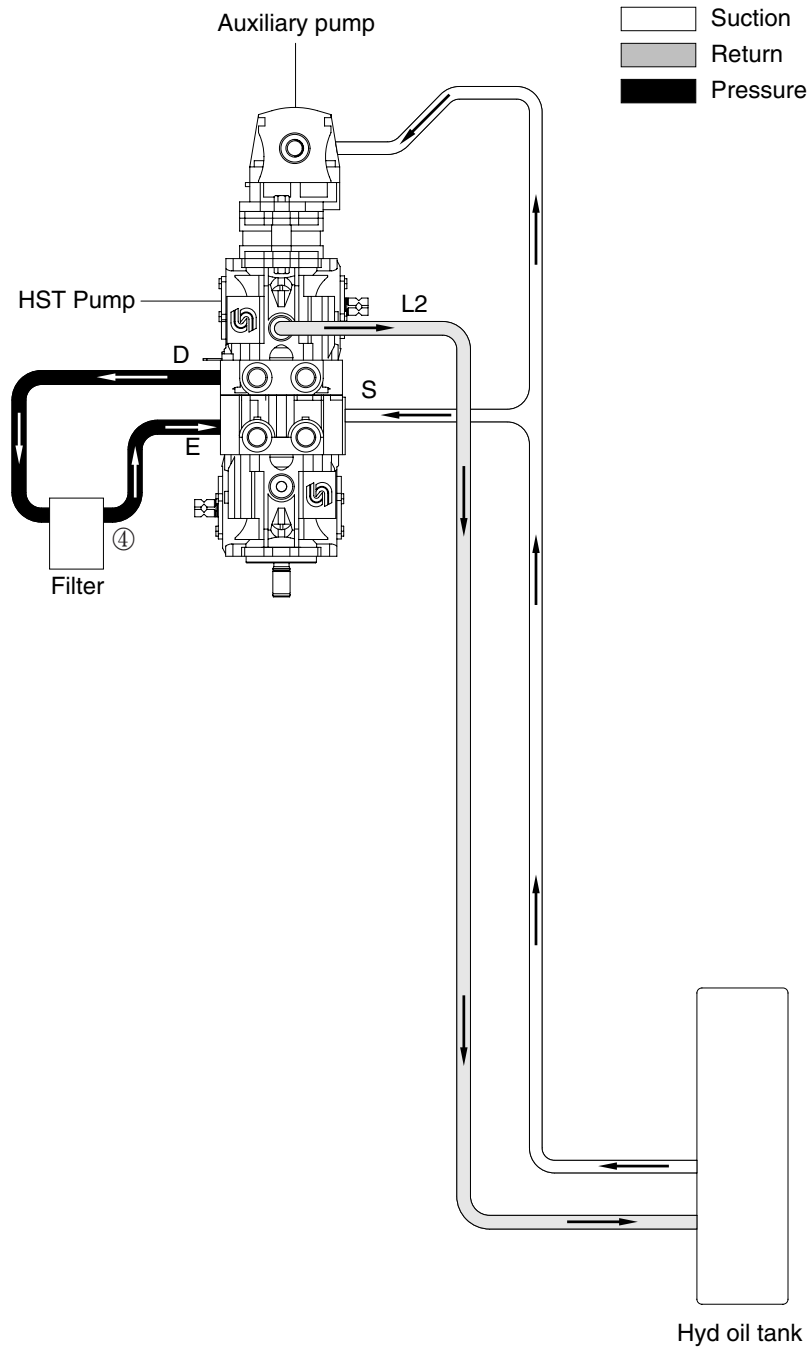


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### 3) CHARGE PUMP PRESSURE

With a pressure gauge installed at test location ④ and engine at idle; The pressure reading should be at least 260psi (18bar) minimum. The charge relief cartridge is not adjustable and requires replacement if the pressure reading is not correct.

(Test port size ④ : O-ring boss connector SAE 6)



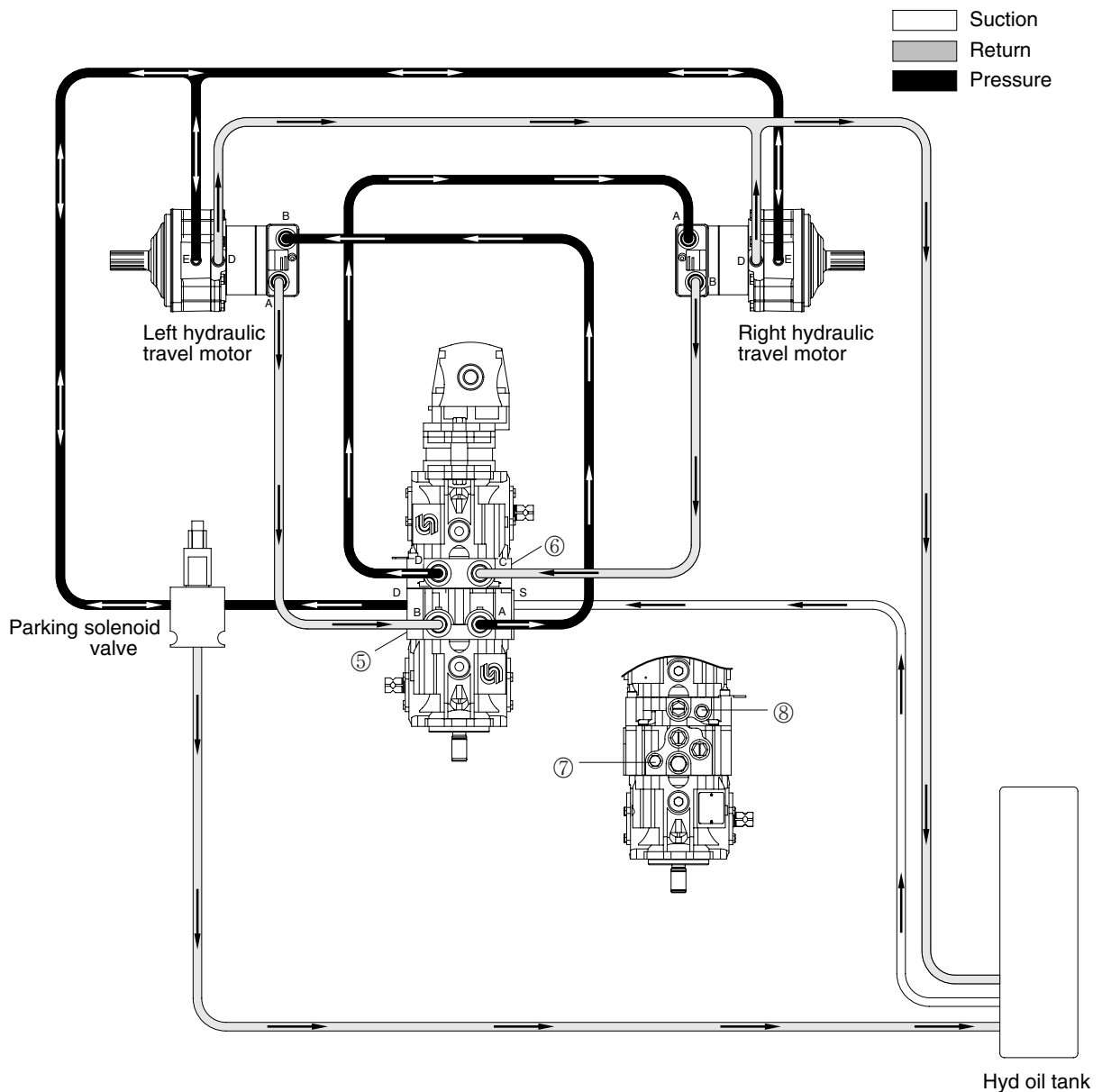
#### 4) HYDROSTATIC CONTROL PUMP PRESSURE

There are four relief valve cartridges to test in the hydrostatic control pump valve block. Each relief valve cartridge is set the same and is located directly below each port shown for testing.

**Example :** Oil flow shown is for testing the relief valve cartridge for the right travel motor in forward drive as shown in the shaded area of the travel circuit oil flow chart below. With a pressure gauge installed at test location ⑥ and engine at 2700rpm, seat bar up with park lock engaged; Stall the travel function by moving the right control lever forward slightly.

The pressure reading should be  $4061 \pm 290$ psi ( $280 \pm 20$ bar). The relief valve cartridge is not adjustable. If the reading is not correct, replace the relief valve cartridge that locates directly below the port.

Follow the travel circuit oil flow chart for testing the other relief valve cartridges with a pressure gauge installed at the other test locations ⑤,⑥,⑦,⑧. With engine at full throttle, seat bar up and park lock engaged; Stall the travel function by moving the left or right control lever forward or backward slightly as shown in the chart. (Test port size ⑤,⑥,⑦,⑧ : O-ring boss connector SAE 6)



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## 5) HYDROSTATIC CONTROL PUMP FLOW

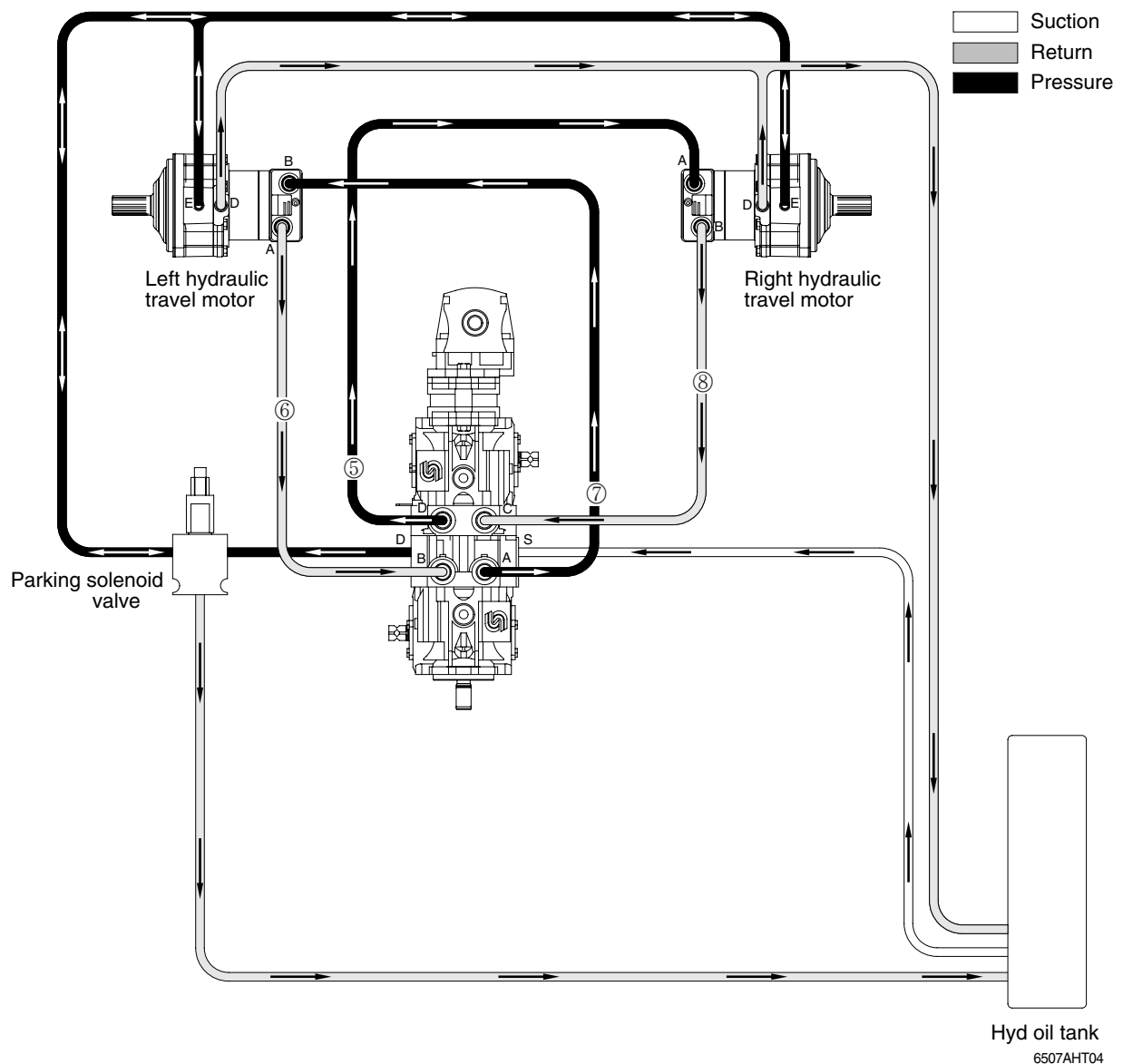
The loader must be raised and set on jack stands or blocks with all four wheels off the ground to perform the following tests.

There are four hydrostatic flow displacement tests to check the displacement of oil from the right and left hydrostatic control pumps.

**Example :** Oil flow shown is for testing the oil flow displacement of the right control pump in forward drive as shown in the shaded area of the travel circuit oil flow chart below. With a flow meter and a load valve installed at test location ⑥ and engine at 2700rpm under 2500psi(170bar) load ; The flow meter reading should be 27.7gpm (105lpm). You must move the right control lever forward to get flow reading.

Follow the travel circuit oil flow chart to test the oil flow displacement of the right control pump in reverse drive and the left control pump in forward and reverse drive by installing a flow meter at the other test locations ⑤,⑦,⑧. With engine at  $2700 \pm 50$ rpm under a 2500psi (170bar) load; The flow meter reading should be 27.7gpm (105lpm). You must move the right or left travel control forward or backward as shown in the chart to get flow reading.

If the flow meter reading is approximately 22.5gpm (85lpm) or less in any of the tests, the drive pump is showing considerable wear and should be repaired or replaced.

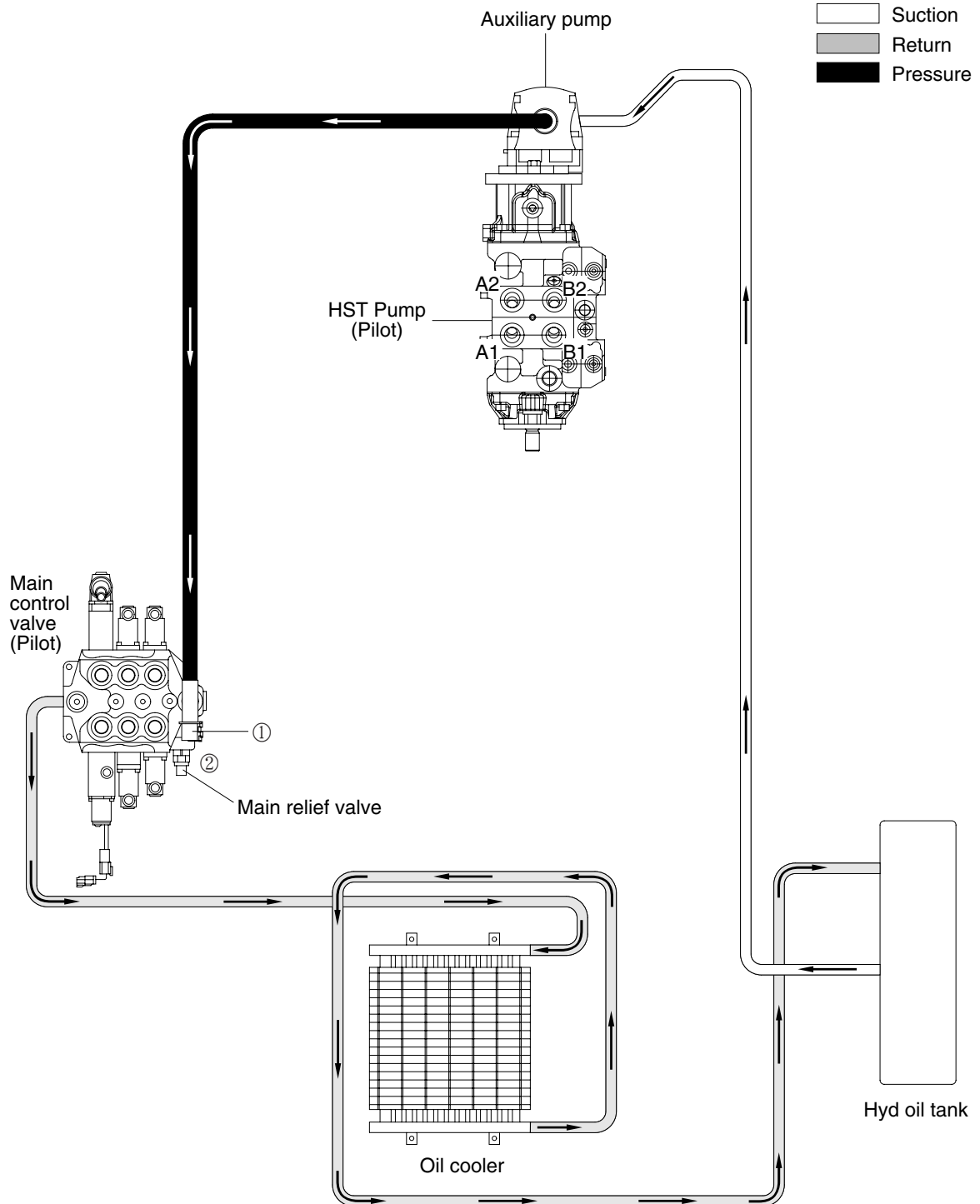


## 2. PILOT TYPE

### 1) MAIN CONTROL VALVE SYSTEM PRESSURE

With a pressure gauge installed at test location ① and engine at 2700rpm ; Move the right control lever toward the right. The pressure reading should be 2490psi(175bar). If pressure is not correct, replace or adjust the main relief valve cartridge at location ②.

(Test port size ① : M16×2.0)

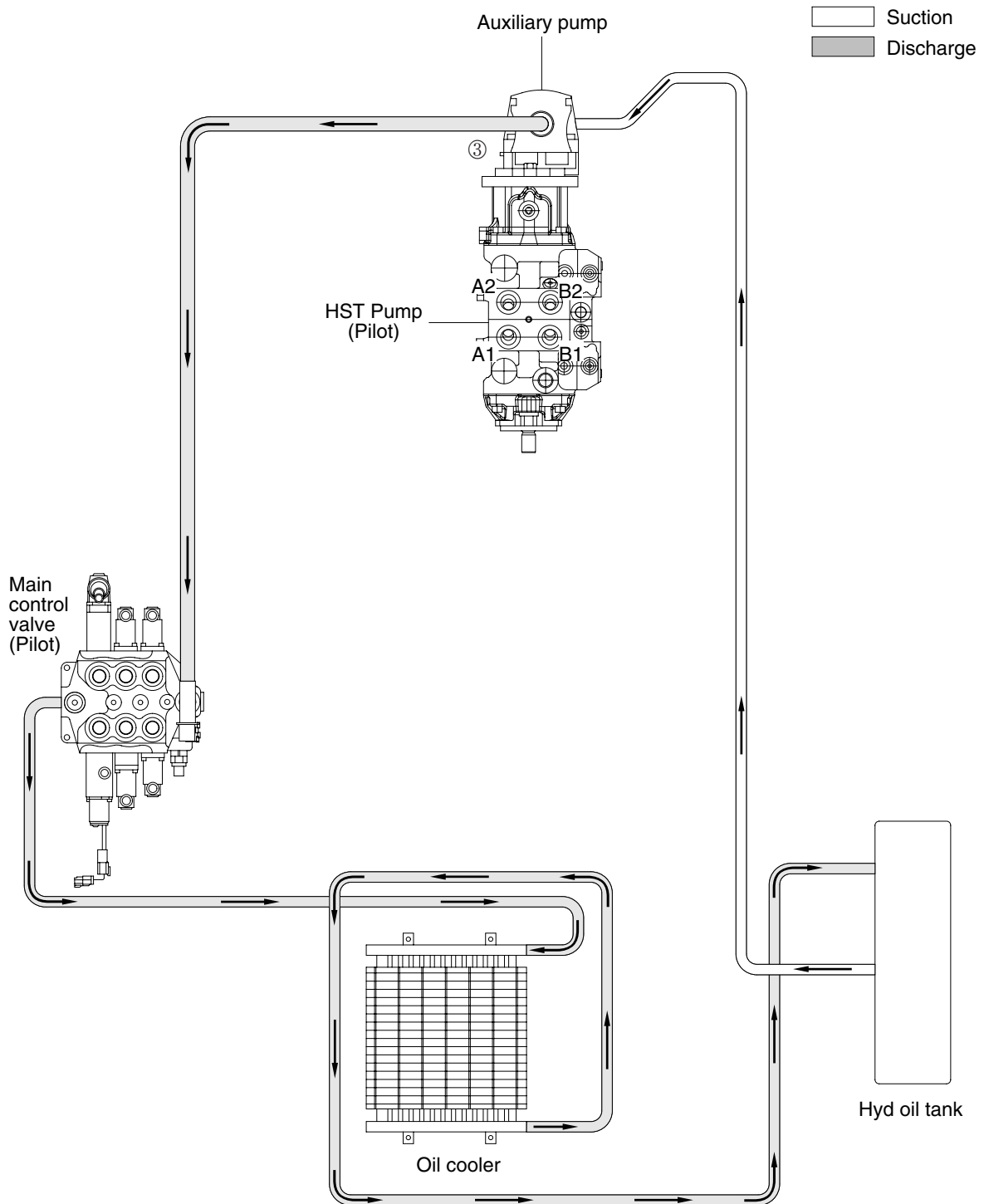


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## 2) AUXILIARY PUMP FLOW

With a flow meter and a load valve installed at location ③ and engine at 2700rpm under a 500psi(34.5bar) load; The flow meter reading should be 17.4gpm (66lpm). If the reading is approximately 13.9gpm (52.8lpm) or less, the auxiliary pump is showing considerable wear and should be repaired or replaced.

(Test port size ③ : O-ring boss elbow SAE 12-12S)

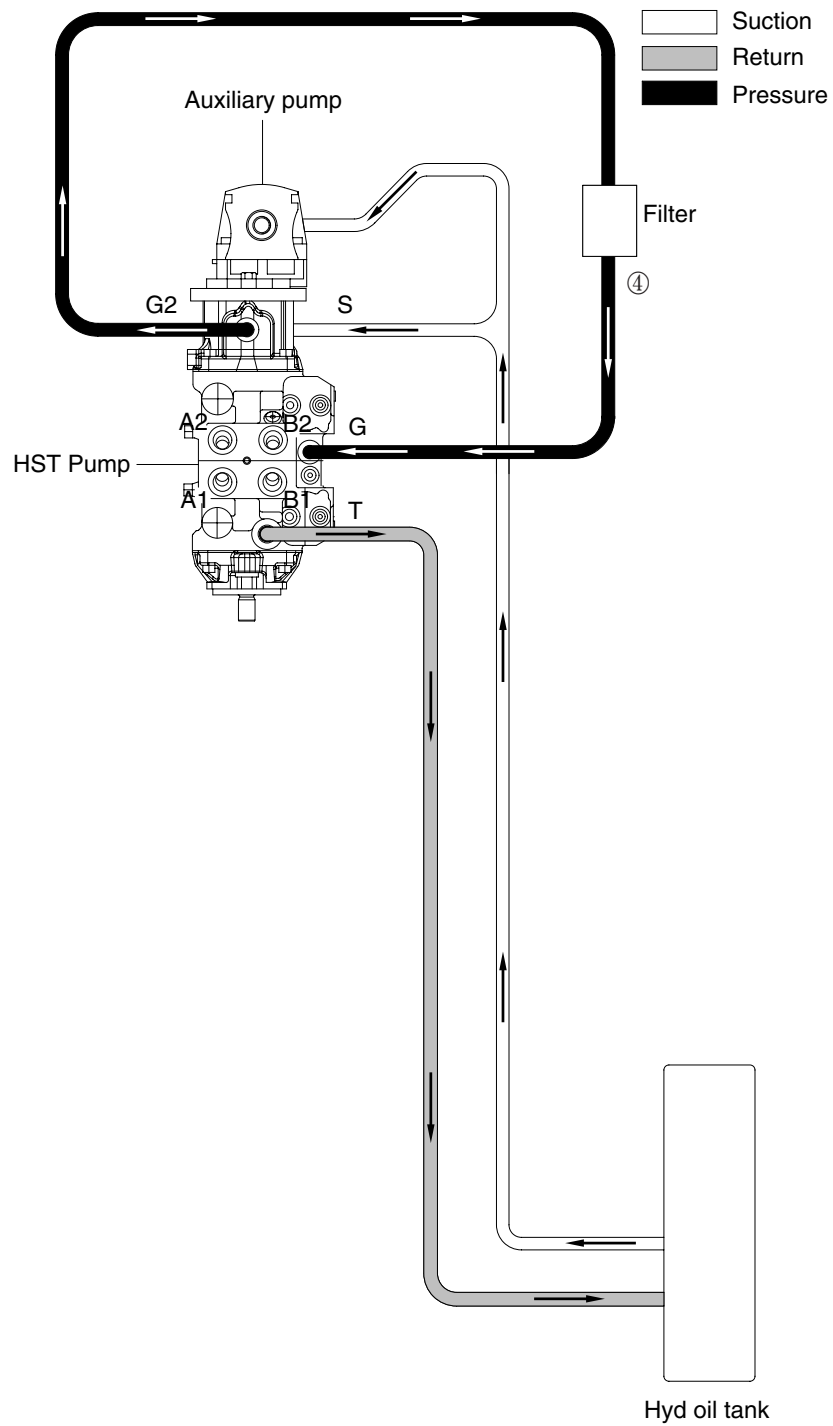


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### 3) CHARGE PUMP PRESSURE

With a pressure gauge installed at test location ④ and engine at idle; The pressure reading should be at least 300psi (20bar) minimum. The charge relief cartridge is not adjustable and requires replacement if the pressure reading is not correct.

(Test port size ④ : O-ring boss connector SAE 6)



#### 4) HYDROSTATIC CONTROL PUMP PRESSURE

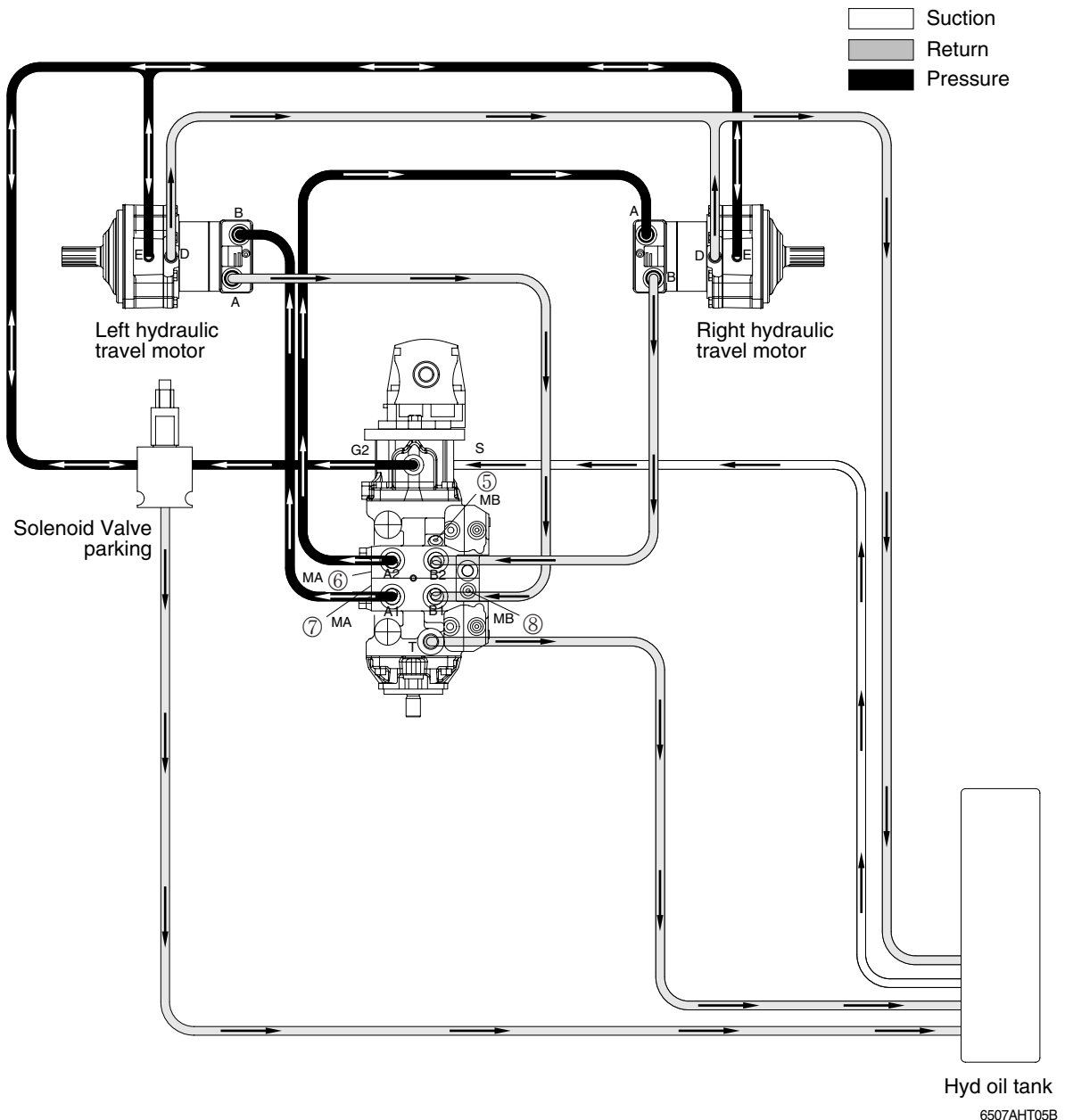
There are four relief valve cartridges to test in the hydrostatic control pump valve block. Each relief valve cartridge is set the same and is located directly below each port shown for testing.

**Example :** Oil flow shown is for testing the relief valve cartridge for the right travel motor in forward drive as shown in the shaded area of the travel circuit oil flow chart below. With a pressure gauge installed at test location ⑥ and engine at 2700rpm, seat bar up with park lock engaged; Stall the travel function by moving the right control lever forward slightly.

The pressure reading should be  $4496 \pm 290$ psi ( $310 \pm 20$ bar). The relief valve cartridge is not adjustable. If the reading is not correct, replace the relief valve cartridge that locates directly below the port.

Follow the travel circuit oil flow chart for testing the other three relief valve cartridges with a pressure gauge installed at the other test locations ⑤,⑥,⑦,⑧. With engine at full throttle, seat bar up and park lock engaged; Stall the travel function by moving the left or right control lever forward or backward slightly as shown in the chart.

(Test port size ⑤,⑥,⑦,⑧ : O-ring boss connector SAE 6)



## 5) HYDROSTATIC CONTROL PUMP FLOW

The loader must be raised and set on jack stands or blocks with all four wheels off the ground to perform the following tests.

There are four hydrostatic flow displacement tests to check the displacement of oil from the right and left hydrostatic control pumps.

**Example :** Oil flow shown is for testing the oil flow displacement of the right control pump in forward drive as shown in the shaded area of the travel circuit oil flow chart below. With a flow meter and a load valve installed at test location ⑥ and engine at 2700rpm under 2500psi(170bar) load ; The flow meter reading should be 27.7gpm (105lpm). You must move the right control lever forward to get flow reading.

Follow the travel circuit oil flow chart to test the oil flow displacement of the right control pump in reverse drive and the left control pump in forward and reverse drive by installing a flow meter at the other test locations ⑤,⑦,⑧. With engine at  $2700 \pm 50$ rpm under a 2500psi(170bar) load; The flow meter reading should be 27.7gpm (105lpm). You must move the right or left travel control forward or backward as shown in the chart to get flow reading.

If the flow meter reading is approximately 22.5gpm (85lpm) or less in any of the tests, the drive pump is showing considerable wear and should be repaired or replaced.

