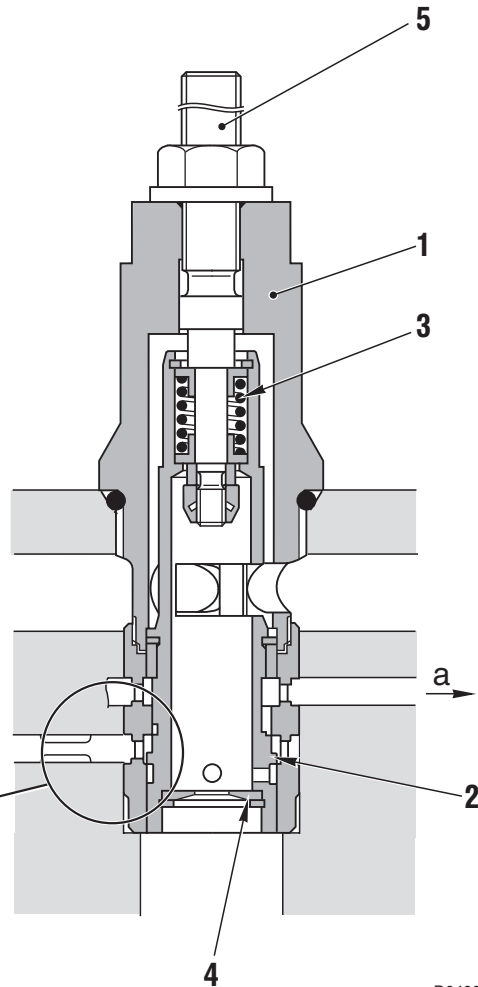
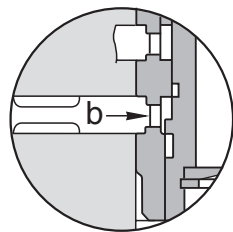


- 1 - External fixed part
- 2 - Internal sliding part
- 3 - Contrast spring
- 4 - Gauged diaphragm
- 5 - Adjusting screw
- 6 - Gear pump
- 7 - Solenoid valve
- 8 - Positioning piston



D0400712

The movement of the sliding part (2) on fixed part (1), opens the port b allowing an oil flow having a checked pressure (and therefore fixed), to reach the solenoid valve (7) and later the positioning piston (8).

The principle that the pressure acting on positioning cylinder is proportional to the Diesel engine revolutions, derives from the following considerations:

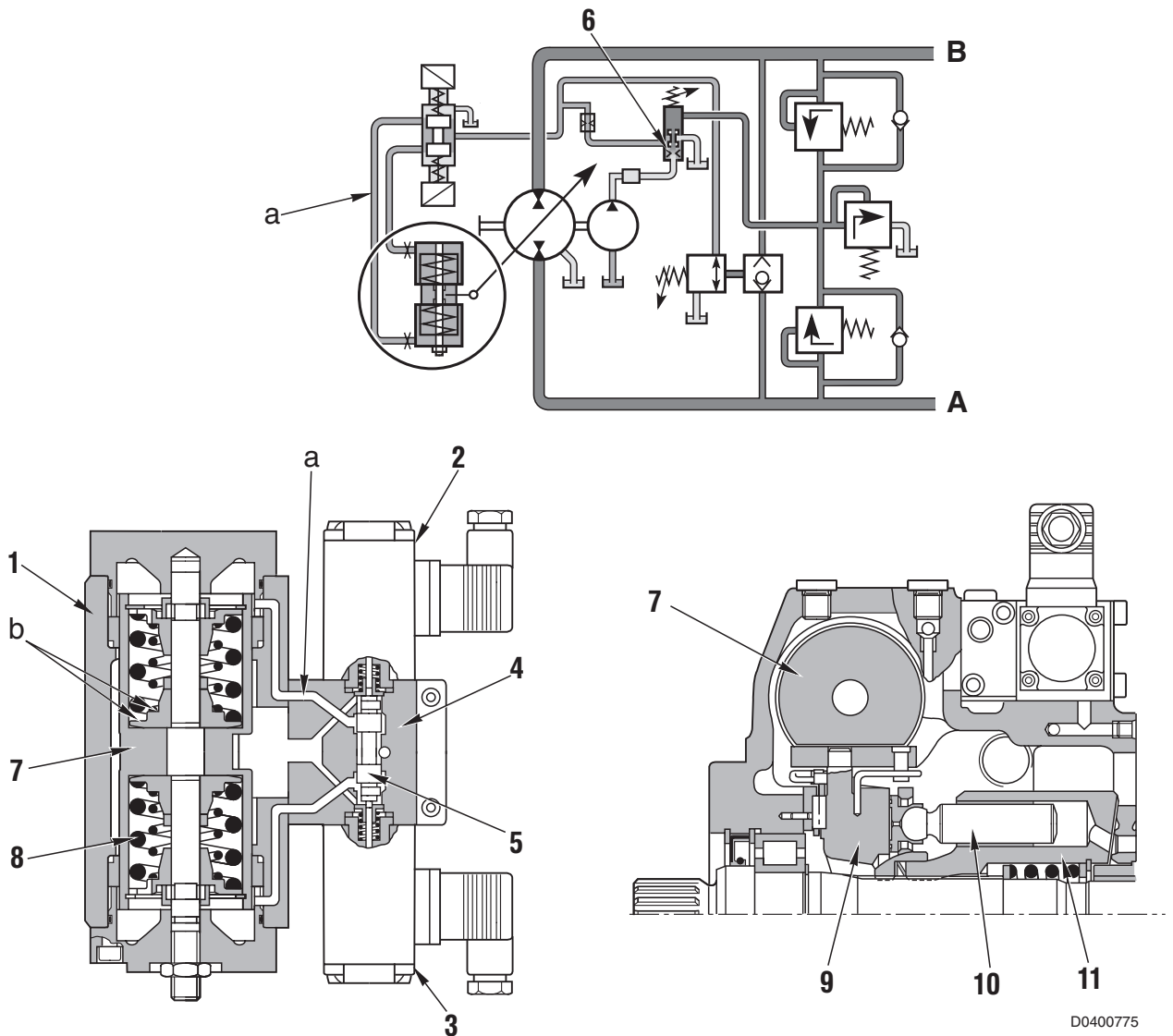
- a - The quantity of pressurised oil which reaches the solenoid valve (7) depends from the flow section between the fixed part (1) and the sliding part (2) of the valve.
  - b - The flow section depends from the force generated on sliding part (2) surface, by the pressure difference generated by the oil volume acrossing the diaphragm (4). ( $\Delta p = f(Q)$ )
  - c - The oil volume sent from gear pump (6) to initial regulation valve is directly proportional to the Diesel engine revolutions. ( $Q = f(n)$ )
- 2 - If the Diesel engine revolutions is low, the pump delivery is also low and the force generated by

the pressure difference on sliding part (2), is not sufficient to compress the spring (3) and therefore any gallery will be opened between the fixed part (1) and the sliding part (2). Acting on adjusting screw (5), it is possible to fix the idle engine to permit the hydraulic pump regulation and, consequently the motion of the machine.

- 3 - If during the work the Diesel engine idle speed decreases, this causes the following decrease:
- hydraulic pump delivery;
  - pressure difference between the two sides of diaphragm (4);
  - the force acting on sliding part (2);
  - pressure P3 acting on positioning piston (8) which, pushed by the springs, returns towards the centre of cylinder.

Therefore it is obtained a displacement decrease which will stop only when the balance is resetted between torque supplied by Diesel engine and the torque absorbed by the hydrostatic transmission.

### 3 - POSITIONING CYLINDER



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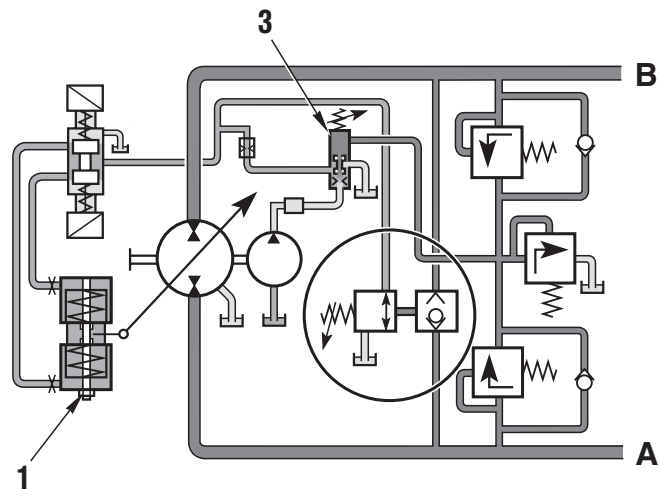
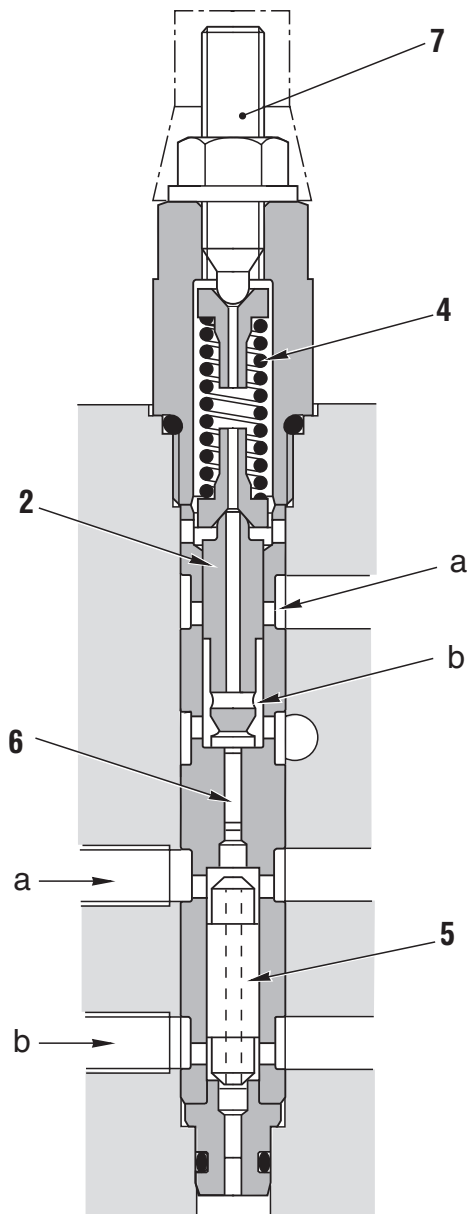
#### Function

- Positioning cylinder (1) is the actuator that moves the swash plate to address the pump's oil flow into pipe **A** or **B** and therefore to fix the travel direction of machine.
- The oil flow direction is fixed by the excitation of the magnets (2) – (3) of solenoid valve (4) by means of selector of machine's travel direction.

#### Operation

- The selector of machine's travel direction, energises a magnet (in the example the magnet (3)) which movable core moves the distribution piston (5), allowing the oil passage coming from initial adjusting valve (6) towards the positioning cylinder (1).
- When the idle speed of Diesel engine increases, the pressure coming from the oil gallery **a** by means of initial adjusting valve (6), increases in proportional manner and acting on surface **b** of piston (7) causing a movement bared by the centering springs (8).
- The movement of piston (7) causes a movement of swash plate (9) of pump which, increasing the angle, moves the pistons (10) inside the cylinder barrel (11), creating the suction and the delivery zones.

## 4 - PRESSURE CUT VALVE



D0400715

### Function

- The valve limits the maximum relief pressure of hydrostatic transmission before the intervention of safety valves, cutting the piloting pressure and cancelling partially the pump oil flow. The valve, acting on piloting circuit, permits to limit the maximum pressure supplied by the initial adjusting regulation valve (1) limiting the direct flow to positioning piston, avoiding the intervention of safety valves and therefore without any oil leakage and oil overheating.

### Operation

- The valve includes a slider (2) which intercepts the piloting pressure coming from initial adjusting valve (1) and going to positioning cylinder (3). The slider (2) is moved by the higher pressure of closed circuit in contrast with the adjusting spring (4). The pressure existing in the pressure line of closed circuit (line A on the drawing) selects the oil passage through flow selection valve (5) and, pressing on plunger (6) and therefore on slider (2), engages the spring (4). When the setting value is reached, the slider (2) lifts itself putting in communication the chamber a of piloting pressure, with relief chamber b; the effect of piloting pressure drops, causing a positioning piston backing and therefore a swash plate repositioning, until a balance condition is reached to allow the minimum flow rate holding, necessary to setting pressure value (stand-by condition).
- The pressure cut valve must be adjusted to operate at a lower pressure compared with the safety valves setting; the adjustment is obtained with the screw (7) which acts directly on contrast spring (4).

## 5 - SAFETY VALVES

The safety valves are used to protect the hydrostatic circuit from pressure peaks which exceed the maximum permissible value for hydraulic pump.

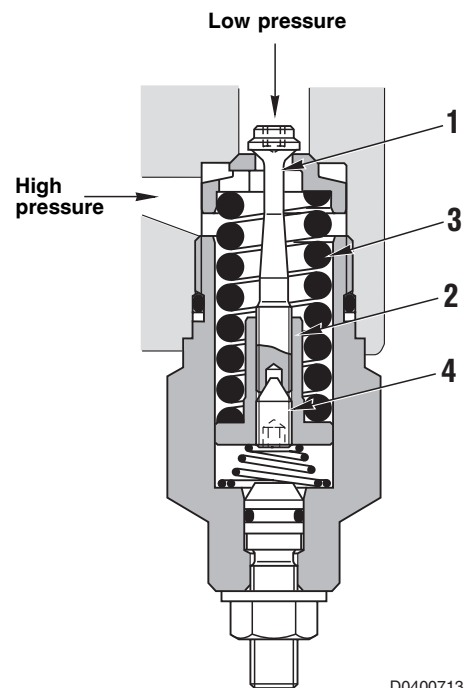
The valves are dual cartridge movable type, separating the low pressure line from the other high pressure line and both are fitted on delivery line.

When the restrictor (1) is opened, exceeding pressure is sent directly from high pressure line into low pressure line.

The safety valves must operate only in special case and only for a short time period because the oil leakage following the opening of the valve (1), produces heat and therefore the oil overheating inside the closed circuit.

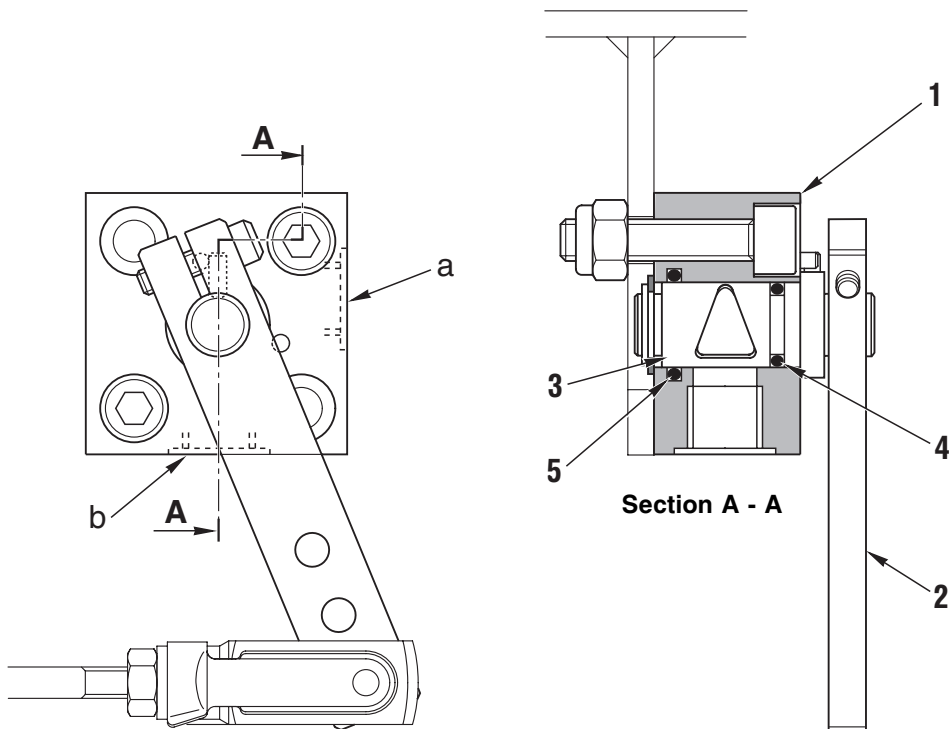
The safety valves setting must be done on test bench and is obtained adjusting the restrictor (1) into the seat (2) of the contrast spring (3).

The position is fixed by the screw (4).



D0400713

# INCHING VALVE



D0400767

- a. A Port - From hydrostatic transmission pump (PS Port)
- b. B Port - To ST1 solenoid valve (T Port)

- 1. Valve body
- 2. Control lever
- 3. Spool
- 4. O-Ring
- 5. O-Ring

## INCH VALVE

The function of this valve is to send to relief all or part of piloting flow acting on positioning piston, to limit the displacement and therefore the machine speed independently from Diesel engine revolutions.

The engine power not utilised for the swing function remains at disposal for the work equipments.