PART NO. TOPD850-EN-01

HITACHI

Reliable solutions

Technical Manual
Operational Principle

ZW

180-6
180PL-6
Wheel Loader

Service Manual consists of the following separate Part No.

Technical Manual (Operational Principle)	: Vol. No.TOPD850-EN
Technical Manual (Troubleshooting)	: Vol. No.TTPD850-EN
Workshop Manual	: Vol. No.WPD850-EN

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Electrical Component

FUEL LEVEL SENSOR	Resistance Value	Empty : 90^{+10}_{0} Ω, Full : 10^{0}_{-4} Ω
BATTERY RELAY	Voltage/Current	24 V/100 A
STARTER RELAY 2	Voltage	24 V
GLOW RELAY	Voltage	24 V
AIR FILTER RESTRICTION SWITCH	Operating Pressure	6.2±0.6 kPa
HORN	Voltage/Current	24 V·1.5±0.7 A
	Sound Pressure	113±5 dB (A) at 2 m (6'6.7")
ILLUMINATION	Work Light	Halogen 24 V, 70 W
	Cab Light	24 V, 10 W
	Head Light	Halogen 24 V, 75/70 W
	Turn Signal Light	24 V, 25 W (Front), 21W (Rear)
	Clearance Light	24 V, 4 W (EU)/24V, 5W
	License Light	24 V, 10 W×2 pcs
	Tail Light	24 V, 5 W (EU)
	Brake Light	24 V, 21 W
AIR CONDITIONER	Refrigerant	134 a
	Cooling Ability	4.65 kW or More
	Cool Air Volume	550 m^3/h or More
	Heating Ability	5.81 kW or More
	Warm Air Volume	400 m^3/h or More
	Temperature Adjusting System	Electronic Type
	Refrigerant Quantity	900±50 g
	Compressor Oil Quantity	160 cm^3
EMERGENCY (SECONDARY) STEERING PUMP UNIT	Type	Electric Motor Operated Type
	Maximum Flow	15 L/min (3.96 gpm) at 10.0 MPa (1450 psi)
ELECTRIC MOTOR	Voltage	24 V, 2.4 kW

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Engine Torque Idle Speed-Up Control

Purpose:
In case the engine speed is slow and the engine load is large, for instance while the machine climbs on a slope, the engine torque idle speed-up control increases the engine speed in order to prevent the engine stall.

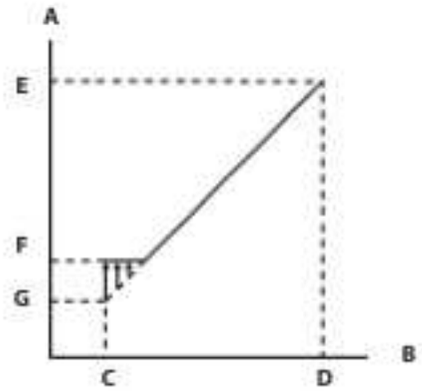
Operation:

1. When all following conditions exist, MC (3) sends the signal equivalent to the target engine speed to ECM (10) by using CAN communication (5).

- Forward/Reverse Lever (23): Operated
- Vehicle Speed: less than 20 km/h (12 mph)
- Accelerator Pedal (1) Depressing Amount: Lightly depressed (Engine Speed: less than 1100 min^{-1})
- Engine Torque: over specified value (Reference: over 20 %)

2. ECM (10) increases the engine speed to engine torque idle speed-up speed (F).

NOTE: The engine torque idle speed-up control is also activated when the signal of forward/reverse switch (27) is effective in case of the machine equipped with forward/reverse switch (27).



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A - Engine Speed
B - Accelerator Pedal Depressing Amount
C - Accelerator Pedal Depressing Amount: Not depressed
D - Accelerator Pedal Depressing Amount: Fully depressed
E - Fast Idle Speed (2350 min^{-1})
F - Engine Torque Idle Speed-Up Speed (Max. 1100 min^{-1})
G - Slow Idle Speed (800 min^{-1})

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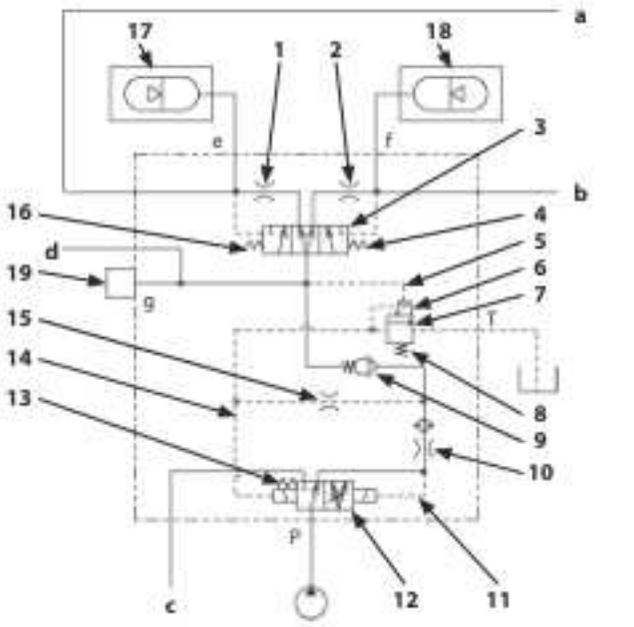
Brake Charge Valve

The brake charge valve consists of priority valve (12), spool (3), and pilot piston (7).

Operation

- Between pressure accumulation start and finish

1. When the pressure of the brake circuits (service brake accumulators (17, 18)) decrease, the passage (5) pressure also decreases. Pilot piston (7) and piston (6) are moved down (up on the circuit diagram) by the spring (8) force.
2. Therefore, the passage (14) pressure increases slowly as passage (14) and port T are blocked by pilot piston (7).
3. When the passage (14) pressure is under the condition that the passage (14) pressure and the spring (13) force are larger than the oil chamber (11) pressure, priority valve (12) moves to the right.
4. The pressure oil from port P pushes to open check valve (9) and flows to service brake accumulators (17, 18) and the brake circuits.
5. At this time, in case the pressure difference is generated in the front and rear brake circuits, spool (3) moves to the pressure-low side.
6. Therefore, the pressure oil is supplied to the pressure-low circuit preferentially.
7. When the brake circuit pressure decreases, priority valve (12) is moved to the right by the spring (13) force and the pressure oil is supplied to the brake circuit preferentially.
8. This operation continues until the pressure oil is accumulated in service brake accumulators (17, 18) and the accumulator pressure reaches the cutout pressure.

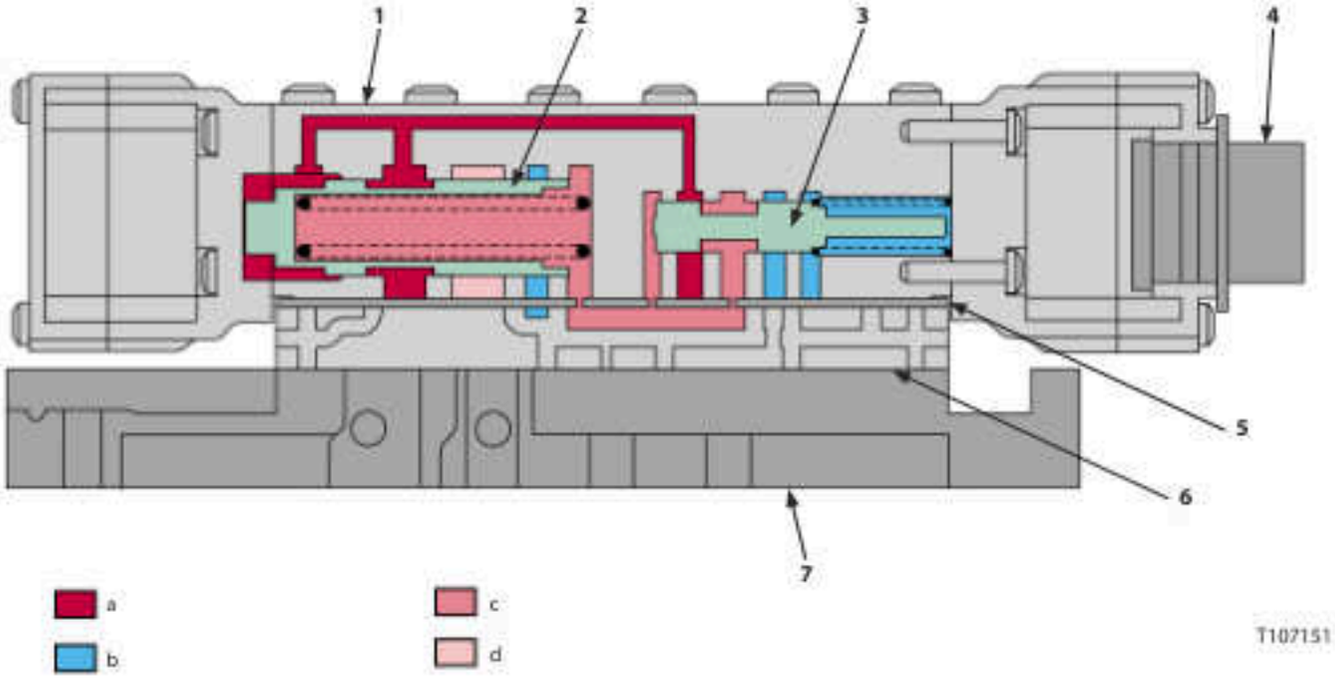


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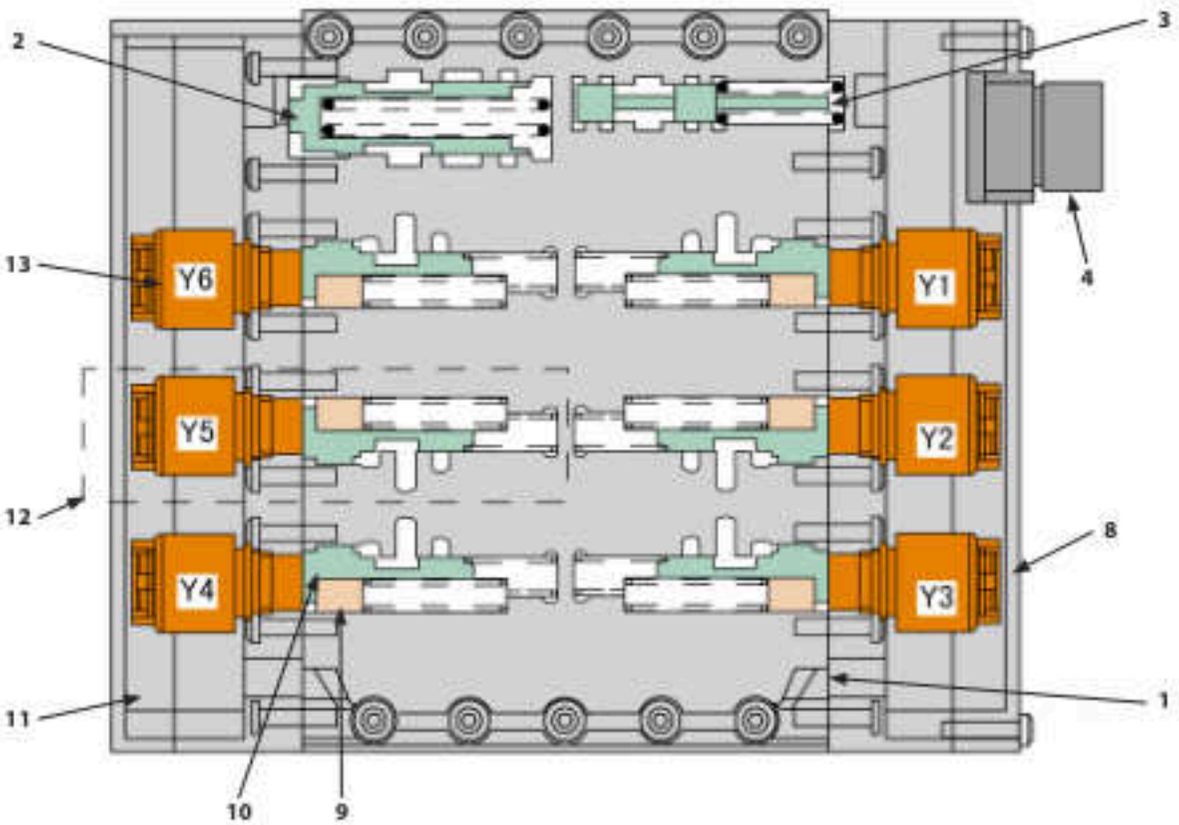
a- To Brake Valve (Front)
b- To Brake Valve (Rear)
c- To Manifold Valve
d- To Parking Brake

1- Orifice
2- Orifice
3- Spool
4- Spring
5- Passage
6- Piston
7- Pilot Piston
8- Spring
9- Check Valve
10- Orifice
11- Oil Chamber
12- Priority Valve
13- Spring
14- Passage
15- Orifice
16- Spring
17- Service Brake Accumulator (Front)
18- Service Brake Accumulator (Rear)
19- Pressure Sensor (Brake Primary Pressure)

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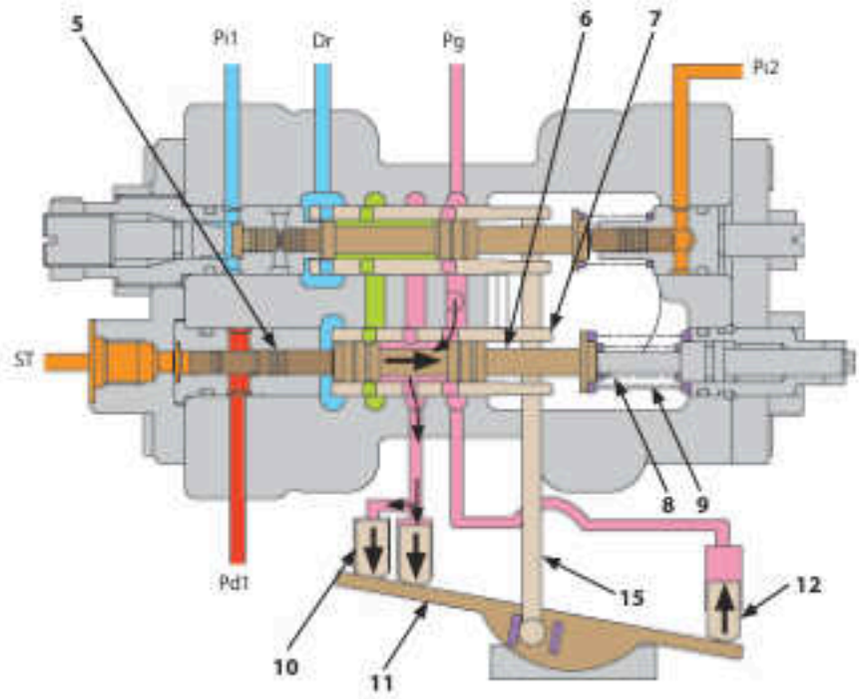


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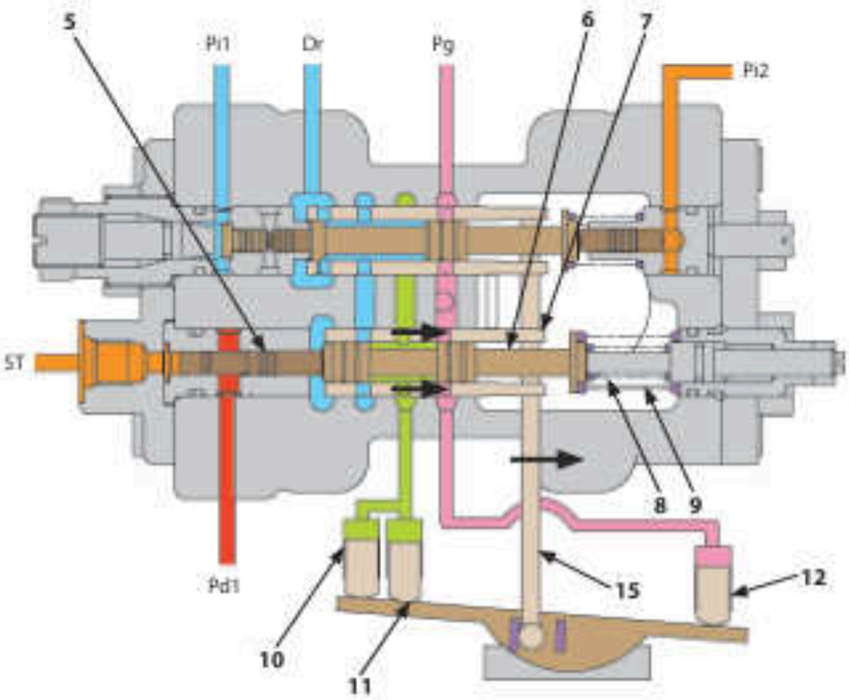
a- System Main Pressure Oil
b- Returning Oil
c- Reduced Pressure Oil
d- Converter Pressure Oil (Return Oil)

1- Valve Body
2- Pressure Control Valve
3- Pressure Reducing Valve
4- Connector
5- Middle Plate
6- Channel Plate
7- Plate
8- Cover
9- Damper Valve
10- Spool
11- Housing
12- Modulation Circuit
13- Proportional Solenoid Valve

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Pd1- Own Pump Delivery Pressure
ST- Torque Control Pressure

Dr- Returning to Hydraulic Oil Tank
Pi1- Pump Control Pressure 1

Pi2- Pump Control Pressure 2
Pg- Primary Pilot Pressure (From Pilot Pump)

5- Load Piston
6- Spool 2
7- Sleeve 2

8- Inner Spring
9- Outer Spring
10- Servo Piston 1

11- Swash Plate
12- Servo Piston 2
15- Feedback Lever Link

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