PART NO. TODFU90-EN-00

HITACHI

Reliable solutions

Technical Manual
Operational Principle

ZX
225US-5A
225USLC-5A
Hydraulic Excavator

Service Manual consists of the following separate Part No.

Technical Manual (Operational Principle)	: Vol. No.TODFU90-EN
Technical Manual (Troubleshooting)	: Vol. No.TTDFU90-EN
Workshop Manual	: Vol. No.WDFU90-EN
Engine Manual	: Vol. No.ETDCY-EN, EWDCY-EN

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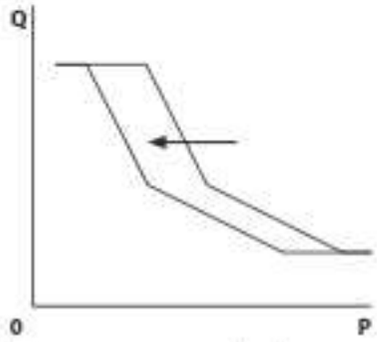
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Electrical Component

BATTERY RELAY	Voltage/Current	24 V/100 A
STARTER RELAY 1	Voltage	24 V
GLOW RELAY	Voltage	24 V
HYDRAULIC OIL TEMPERATURE SENSOR	Operating Temperature	-30 to 120 °C
AIR FILTER RESTRICTION SWITCH	Operating Pressure	6.2±0.6 kPa
HORN	Voltage/Current	24 V/2.5$^{+0.5}_{-1}$ A
	Sound Pressure	113±5 dB (A) at 2 m
ILLUMINATION	Work Light	Halogen 24 V, 70 W
	Cab Light	24 V, 10 W
AIR CONDITIONER	Refrigerant	134 a
	Cooling Ability	3.7 kW or More
	Cool Air Volume	380 m^3/h or More
	Heating Ability	5.2 kW or More
	Warm Air Volume	320 m^3/h or More
	Temperature Adjusting System	Electronic Type
	Refrigerant Quantity	850±50 g
	Compressor Oil Quantity	160 cm^3

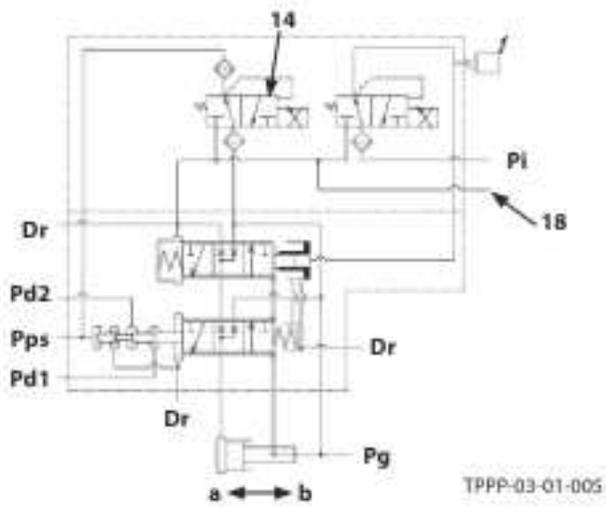
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- Control by Pilot Pressure from Torque Control Solenoid Valves (14, 16)
  MC (main controller) sends the signals to torque control solenoid valves (14, 16) according to the engine speed and the signals from sensors.
  Torque control solenoid valves (14, 16) deliver torque control pilot pressure Pps to the regulator in response to the these signals. When receiving torque control pilot pressure Pps, the regulator decreases the pump delivery flow rate.
  (Refer to SYSTEM/Control System.)

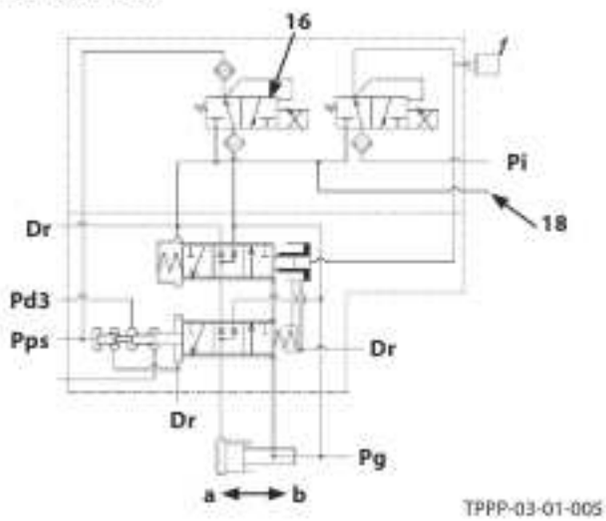


Q- Flow Rate
P- Pressure

Pump 2 Regulator



Pump 3 Regulator



Pd1- Pump 1 Delivery Pressure
Pd2- Pump 2 Delivery Pressure
Dr- Returning to Hydraulic Oil Tank
Pi- Pump Control Pressure
Pps- Torque Control Pressure
Pg- Primary Pilot Pressure (From Pilot Pump)
a- Displacement Angle Increase
b- Displacement Angle Decrease

14- Pump 1 and 2 Torque Control Solenoid Valve
16- Pump 3 Torque Control Solenoid Valve
18- Air Bleeding Circuit

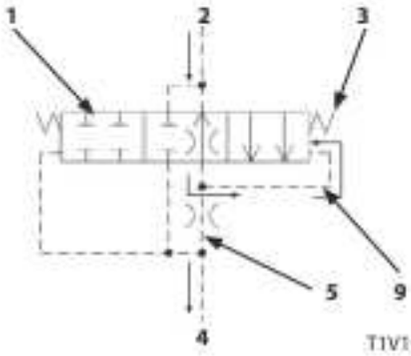
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Shockless Valve

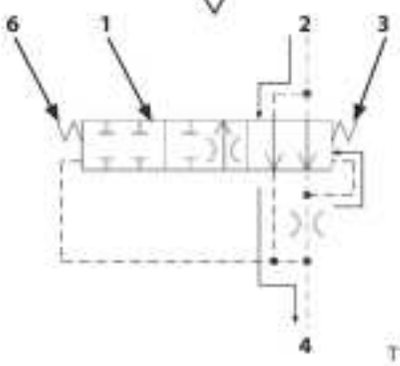
The shockless valve is provided in the boom raise circuit and functions during boom lowering operation or when stopping boom raise operation.

During boom raise operation

1. Boom raise pilot pressure acts on spool (1) through port A (2).
2. Immediately after operation is started, pilot pressure is low. The pilot pressure oil flows to the spring B (3) chamber through clearance C between spool (1) and housing (7) and inner passage 3 (9). At the same time, pilot pressure oil flows to the port 1 (4) side through inner passage 2 (5).
3. When pilot pressure increases, pressure in the spring B (3) chamber also increases. Spool (1) pushes spring A (6) and is moved to the left.
4. As spool (1) is moved, port A (2) is connected to port 1 (4) and pressure in the port 1 (4) side increases. Then, the control valve spool is moved.



T1V1-03-06-003

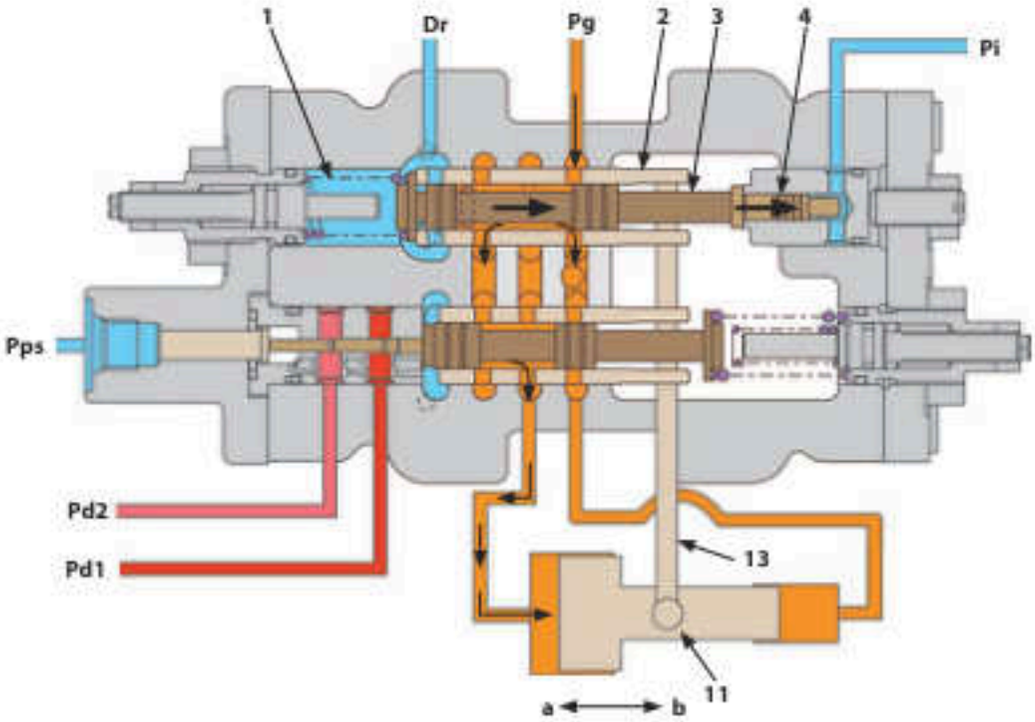


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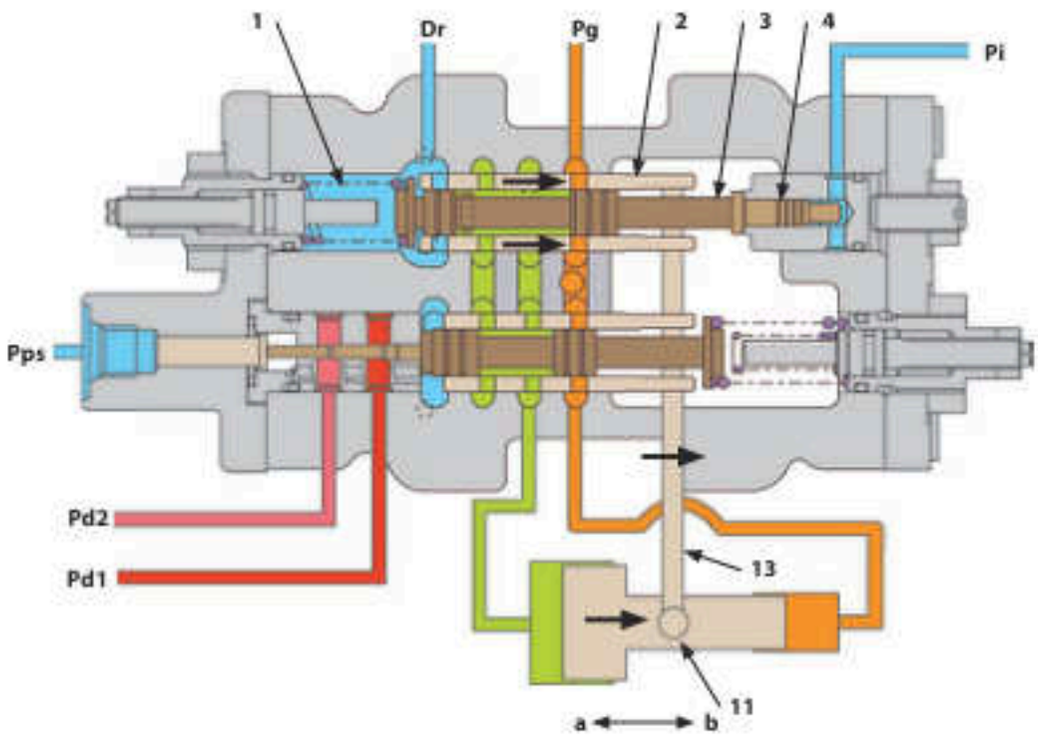
1- Spool
2- Port A
3- Spring B
4- Port 1
5- Inner Passage 2
6- Spring A
9- Inner Passage 3

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NOTE: The illustration shows the pump1 regulator.



TPPP-03-01-018



TPPP-03-01-019

Pd1- Pump 1 Delivery Pressure
Pd2- Pump 2 Delivery Pressure

Dr- Returning to Hydraulic Oil Tank
Pi- Pump Control Pressure

Pps- Torque Control Pressure
Pg- Primary Pilot Pressure (From Pilot Pump)

a- Displacement Angle Increase
b- Displacement Angle Decrease

1- Spring
2- Sleeve A

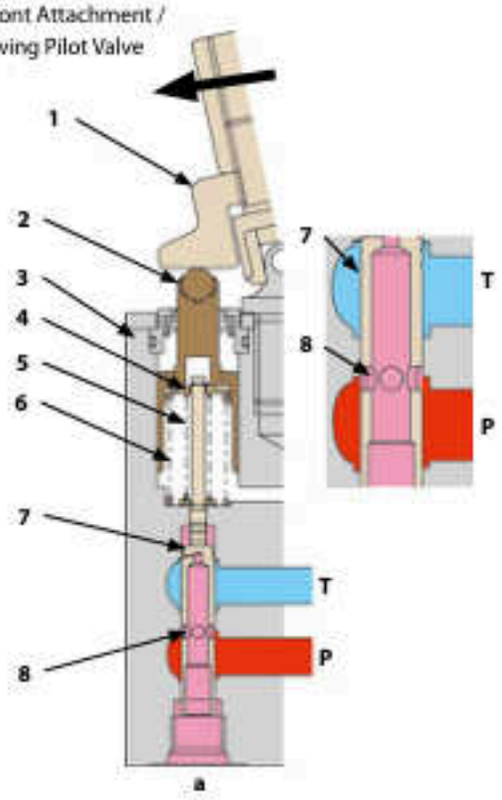
3- Spool A
4- Piston

11- Servo Piston

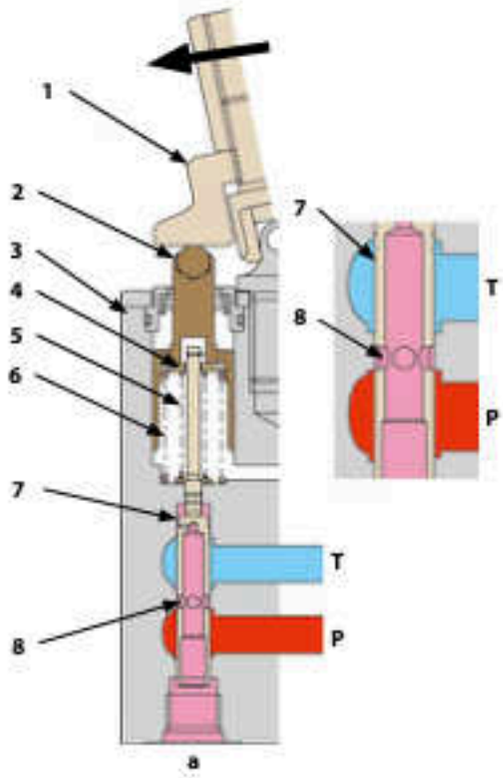
13- Link

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Front Attachment / Swing Pilot Valve

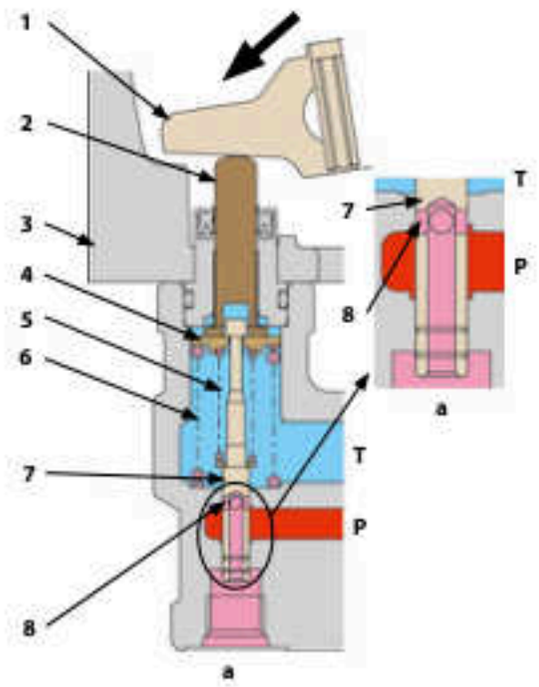


TPPP-03-04-007

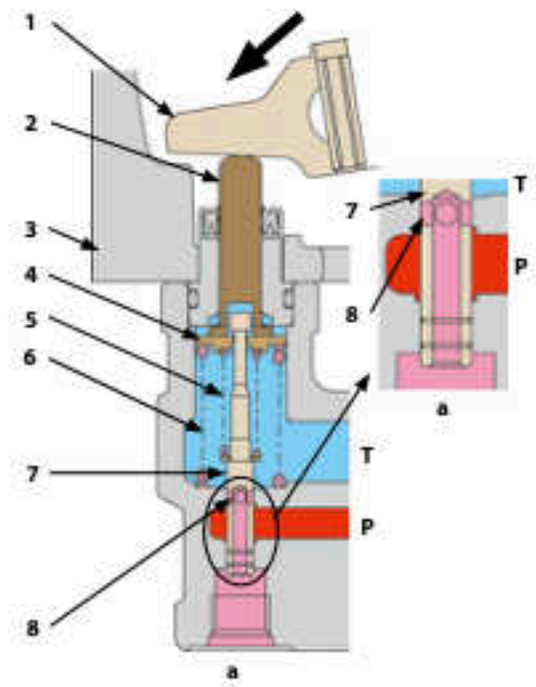


TPPP-03-04-008

Travel Pilot Valve



TPPP-03-04-012



TPPP-03-04-013

P- Port P
T- Port T
a- Output Port

1- Cam
2- Pusher
3- Casing
4- Spring Guide
5- Balance Spring
6- Return Spring
7- Spool
8- Hole

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