PART NO. TODCY90-EN-00

HITACHI

Reliable solutions

# Technical Manual
## Operational Principle

# ZX
# 240-5A
# 240LC-5A
# 250H-5A
# 250LCH-5A
# 250K-5A
# 250LCK-5A
# Hydraulic Excavator

Service Manual consists of the following separate Part No.

| | |
|---|---|
| Technical Manual (Operational Principle) | : Vol. No.TODCY90-EN |
| Technical Manual (Troubleshooting) | : Vol. No.TTDCY90-EN |
| Workshop Manual | : Vol. No.WDCY90-EN |
| Engine Manual | : Vol. No.ETDCY-EN, EWDCY-EN |

MidWestTech | Hitachi ZX240-5A, ZX240LC-5A, ZX250H-5A, ZX250LCH-5A, ZX250K-5A, ZX250LCK-5A Excavator Operational Principle Technical Service Manual | Publication TODCY90-EN-00

Order the manual at mid-west-tech.com >

# SECTION 1

# GENERAL

## CONTENTS


### Group 1 Specifications

Specifications ..... T1-1-1
Working Ranges ..... T1-1-4

### Group 2 Component Layout

Main Component ..... T1-2-1
Electrical System (Overview) ..... T1-2-2
Electrical System (Rear Tray) ..... T1-2-3
Electrical System (Switch Panel) ..... T1-2-4
Electrical System (Around Air Cleaner) ..... T1-2-5
Electrical System (Relays, etc.) ..... T1-2-6
Components Related with Engine ..... T1-2-7
Components Related with Pump Device ..... T1-2-8
Around Pump Device ..... T1-2-9
Components Related with Control Valve ..... T1-2-10
Components Related with Signal Control Valve ..... T1-2-10
Components Related with Swing Device ..... T1-2-12
Travel Device ..... T1-2-12
3-Spool Solenoid Valve Unit ..... T1-2-13
Layout of Attachment Spec. Parts ..... T1-2-14
Control Valve Side of Hydraulic Oil Tank ..... T1-2-16

### Group 3 Component Specifications

Engine ..... T1-3-1
Engine Accessories ..... T1-3-5
Hydraulic Component ..... T1-3-6
Electrical Component ..... T1-3-10





MidWestTech | Hitachi ZX240-5A, ZX240LC-5A, ZX250H-5A, ZX250LCH-5A, ZX250K-... Order the manual at mid-west-tech.com >

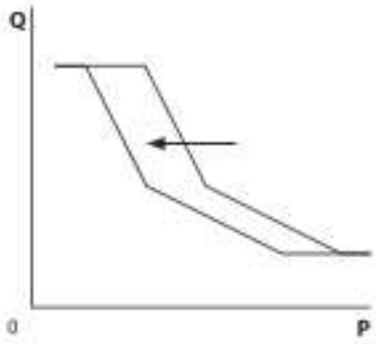
## Group 3 Component Specifications

| | | |
|---|---|---|
| FRONT ATTACHMENT PILOT VALVE | Plunger Stroke | Ports 1, 3: 6.5 mm (0.26 in) |
| | | Ports 2, 4: 8.0 mm (0.32 in) |
| TRAVEL PILOT VALVE | Plunger Stroke | Ports 1, 2, 3, 4: 4.6 mm (0.18 in) |
| 3-SPOOL SOLENOID VALVE UNIT | Type | 3-Spool Proportional Solenoid Valve |
| | Rated Voltage | DC 24 V |
| | Coil Resistance | 22 Ω |
| AUXILIARY FLOW CONBINER CONTROL SOLENOID VALVE (Optional) | Rated Voltage | DC 24 V |
| | Coil Resistance | 59.7 Ω |
| AUXILIARY FLOW RATE CONTROL SOLENOID VALVE (Optional) | Rated Voltage | DC 24 V |
| | Coil Resistance | 22 Ω |
| SIGNAL CONTROL VALVE | Rated Pressure | 3.72 MPa (38 kgf/cm$^2$, 540 psi) |
| PILOT SHUT-OFF SOLENOID VALVE | Type | ON/OFF Solenoid Valve |
| | Rated Voltage | DC 24 V |
| | Coil Resistance | 49 Ω |
| OIL COOLER BYPASS CHECK VALVE | Cracking Pressure | 490 kPa (5 kgf/cm$^2$, 71 psi) at 5 L/min |

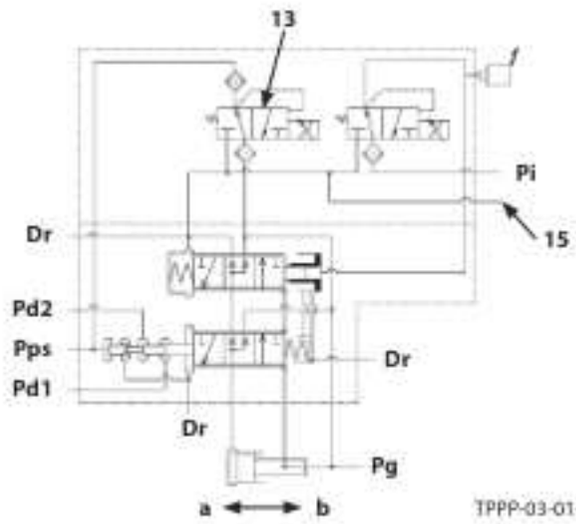


MidWestTech | Hitachi ZX240-5A, ZX240LC-5A, ZX250H-5A, ZX250LCH-5A, ZX250K-... Order the manual at mid-west-tech.com >

- Control by Pilot Pressure from Torque Control Solenoid Valve (13)
  MC (main controller) sends the signals to torque control solenoid valve (13) according to the engine speed and the signals from the sensors.
  Torque control solenoid valve (13) delivers the torque control pressure Pps to the regulator in response to the signals from MC. When receiving the torque control pressure Pps, the regulator reduces the pump delivery flow rate.
  (Refer to SYSTEM / Control System.)




Q- Flow Rate
P- Pressure




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
13- Torque Control Solenoid Valve
15- Air Bleeding Circuit



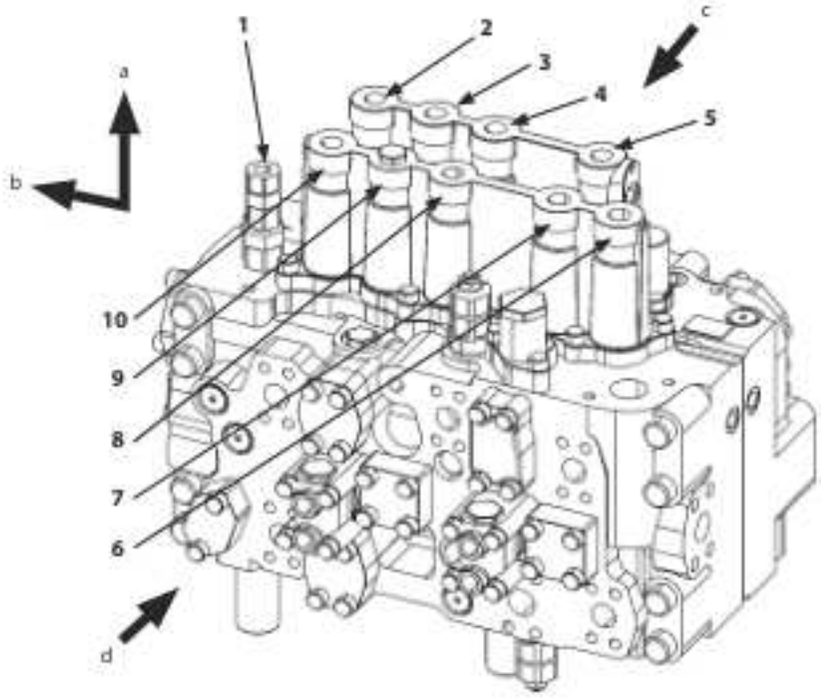
MidWestTech | Hitachi ZX240-5A, ZX240LC-5A, ZX250H-5A, ZX250LCH-5A, ZX250K-... Order the manual at mid-west-tech.com >

## Outline

The control valve controls the oil pressure, flow rate, and flow direction in the hydraulic circuit.
The major parts are the main relief valve, overload relief valve, flow combiner valve, anti-drift valve, flow rate control valve, regenerative valve, digging regenerative valve, boom lower meter-in cut valve, auxiliary flow combiner valve, bypass shut-out valve, and spools. The spools are operated by the pilot oil pressure.

As for the spools, in the 4-spool section, travel (right), bucket, boom 1, and arm 2 are arranged in that order as viewed from the machine front. In the 5-spool section, travel (left), auxiliary, boom 2, arm 1, and swing are arranged in that order as viewed from the machine front.

### Control Valve



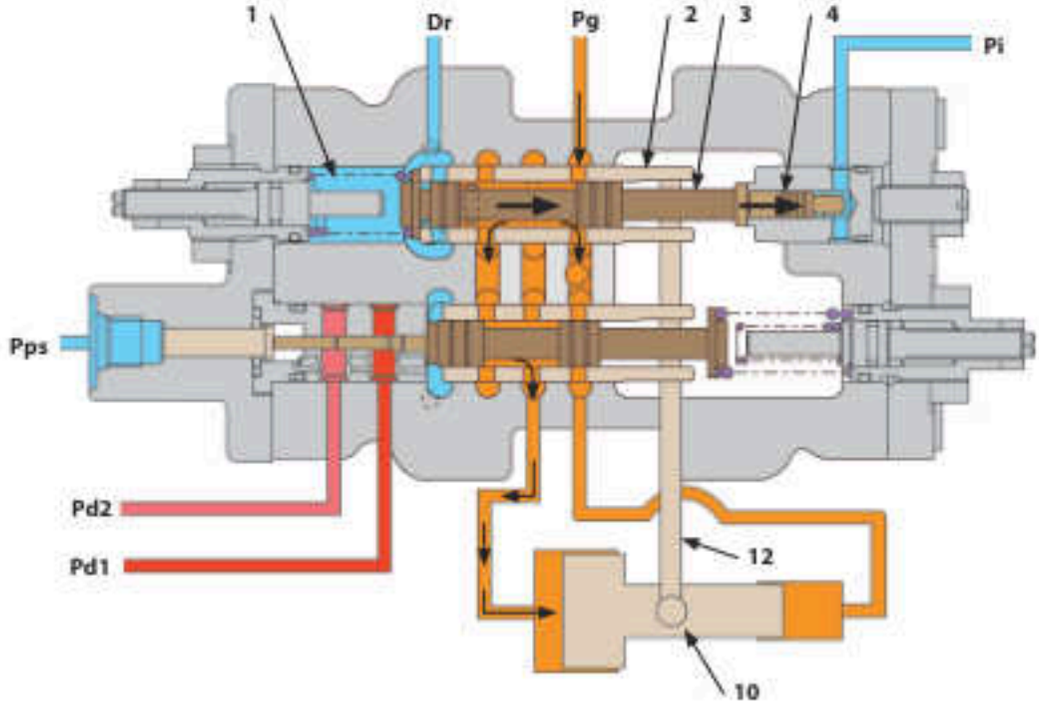

T1V1-03-03-072

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| a- | Machine Upper Side | b- | Machine Front Side | c- | 4-Spool Section | d- | 5-Spool Section |
| 1- | Main Relief Valve (A Side) | 4- | Boom 1 | 7- | Arm 1 | 10- | Travel (Left) |
| 2- | Travel (Right) | 5- | Arm 2 | 8- | Boom 2 | | |
| 3- | Bucket | 6- | Swing | 9- | Auxiliary | | |

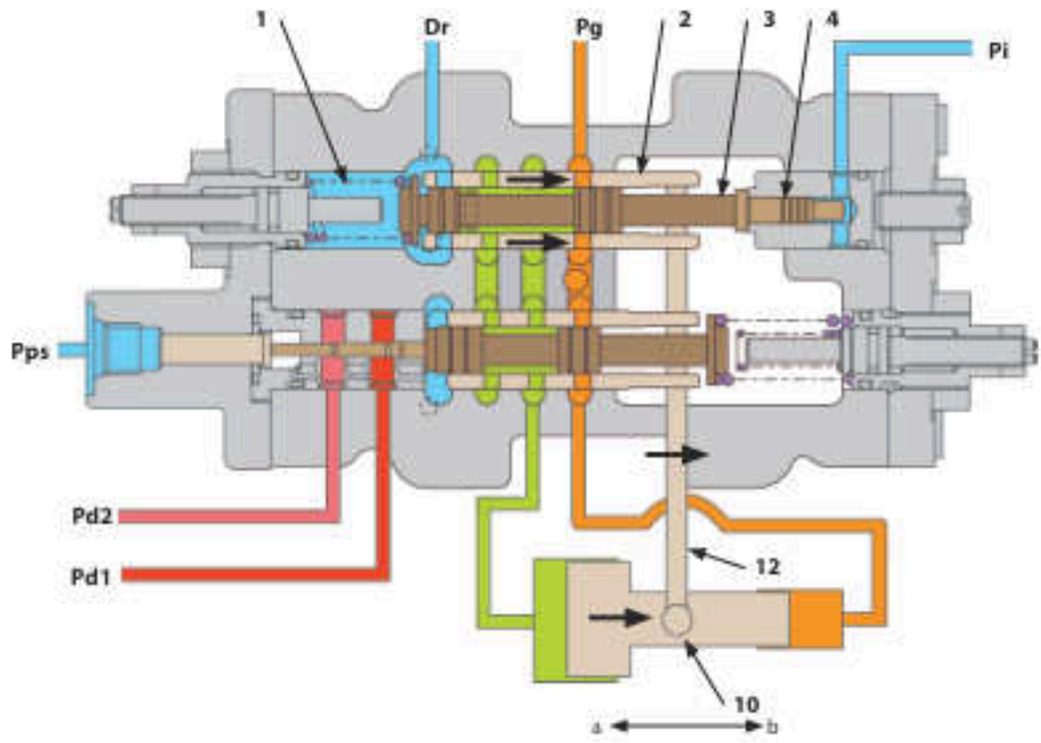


MidWestTech | Hitachi ZX240-5A, ZX240LC-5A, ZX250H-5A, ZX250LCH-5A, ZX250K-... Order the manual at mid-west-tech.com >

*NOTE: The illustration shows the pump 2 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

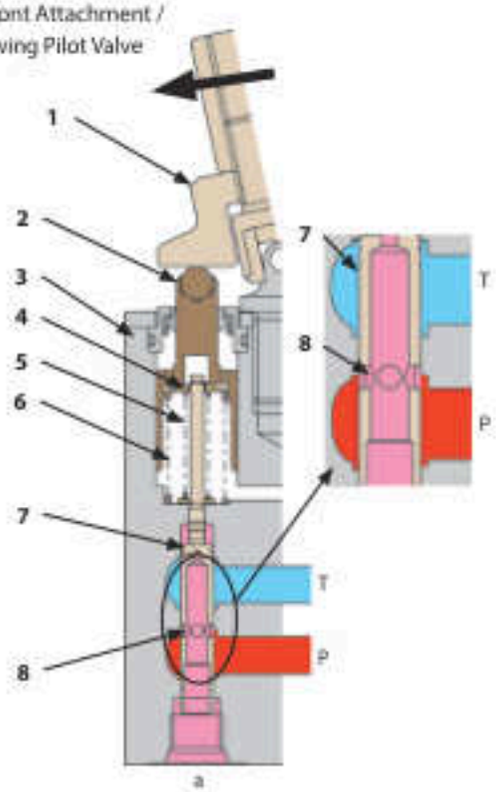
Pg- Primary Pilot Pressure (From Pilot Pump)

1- Spring
2- Sleeve A
3- Spool A
4- Piston
10- Servo Piston
12- Link

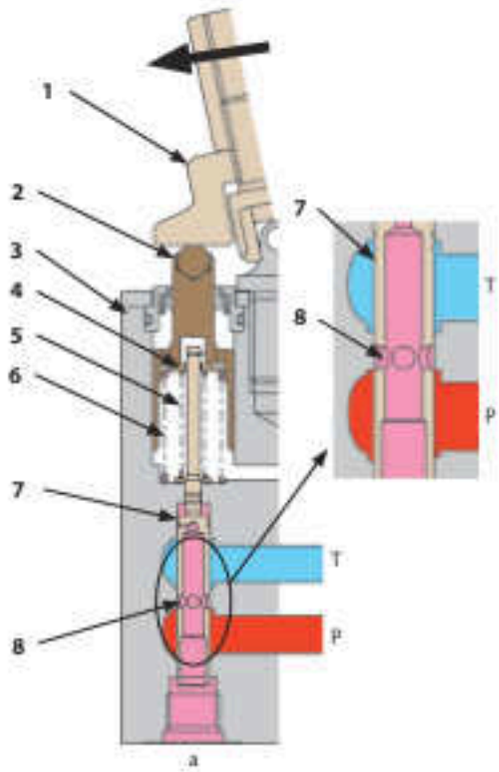


MidWestTech | Hitachi ZX240-5A, ZX240LC-5A, ZX250H-5A, ZX250LCH-5A, ZX250K-... Order the manual at mid-west-tech.com >

Front Attachment /
Swing Pilot Valve

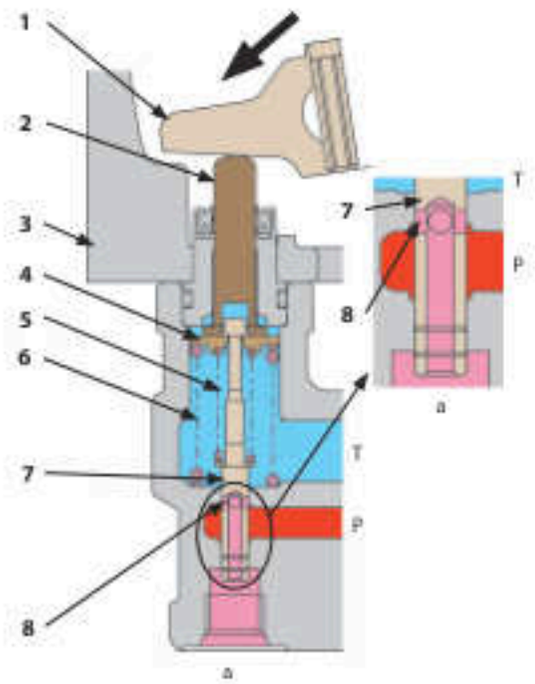



TPPP-03-04-007

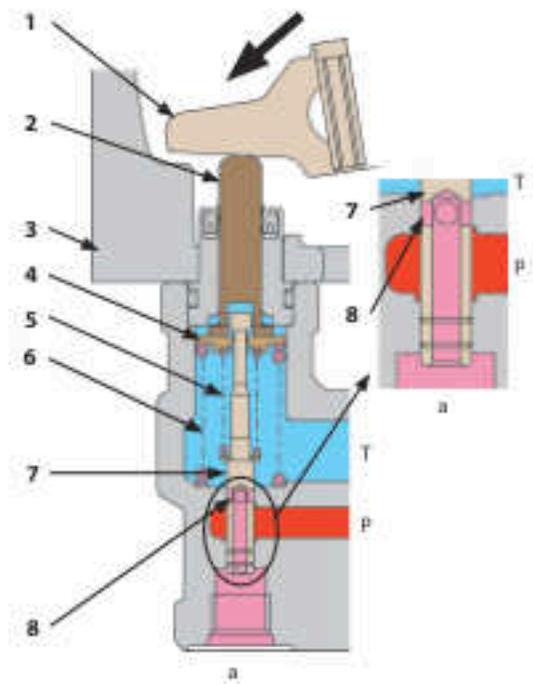



TPPP-03-04-008

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



MidWestTech | Hitachi ZX240-5A, ZX240LC-5A, ZX250H-5A, ZX250LCH-5A, ZX250K-...
Order the manual at mid-west-tech.com >