PART NO. TODDF-EN-00

HITACHI

Reliable solutions

Technical Manual

Operational Principle

ZX
280-5G
280LC-5G

Hydraulic Excavator

Service Manual consists of the following separate Part No.

Technical Manual (Operational Principle)	: Vol. No.TODDF-EN
Technical Manual (Troubleshooting)	: Vol. No.TTDDF-EN
Workshop Manual	: Vol. No.WDDF-EN
Engine Manual	: Vol. No.EDCD-EN

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SECTION 1

GENERAL

CONTENTS

Group 1 Specifications

Specifications T1-1-1
Working Ranges (Grouser shoe) T1-1-2

Group 2 Component Layout

Main Component T1-2-1
Electrical System (Overview) T1-2-2
Engine T1-2-3
Electrical System (In Cab) T1-2-3
Electrical System (Rear Tray) T1-2-4
Electrical System (Switch Panel) T1-2-5
Electrical System (Around Air Cleaner) T1-2-6
Electrical System (Relays) T1-2-7
Pump Device T1-2-8
Control Valve T1-2-9
Signal Control Valve T1-2-9
Swing Device T1-2-11
Travel Device T1-2-11
3-Spool Solenoid Valve Unit T1-2-12
Layout of Attachment Spec. Parts T1-2-14

Group 3 Component Specifications

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

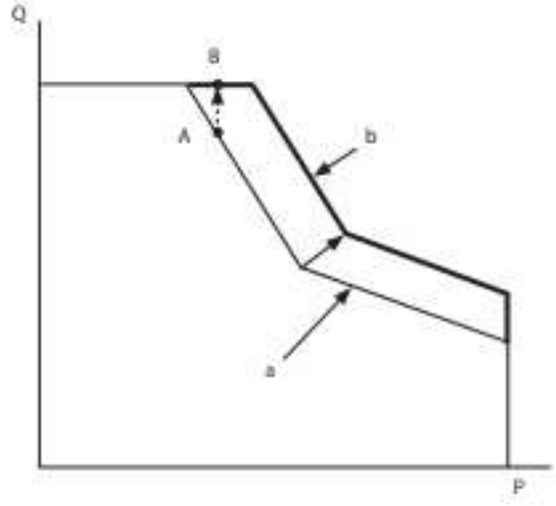
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SWING DEVICE	Type	Two-Stage Reduction Planetary Gear
	Reduction Gear Ratio	17.513
SWING MOTOR	Model	MSX180 CHB-10A-65B
	Type	Swash-Plate Type, Fixed Displacement Axial Plunger Motor
VALVE UNIT	Type	Non Counterbalance Valve Type
	Relief Set-Pressure	32.4 MPa (330 kgf/cm^2, 4710 psi) at 190 L/min
SWING PARKING BRAKE	Type	Wet-Type Spring Set Hydraulic Released Multi-Disc Brake
	Release Pressure	1.9 to 2.8 MPa (20 to 28.6 kgf/cm^2, 284 to 410 psi)
TRAVEL DEVICE	Type	Three-Stage Reduction Planetary Gear
	Reduction Gear Ratio	70.842
TRAVEL MOTOR	Type	Swash-Plate Type Variable Displacement Axial Plunger Motor
	Theoretical Displacement (Fast/Slow)	86.5/145.5 cm^3/rev (5.3/8.9 in^3/rev)
TRAVEL BRAKE VALVE	Type	Counterbalance Valve Type
	Relief Set Pressure	34.8 MPa (355 kgf/cm^2, 5050 psi)
TRAVEL PARKING BRAKE	Type	Wet-Type Spring Set Hydraulic Released Multi-Disc Brake
	Release Starting Pressure	1.07 to 1.23 MPa (10.9 to 12.3 kgf/cm^2, 156 to 179 psi)

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Travel Torque-Up Control

Purpose:
The travel torque-up control effectively controls during single travel operation.
When travel operation is performed with the engine running at slow speed, normally, the hydraulic pump delivers pressure oil at the flow rate corresponding to point A on the P-Q curve as illustrated. Therefore, if any difference exists between pump 1 and pump 2 flow rate, the machine will mistrack.
In order to prevent mistracking, when traveling the machine with the engine running at slow speed, the pump P-Q curve is raised and the pump delivers pressure oil at the flow rate corresponding to point B (maximum flow rate).
When travel operation is made with the engine running at fast speed, the pump P-Q curve is raised in order to improve travel function.



P - Pressure
a - Normal P-Q Curve
Q - Flow Rate
b - Increased Torque P-Q Curve

Operation:

1. When all following conditions exist, MC (8) calculates the data including the signals from pump 1 delivery pressure sensor (17) and pump 2 delivery pressure sensor (16) and sends the signals to torque control solenoid valve (20).
2. Torque control solenoid valve (20) delivers the pilot pressure according to the signals to the regulator and increases the pump delivery flow rate.

Condition:

- Engine control dial (24): Slow idle speed
- Pressure sensor (travel) (5): Outputting signal
- Pressure sensor (front attachment) (6): No signal

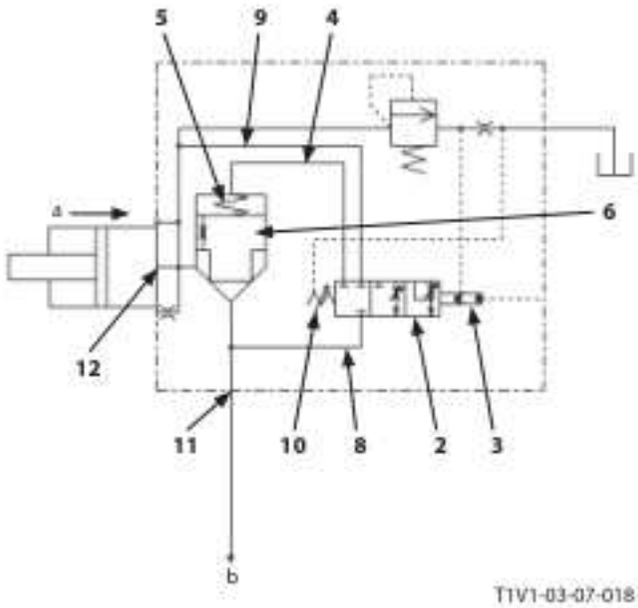
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Hose Rupture Valve

The hose rupture valve is installed to boom cylinder (bottom side circuit), arm cylinder (rod side circuit). When the hose of front attachment is damaged, the hose rupture valve holds the front attachment and prevents the front attachment from falling.

NOTE: The hose rupture valve in boom cylinder is explained here.

- Control Lever: In Neutral
  1. As pilot pressure Pi does not act on piston (3), spool (2) is pushed to the right by the spring (10) force.
  2. One holding pressure of cylinder at port B (12) acts on poppet (6) and the other acts on spool (2) through passage C (9).
  3. Holding pressure through passage C (9) is blocked by spool (2). Although pressure oil in the spring (5) chamber also acts on spool (2) through passage A (4), pressure oil is blocked by spool (2) and does not flow to passage B (8).
  4. Therefore, poppet (6) is pushed downward by force (pressure of the spring (5) chamber + spring (5)).
  5. Consequently, as holding pressure at port B (12) is blocked completely, the front attachment is held and prevented from falling when the hose of front attachment is damaged.

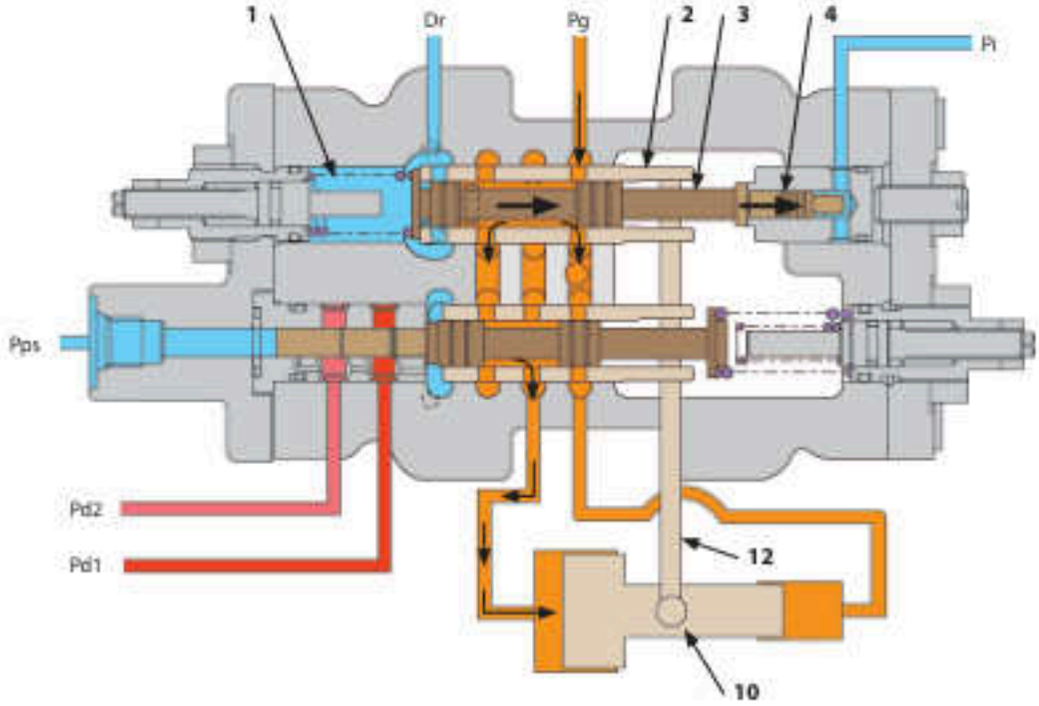


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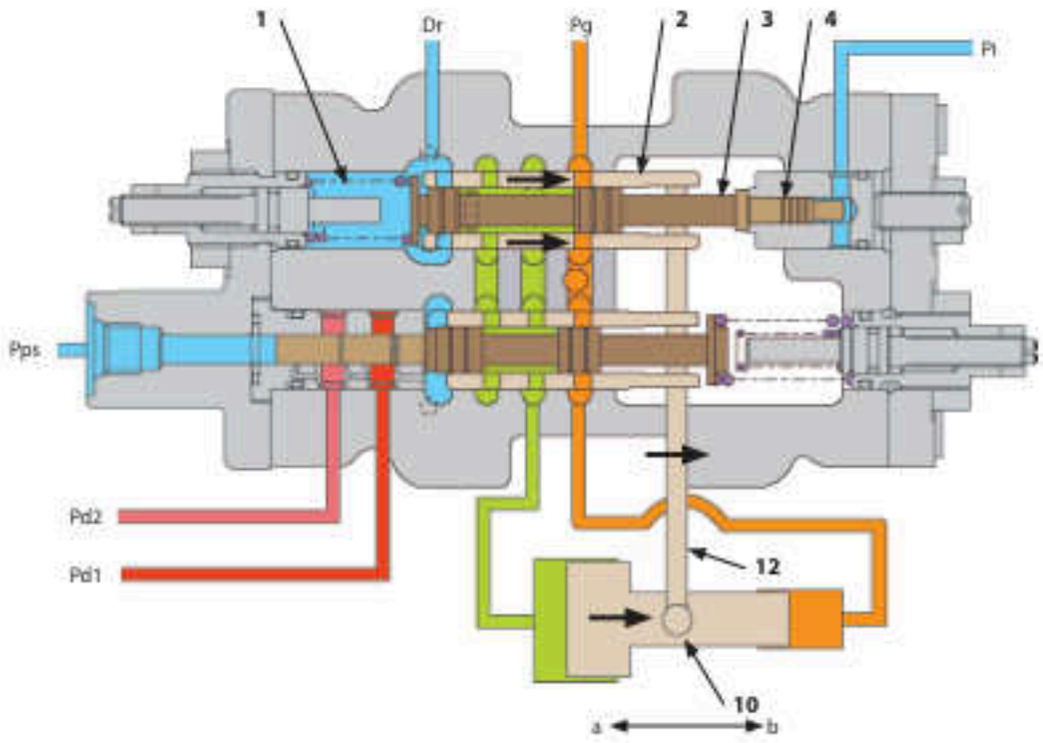
a- External Force
b- To Spool in Control Valve (To Hose of Front Attachment)
2- Spool
3- Piston
4- Passage A
5- Spring
6- Poppet
8- Passage B
9- Passage C
10- Spring

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NOTE: The illustration shows the pump2 regulator.



TDCD-03-01-011



TDCD-03-01-012

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

Dr- Returning to Hydraulic Oil Tank

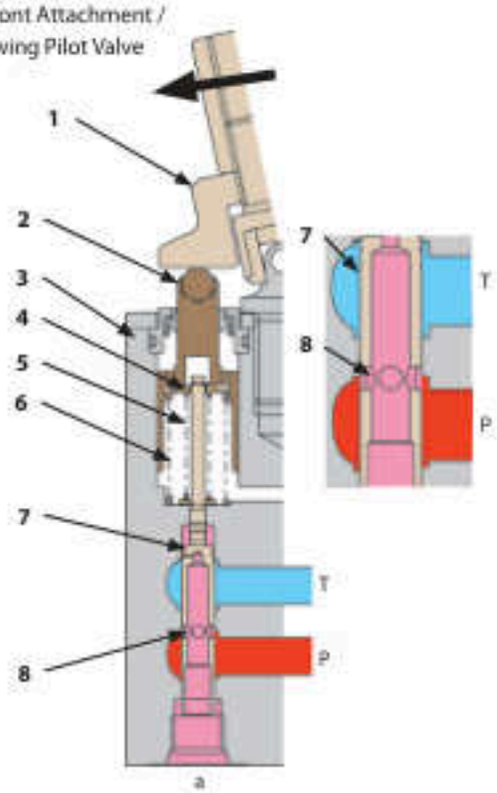
Pi- Pump Control Pressure
Pps- Torque Control Pressure

Pg- Primary Pilot Pressure (From Pilot Pump)

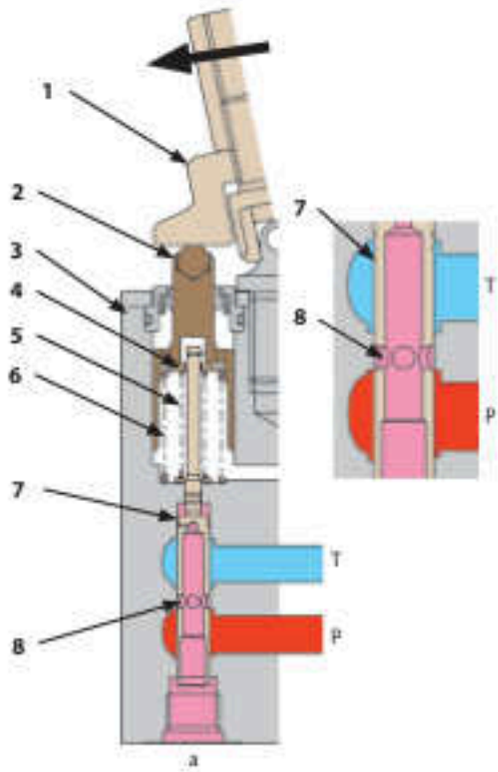
1- Spring
2- Sleeve A
3- Spool A
4- Piston
10- Servo Piston
12- Link

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Front Attachment / Swing Pilot Valve

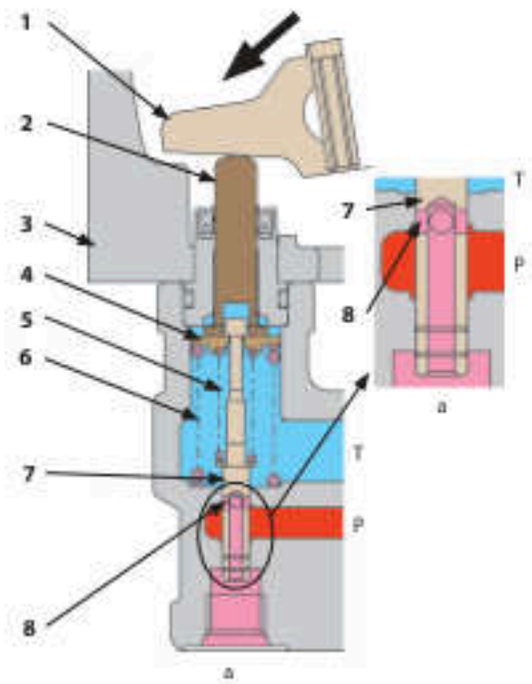


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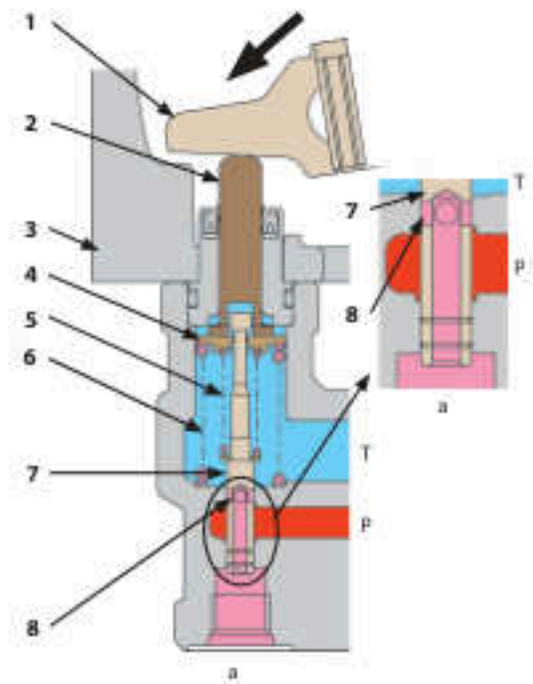


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Travel Pilot Valve



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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ELECTRICAL CIRCUIT DIAGRAM

Applicable Machine

Attach to vol. No.	Model
TTDAG-EN-00	ZX130-5G/130K-5G
TTDBG-EN-00	ZX160LC-5G
TTDBH-EN-00	ZX180LC-5G/180LCN-5G
TTDCD-EN-01	ZX200-5G/200LC-5G/210H-5G/210LCH-5G/210K-5G/210LCK-5G
TTDCE-EN-00	ZX240-5G/240LC-5G/250H-5G/250LCH-5G
TTDDF-EN-00	ZX280-5G/280LC-5G
TTDDE-EN-01	ZX330-5G/330LC-5G/350H-5G/350LCH-5G/350K-5G/350LCK-5G

⚠ CAUTION: Parts numbers on the drawing are provided only for reference purpose.
To order parts on the drawing, be sure to consult the Parts Catalog.



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