PART NO. TODBE-EN-00

HITACHI

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Technical Manual
Operational Principle

ZX
160LC-5B
Hydraulic Excavator

Service Manual consists of the following separate Part No.

Technical Manual (Operational Principle)	: Vol. No.TODBE-EN
Technical Manual (Troubleshooting)	: Vol. No.TTDBE-EN
Workshop Manual	: Vol. No.WDBE-EN
Engine Manual	: Vol. No.EDBE-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) T1-2-3
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
Engine T1-2-8
Muffler Filter T1-2-9
Pump Device T1-2-10
Around Pump Device T1-2-11
Control Valve T1-2-12
Signal Control Valve T1-2-12
Swing Device T1-2-14
Travel Device T1-2-14
3-Spool Solenoid Valve Unit T1-2-15
2-Spool Solenoid Valve Unit (for Muffler Filter Regeneration Control) T1-2-15
Layout of Attachment Spec. Parts T1-2-16
Boom Foot Part Lower Side T1-2-17
Utility Space Partition Cover T1-2-18
Control Valve Upper Side, Lower Side T1-2-18

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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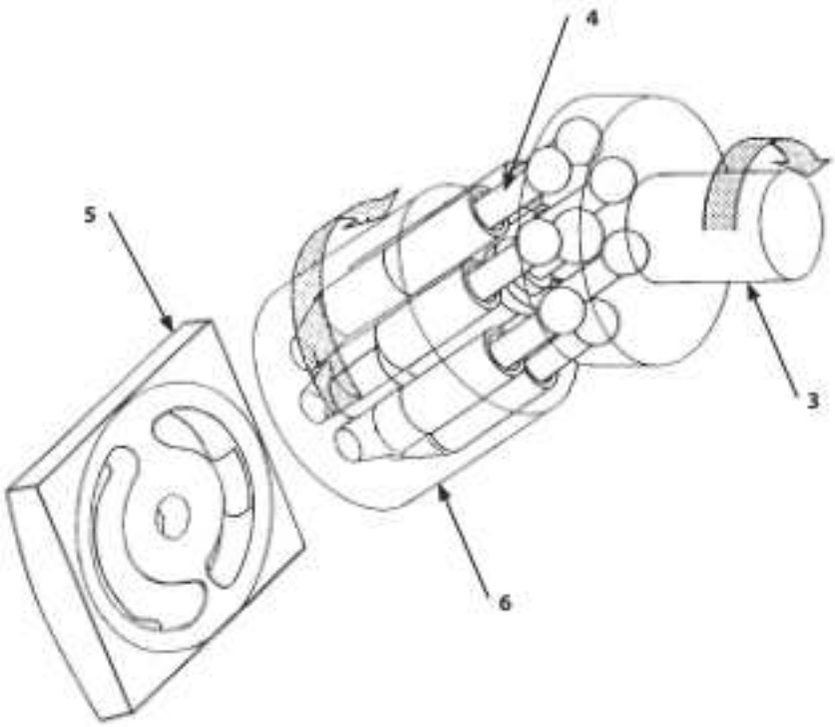
Engine

Manufacturer	ISUZU
Model	AM-4JJ1XZSA-01
Type	Diesel, 4-Cycle, Water-cooled, Direct Injection Type
Cyl. No.- Bore × Stroke	4-95.4 mm×104.9 mm (3.8 in×4.1 in)
Piston Displacement	2999 cm^3 (183 in^3)
Rated Output	84±3.4 kW/2000 min^{-1} (113±4.8 PS/2000 rpm)
	Travel HP Mode: 90.2±2.7 kW/2200 min^{-1} (121±3.7 PS/2200 rpm)
Compression Ratio	17.5
Dry Weight	327 kg (721 lb)
Firing Order	1-3-4-2
Rotation Direction	Clockwise (Viewed from fan side)

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Operational Principle

Engine torque is transferred to shaft (3) and seven plungers (4), and causes cylinder block (6) to rotate while sliding along the valve plate (5) surface. Plunger (4) reciprocates in the cylinder block (6) bore and alternately hydraulic oil is drawn and delivered.



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3- Shaft
4- Plunger
5- Valve Plate
6- Cylinder Block

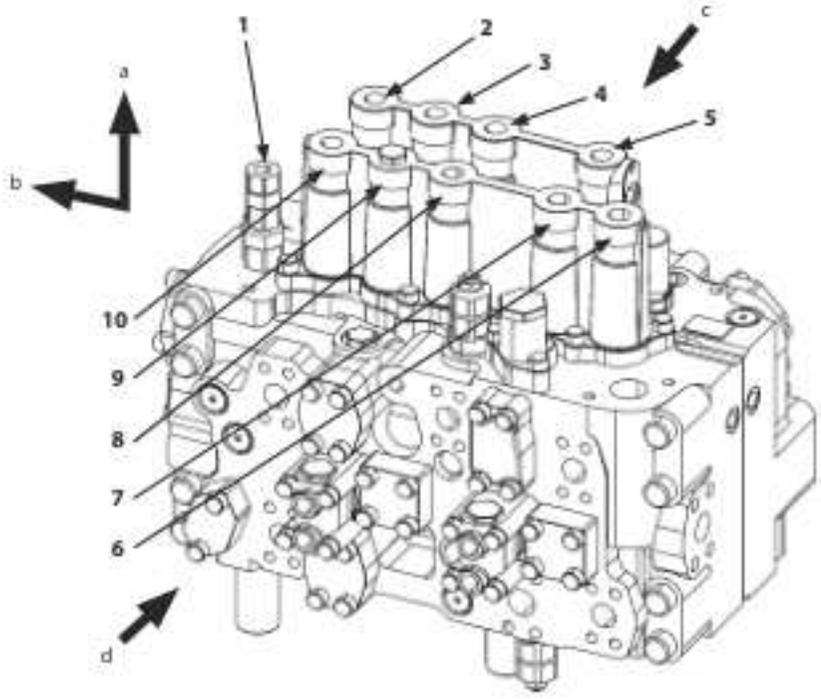
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Outline

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.

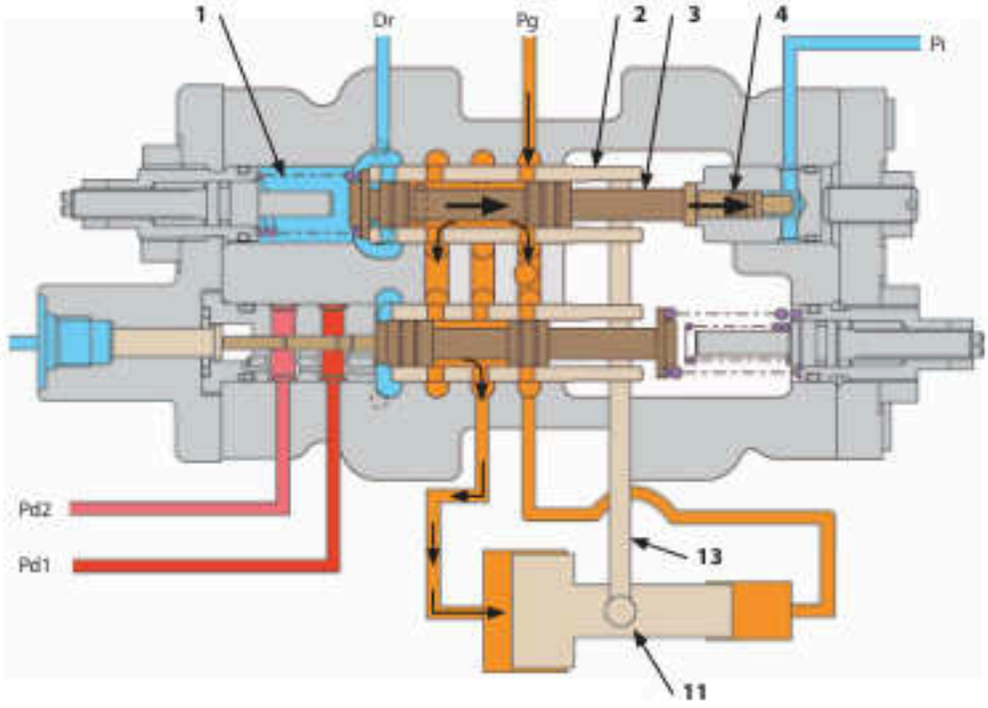
Control Valve



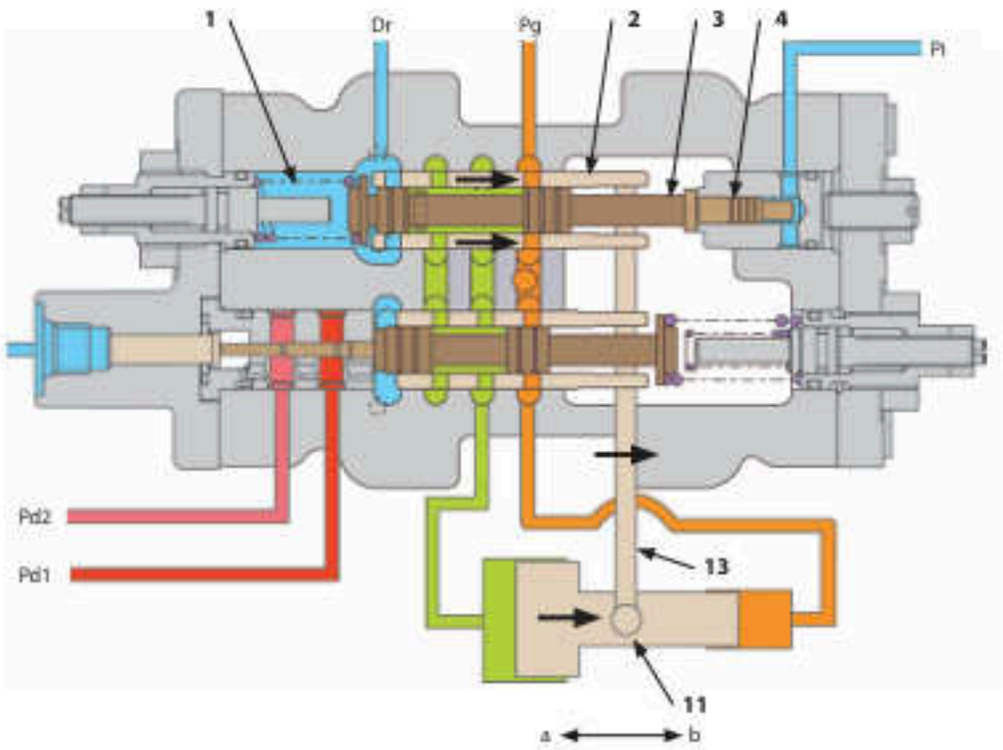
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a-	Machine Upper Side	b-	Machine Front Side	c-	4-Spool Section	d-	5-Spool Section
1-	Main Relief Valve (A Side)	4-	Boom 1	7-	Arm 1	10-	Travel (Left)
2-	Travel (Right)	5-	Arm 2	8-	Boom 2		
3-	Bucket	6-	Swing	9-	Auxiliary		

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

Dr- Returning to Hydraulic Oil Tank

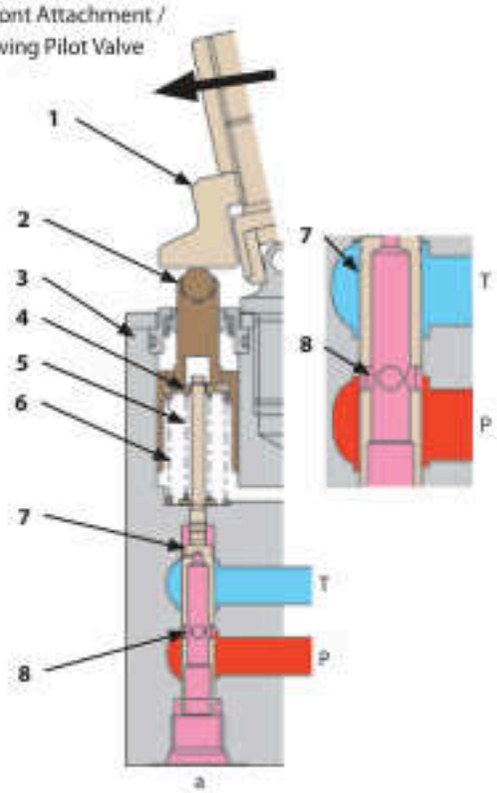
Pi- Pump Control Pressure
Pps- Torque Control Pressure

Pg- Primary Pilot Pressure (From Pilot Pump)

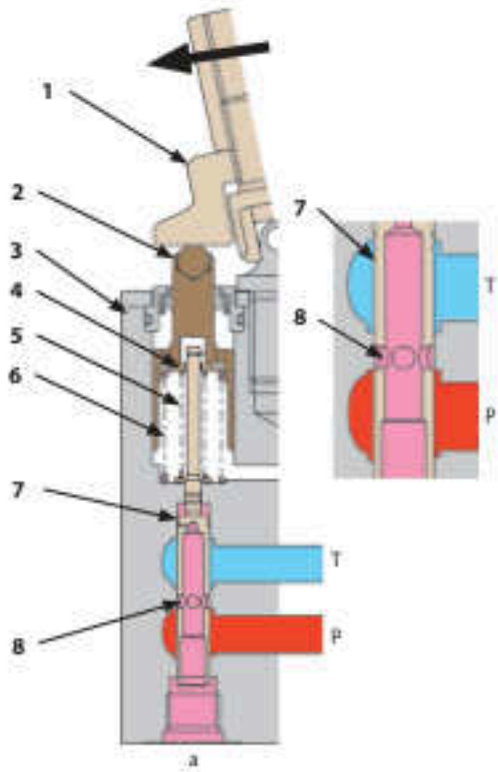
1- Spring
2- Sleeve A
3- Spool A
4- Piston
11- Servo Piston
13- Link

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Front Attachment / Swing Pilot Valve

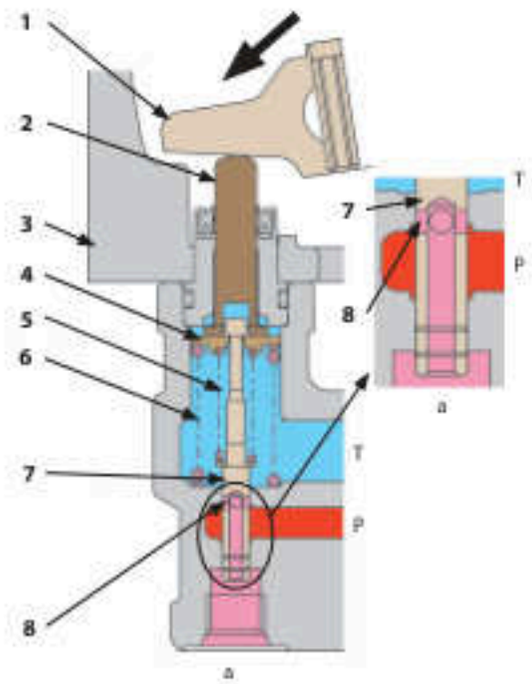


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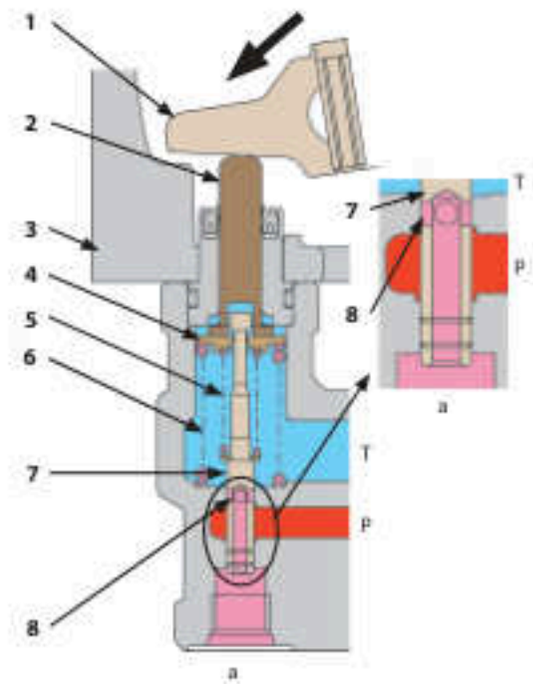


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Travel Pilot Valve



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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