PART NO. TOJAA-EN-01

HITACHI

Reliable solutions

Technical Manual
Operational Principle

ZX
470-5B
470LC-5B
470H-5B
470LCH-5B
470R-5B
470LCR-5B
520LCH-5B
Hydraulic Excavator

Service Manual consists of the following separate Part No.

Technical Manual (Operational Principle)	: Vol. No.TOJAA-EN
Technical Manual (Troubleshooting)	: Vol. No.TTJAA-EN
Workshop Manual	: Vol. No.WJAA-EN
Engine Manual	: Vol. No.ETJAA-EN, EWJAA-EN

MidWestTech | Hitachi ZX470-5B, ZX470LC-5B, ZX470H-5B, ZX470LCH-5B, ZX470R-5B, ZX470LCR-5B, ZX520LCH-5B Excavator Operational Principle Technical Service Manual | Publication TOJAA-EN-01

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

SECTION 1

GENERAL

CONTENTS

Group 1 Specifications

Specifications T1-1-1
Working Ranges T1-1-5

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 (Cab Behind Side) T1-2-6
Engine 1 ..... T1-2-8
Engine 2 ..... T1-2-9
Muffler Filter T1-2-10
Pump Device T1-2-11
Control Valve T1-2-12
Check Valve T1-2-14
Signal Control Valve T1-2-14
4-Spool Solenoid Valve Unit T1-2-17
2-Spool Solenoid Valve Unit T1-2-17
Layout of Attachment Spec. Parts (Hydraulic System) T1-2-18

Group 3 Component Specifications

Engine T1-3-1
Engine Accessories T1-3-5
Hydraulic Component T1-3-7
Electrical Component T1-3-11

MidWestTech | Hitachi ZX470-5B, ZX470LC-5B, ZX470H-5B, ZX470LCH-5B, ZX470R-... Order the manual at mid-west-tech.com >

Group 3 Component Specifications

FRONT ATTACHMENT PILOT VALVE	Model	HVP07C-040-101
	Plunger Stroke	Ports 1, 3: 6.5 mm (0.26 in), Ports 2, 4: 8.0 mm (0.32 in)
TRAVEL PILOT VALVE	Model	HVP08A-040-101
	Plunger Stroke	Ports 1, 2, 3, 4: 4.6 mm (0.18 in)
AUXILIARY / COUNTERWEIGHT PILOT VALVE	Model	HVP09A-040-101
	Plunger Stroke	Ports 1, 2: 3.7 mm (0.15 in)
4-SPOOL SOLENOID VALVE UNIT	Type	4-Spool Proportional Solenoid valve
	Rated Voltage	DC 24 V
	Coil Resistance	22 Ω
2-SPOOL SOLENOID VALVE UNIT	Type	2-Spool Proportional Solenoid Valve
	Rated Voltage	DC 24 V
	Coil Resistance	22 Ω
FAN PUMP CONTROL SOLENOID VALVE	Rated Voltage	DC 24 V
	Coil Resistance	22 Ω
SIGNAL CONTROL VALVE	Model	KVSS-10-H
	Rated Pressure	3.72 MPa (38 kgf/cm², 540 psi)
PILOT SHUT-OFF SOLENOID VALVE	Type	ON/OFF Solenoid Valve
	Rated Voltage	DC 24V
	Coil Resistance	49 Ω
LOW-PRESSURE RELIEF VALVE	Relief Set Pressure	150±37 kPa (1.5±0.4 kgf/cm², 22±5 psi)
BYPASS CHECK VALVE	Relief Set Pressure	350±38 kPa (3.6±0.4 kgf/cm², 51±6 psi)
FILTER	Air Cleaner (Filtration)	-
	Full-Flow Filter (Filtration)	β10≥2.0
	Suction Filter (Filtration)	177 µm (80 mesh)
	Drain Filter (Filtration)	10 µm
	Pilot Filter (Filtration)	10≥1.4

MidWestTech | Hitachi ZX470-5B, ZX470LC-5B, ZX470H-5B, ZX470LCH-5B, ZX470R-... Order the manual at mid-west-tech.com >

Counterweight Removal/Installation Pump Control (Only Machine with Optional Parts Equipped)

Purpose:
The pump flow rate is limited to easily perform the inching operation.
(Refer to SYSTEM/Hydraulic System Counterweight Removal/Installation Circuit)

Operation:

1. When operating the counterweight pilot valve (optional), pressure sensor (counterweight) (13) detects pilot pressure and sends the signal to MC (14).
2. MC (14) drives pump 1 control solenoid valve (30) and pump 2 control solenoid valve (28) in order to minimize the delivery flow rate of pump 1 and pump 2.
3. Each delivery flow rate of pump 1 and pump 2 is reduced to the minimum flow rate.

MidWestTech | Hitachi ZX470-5B, ZX470LC-5B, ZX470H-5B, ZX470LCH-5B, ZX470R-... Order the manual at mid-west-tech.com >

Hydraulic Circuit

Main Circuit

Pressure oil from pump 1 flows to each spool of travel (right), bucket, boom 1, and arm 2 at the 4-spool side of control valve. Pressure oil from pump 2 flows to each spool of swing, arm 1, boom 2, auxiliary, and travel (left) at the 5-spool side of control valve.

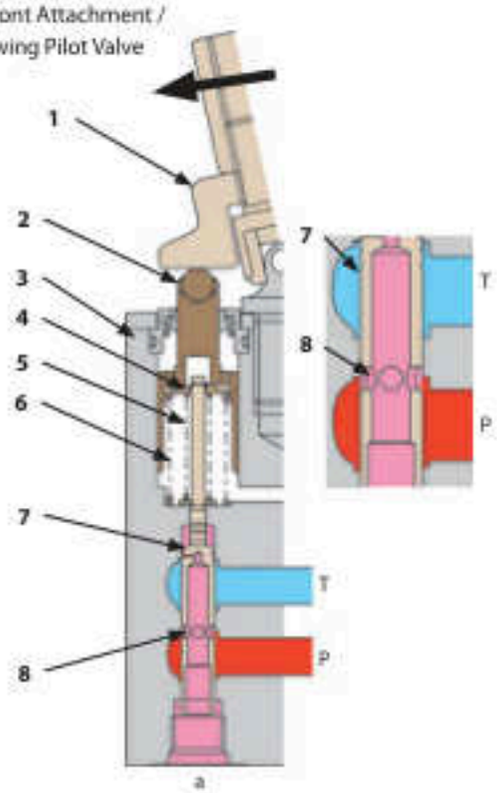
The parallel circuit is provided in each main circuit of pump 1 and pump 2, and makes the combined operation possible.
In addition, the flow combiner circuit is provided in both boom and arm circuits so that pressure oil from pump 1 and pump 2 are combined during a single operation.

The main relief valve (15) is provided in the main circuit (between the pump and the actuator). The main relief valve (15) prevents the pressure in the main circuit from exceeding the set pressure when the spool is operated (when the control lever is operated).
The overload relief valves (6,11,19,22,and 29) are provided in the actuator circuits (between the control valve and the actuator) of boom, arm, bucket, and auxiliary. The overload relief valve prevents surge pressure caused by external force in the actuator circuit does not exceed the set pressure when the spool is in neutral (with the control lever set in neutral).

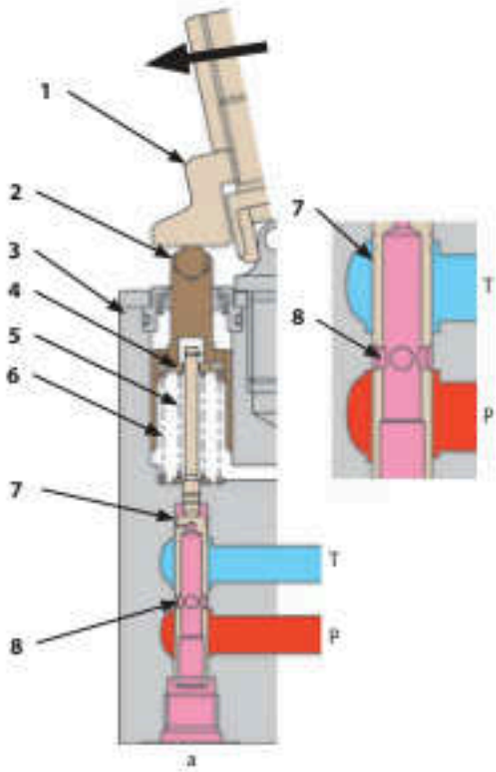
In addition, boom overload relief valve (low pressure) (22) is provided in the boom lower circuit. Boom overload relief valve (low pressure) (22) decreases the relief set pressure in the boom lower circuit and reduces vibration of the machine during boom lower operation.

MidWestTech | Hitachi ZX470-5B, ZX470LC-5B, ZX470H-5B, ZX470LCH-5B, ZX470R-... Order the manual at mid-west-tech.com >

Front Attachment / Swing Pilot Valve

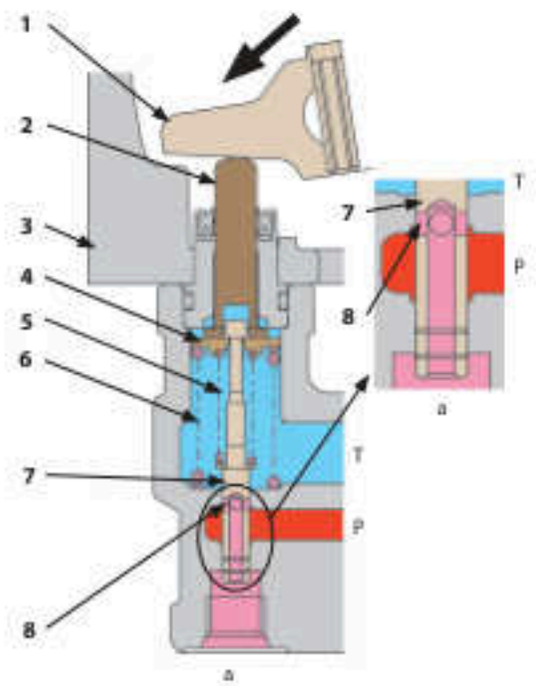


TPPP-03-04-007

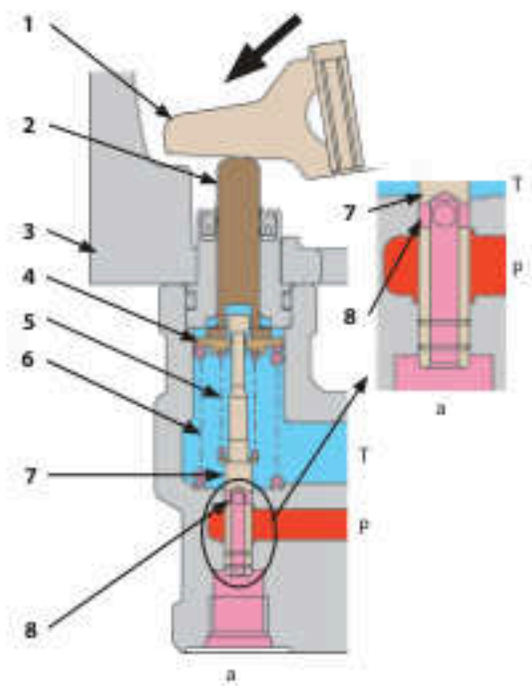


TPPP-03-04-008

Travel Pilot Valve



TPPP-03-04-012

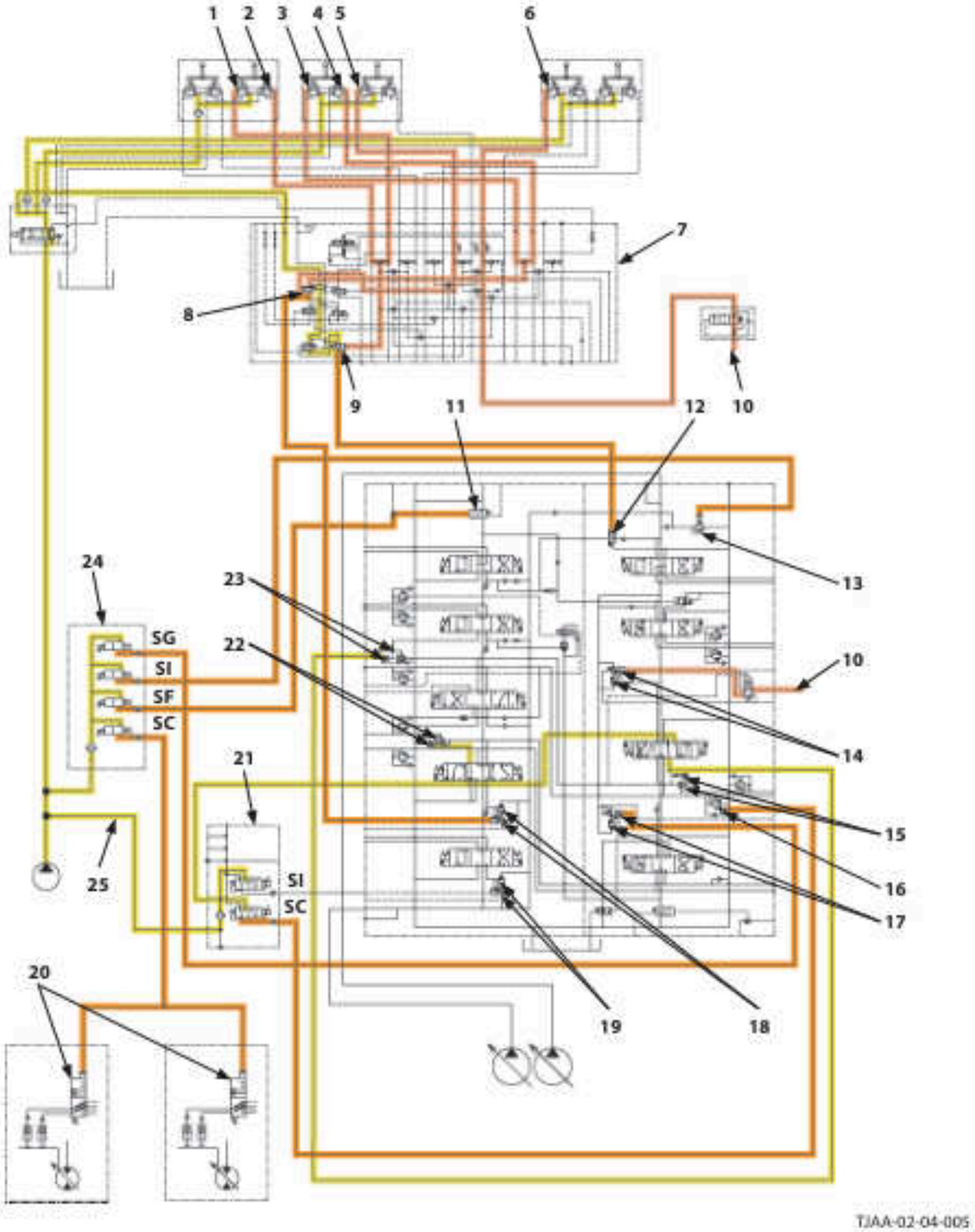


TPPP-03-04-013

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 ZX470-5B, ZX470LC-5B, ZX470H-5B, ZX470LCH-5B, ZX470R-... Order the manual at mid-west-tech.com >



1- Travel Right Reverse
2- Travel Right Forward
3- Swing (Right)
4- Swing (Left)
5- Arm Roll-In
6- Boom Lower
7- Signal Control Valve
8- Arm Flow Rate Control Valve Control Spool
9- Flow Combiner Valve Control Spool
10- Boom Lower Pilot Pressure
11- Bypass Shut-Out Valve
12- Flow Combiner Valve
13- Main Relief Valve
14- Boom Flow Rate Control Valve
15- Boom 1 Anti-Drift Valve
16- Boom Overload Relief Control Valve
17- Arm 2 Flow Rate Control Valve
18- Arm 1 Flow Rate Control Valve
19- Swing Flow Rate Control Valve
20- Travel Motor Displacement Angle Control Valve
21- 2-Spool Solenoid Valve Unit
22- Arm 1 Anti-Drift Valve
23- Boom 2 Anti-Drift Valve
24- 4-Spool Solenoid Valve Unit
25- Pilot Pressure from Pilot Pump

MidWestTech | Hitachi ZX470-5B, ZX470LC-5B, ZX470H-5B, ZX470LCH-5B, ZX470R-... Order the manual at mid-west-tech.com >