PART NO. TODC150-EN-00

HITACHI

Reliable solutions

Technical Manual

Operational Principle

ZX
250LC-6
250LCN-6

Hydraulic Excavator

Service Manual consists of the following separate Part No.

Technical Manual (Operational Principle)	: Vol. No.TODC150-EN
Technical Manual (Troubleshooting)	: Vol. No.TTDC150-EN
Workshop Manual	: Vol. No.WDC150-EN
Engine Manual	: Vol. No.ETDC150-EN, EWDC150-EN

MidWestTech | Hitachi ZX250LC-6, ZX250LCN-6 Excavator Operational Principle Technical... Order the manual at mid-west-tech.com >

SECTION 1

GENERAL

CONTENTS

Group 1 Specifications

Specifications T1-1-1
Working Ranges 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 (Utility Space) T1-2-6
Electrical System (Relays) T1-2-7
Engine T1-2-8
Aftertreatment Device 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
5-Spool Solenoid Valve Unit T1-2-15
2-Spool Solenoid Valve Unit (Aftertreatment Device Regeneration Control) T1-2-15
DEF Tank T1-2-16
DEF Supply Module T1-2-16
Layout of Attachment Spec. Parts 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

MidWestTech | Hitachi ZX250LC-6, ZX250LCN-6 Excavator Operational Principle Tech... Order the manual at mid-west-tech.com >

SECTION 2

SYSTEM

CONTENTS

Group 1 Controller
Outline T2-1-1
CAN Circuit T2-1-2

Group 2 Control System
Outline T2-2-1
Engine Control T2-2-4
Pump Control T2-2-38
Valve Control (Standard) T2-2-62
Valve Control (Optional) T2-2-80
Other Control T2-2-90

Group 3 Engine System
ECM System T2-3-1
Fuel Injection Control T2-3-2
Fuel Injection Amount Correction Control T2-3-10
EGR Control T2-3-12
Preheating Control T2-3-14
Variable Turbocharger Control T2-3-15
Alarm Control T2-3-16
Urea SCR System T2-3-17
Engine Output Restriction Control (INDUCEMENT) T2-3-28
Aftertreatment Device T2-3-32
Aftertreatment Device Regeneration Control T2-3-34

Group 4 Hydraulic System
Outline T2-4-1
Pilot Circuit T2-4-2
Main Circuit T2-4-14
Breaker/Pulverizer/Crusher Circuit (Optional) T2-4-36

Group 5 Electrical System
Outline T2-5-1
Main Circuit T2-5-2
Electric Power Circuit (Key Switch: OFF) T2-5-4
CAN Circuit T2-5-6
Accessory Circuit (Key Switch: ACC) T2-5-8
Starting Circuit (Key Switch: START) T2-5-10
Charging Circuit (Key Switch: ON) T2-5-12
Surge Voltage Prevention Circuit T2-5-16
Pilot Shut-Off Circuit (Key Switch: ON) T2-5-18
Auto Shut-Down Circuit/Automatic Engine Stop Circuit at Low Temperature T2-5-20
Engine Stop Circuit T2-5-22
Monitor Circuit T2-5-25
Security Circuit T2-5-26
Radio Circuit T2-5-28
Air Conditioner Circuit T2-5-28
Accessory Circuit T2-5-31
Work Light Circuit T2-5-32
Wiper/Washer Circuit T2-5-34
Wiper Circuit T2-5-34
Cab Light Circuit T2-5-36

MidWestTech | Hitachi ZX250LC-6, ZX250LCN-6 Excavator Operational Principle Tech... Order the manual at mid-west-tech.com >

SECTION 3

COMPONENT OPERATION

CONTENTS

Group 1 Pump Device
Outline T3-1-1
Main Pump T3-1-2
Regulator T3-1-6
Solenoid Valve T3-1-30
Pilot Pump T3-1-32
Pump Delivery Pressure Sensor T3-1-32
Pump Control Pressure Sensor T3-1-32

Group 2 Swing Device
Outline T3-2-1
Swing Reduction Gear T3-2-2
Swing Motor T3-2-3
Swing Parking Brake T3-2-4
Valve Unit T3-2-6

Group 3 Control Valve
Outline T3-3-1
Hydraulic Circuit T3-3-24
Flow Combiner Valve T3-3-30
Main Relief Valve T3-3-32
Overload Relief Valve (with Make-Up Function) T3-3-36
Regenerative Valve T3-3-40
Anti-Drift Valve T3-3-50
Flow Rate Control Valve T3-3-54
Digging Regenerative Valve T3-3-58
Boom Lower Meter-In Cut Valve T3-3-60
Auxiliary Flow Combiner Valve and
Bypass Shut-Out Valve T3-3-62

Group 4 Pilot Valve
Outline T3-4-1
Operation (Front Attachment /
Swing and Travel Pilot Valves) T3-4-3
Operation (Auxiliary, Positioning Pilot Valve) T3-4-11
Shockless Function (Only for Travel Pilot Valve) T3-4-16

Group 5 Travel Device
Outline T3-5-1
Travel Reduction Gear T3-5-2
Travel Motor T3-5-4
Parking Brake T3-5-6
Travel Brake Valve T3-5-8
Overload Relief Valve T3-5-12
Travel Mode Control T3-5-14

Group 6 Signal Control Valve
Outline T3-6-1
Pilot Port T3-6-2
Shuttle Valve T3-6-7
Shockless Valve T3-6-10
Pump 1 Flow Rate Control Valve,
Pump 2 Flow Rate Control Valve,
and Pump 3 Flow Rate Control Valve T3-6-14
Flow Combiner Valve Control Spool,
Swing Parking Brake Release Spool T3-6-16

Group 7 Others (Upperstructure)
Pilot Shut-Off Solenoid Valve T3-7-1
Solenoid Valve T3-7-3
Hose Rupture Valve T3-7-8
Pilot Relief Valve T3-7-14
Recirculation Valve T3-7-15

Group 8 Others (Undercarriage)
Swing Bearing T3-8-1
Centerjoint T3-8-2
Track Adjuster (Front Idler Integrated Type) T3-8-3

MidWestTech | Hitachi ZX250LC-6, ZX250LCN-6 Excavator Operational Principle Tech... Order the manual at mid-west-tech.com >

IMPORTANT: This list shows design specifications, which are not servicing standards.

Performance	without fan	with fan
Fuel Consumption Ratio	210 g/kW·h at 140 kW/ (at Full Load: 2000 min^{-1})	224 g/kW·h at 132 kW/(at Full Load: 2000 min^{-1})
	207 g/kW·h at 134 kW/(at Working Load: 1900 min^{-1})	220 g/kW·h at 127 kW/(at Working Load: 1900 min^{-1})
Maximum Output Torque	676 N·m at 1800 min^{-1}	
Compression Pressure	3.02 MPa at 200 min^{-1}	
Valve Clearance (Intake/ Exhaust)	0.4/0.4 mm (when cool)	
No Load Speed	Slow: 800 min^{-1}	
	Fast: 1900 min^{-1}	

MidWestTech | Hitachi ZX250LC-6, ZX250LCN-6 Excavator Operational Principle Tech... Order the manual at mid-west-tech.com >

Pump Torque Restriction Control (During Engine Output Restriction)

Purpose:
The pump torque restriction control (during engine output restriction) decreases pump driving torque according to the step of engine output restriction.

Operation:

1. When any following conditions exist and a specified time has passed, MC (10) activates pump 1 and 2 torque control solenoid valve (26) and pump 3 torque control solenoid valve (27).

- DEF level is severely low
- SCR system is abnormal
- EGR system is abnormal

2. Pump 1 and 2 torque control solenoid valve (26) and pump 3 torque control solenoid valve (27) deliver the pilot pressure according to the signals to the regulators and reduces the pump delivery flow rate, and decreases pump driving torque.

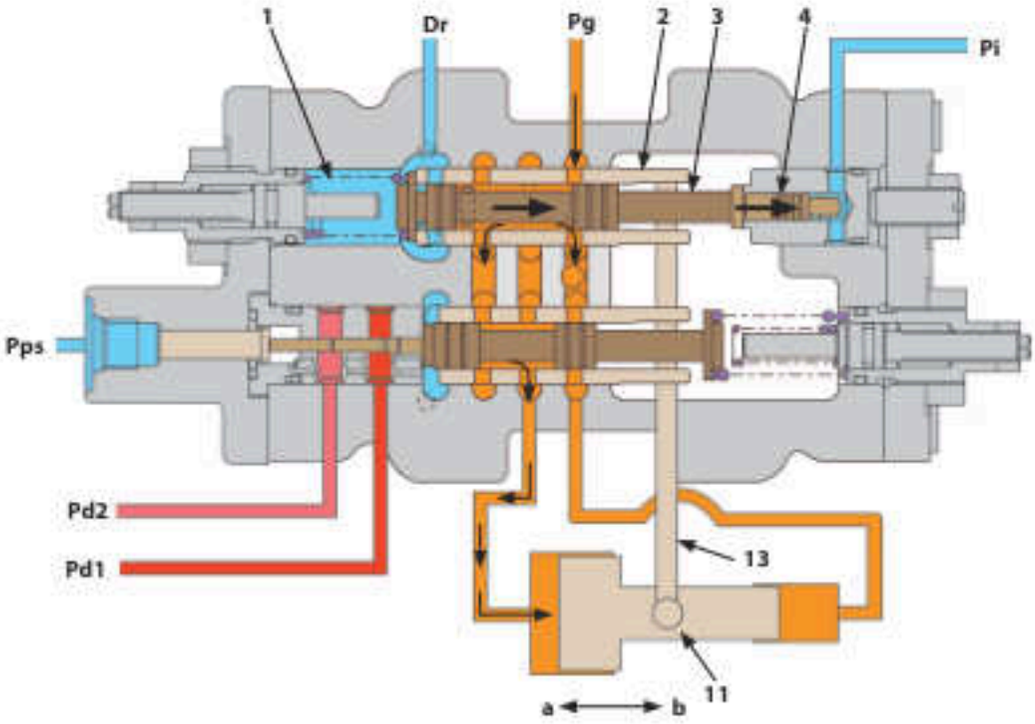
MidWestTech | Hitachi ZX250LC-6, ZX250LCN-6 Excavator Operational Principle Tech... Order the manual at mid-west-tech.com >

CAN Circuit

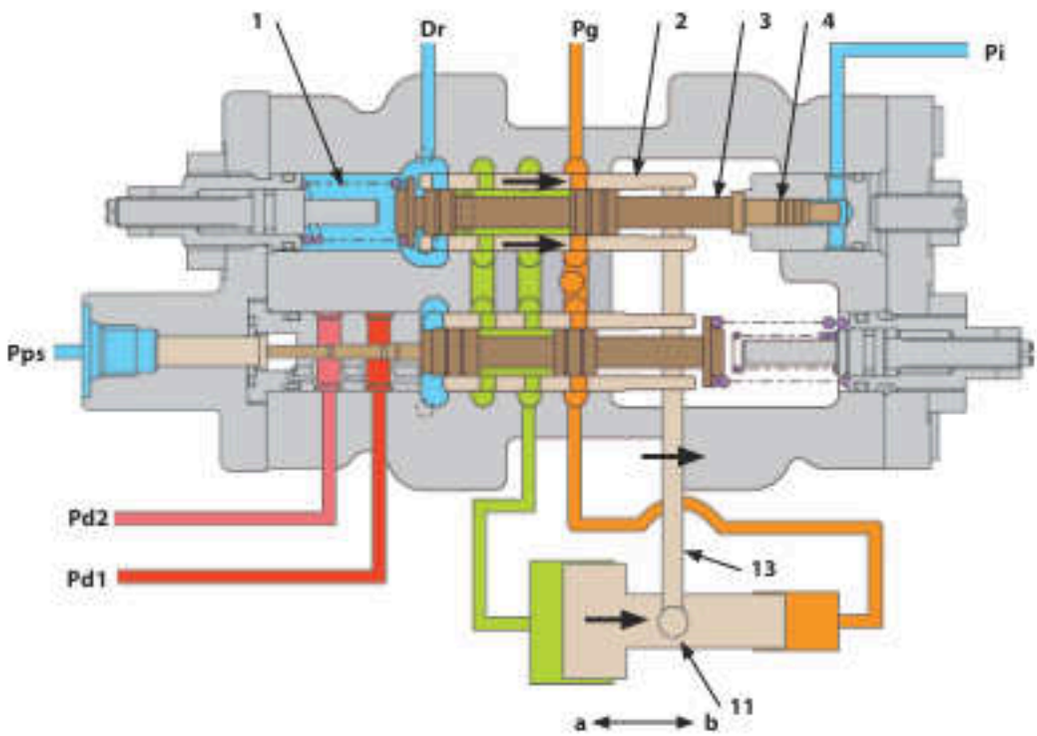
CAN (Controller Area Network) is ISO Standards of the serial communication protocol.
Four networks (CAN bus (4)), CAN 0 (1), CAN 1 (5), ISO-CAN (18), and Local-CAN (20) are equipped for this machine.
CAN 0 (1) and ISO-CAN (18) are used for the engine control. CAN 1 (5) is used for the accessories. Local-CAN (20) is used for the urea SCR system.
CAN bus (4) consists of two harnesses, CAN-H (High) (2) and CAN-L (Low) (3).
Each controller judges the CAN bus (4) level due to the potential difference between CAN-H (High) (2) and CAN-L (Low) (3).
Each controller arranges the CAN bus (4) level and sends the signal and data to other controllers.
Termination resistors (120 Ω) (17) are installed to both ends of CAN bus (4).

MidWestTech | Hitachi ZX250LC-6, ZX250LCN-6 Excavator Operational Principle Tech... Order the manual at mid-west-tech.com >

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

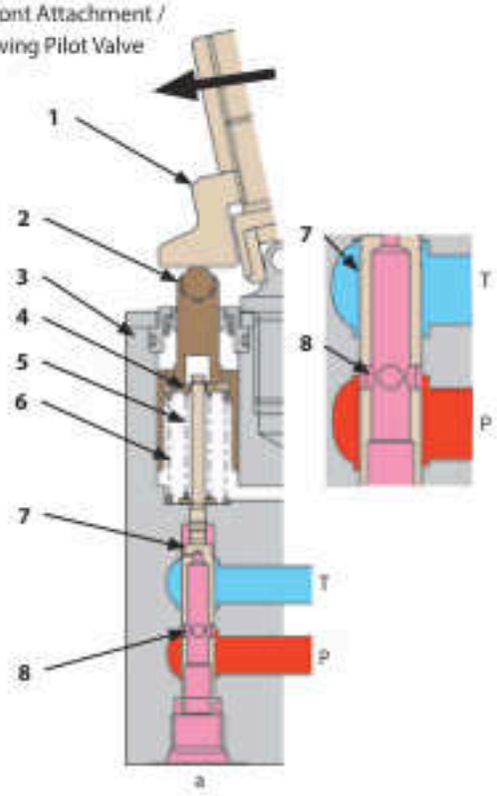
3- Spool A
4- Piston

11- Servo Piston

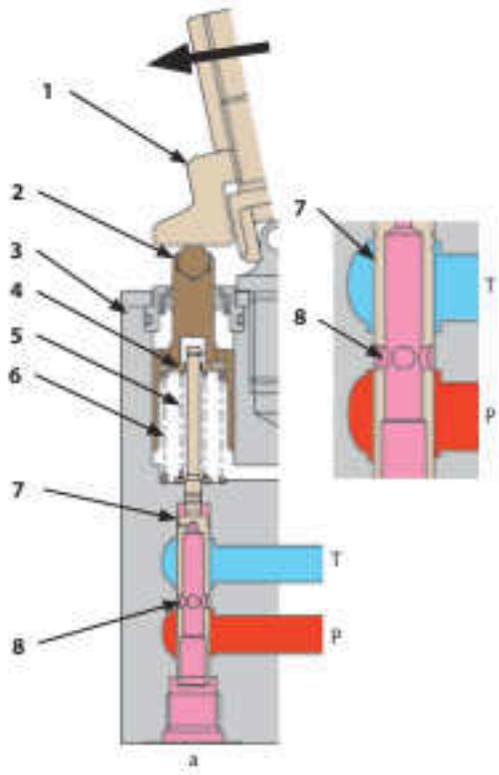
13- Link

MidWestTech | Hitachi ZX250LC-6, ZX250LCN-6 Excavator Operational Principle Tech... Order the manual at mid-west-tech.com >

Front Attachment /
Swing Pilot Valve

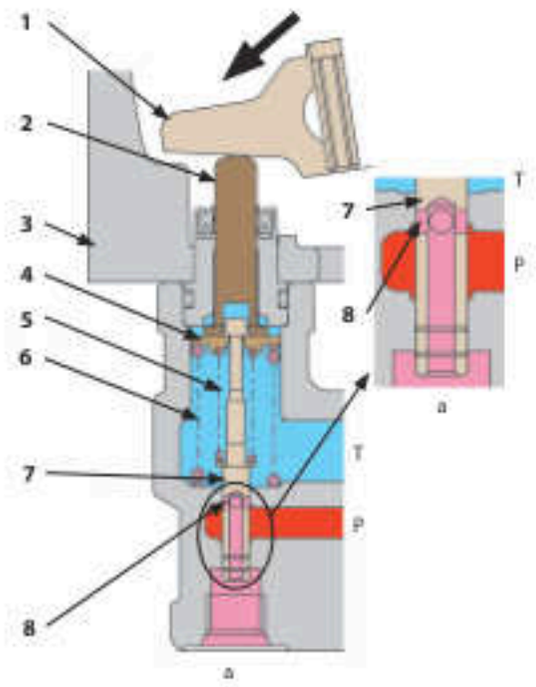


TPPP-03-04-007

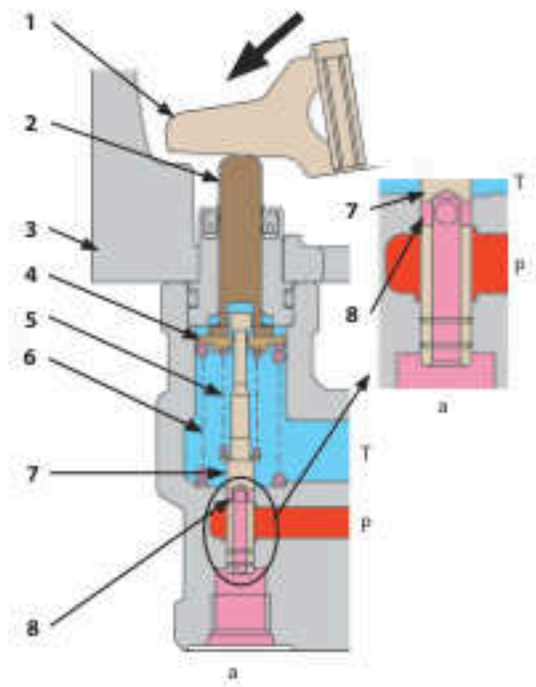


TPPP-03-04-008

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

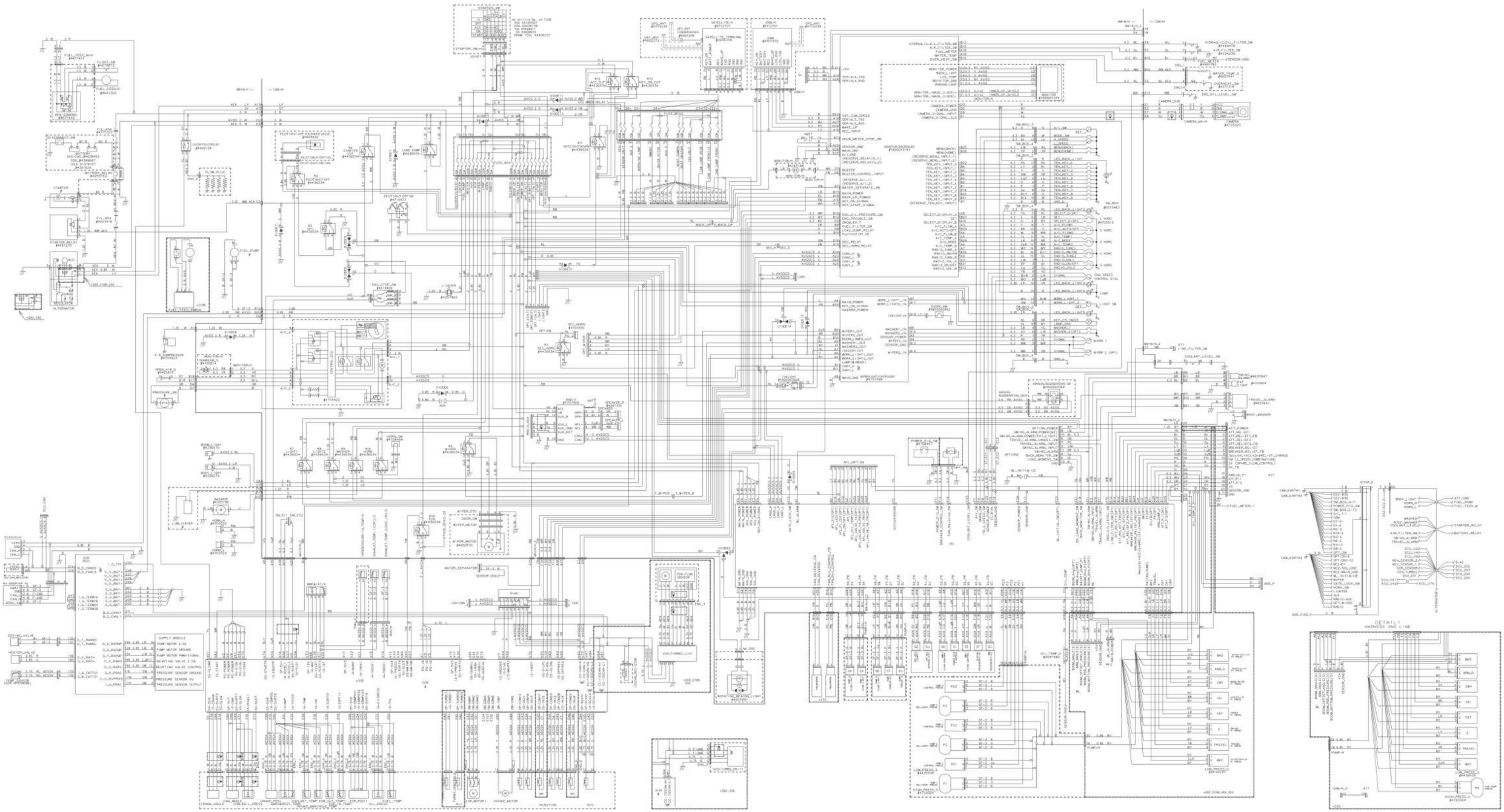
MidWestTech | Hitachi ZX250LC-6, ZX250LCN-6 Excavator Operational Principle Tech... Order the manual at mid-west-tech.com >

ELECTRICAL CIRCUIT DIAGRAM

Applicable Machine

Attach to vol. No.	Model
TTDC150-EN-00	ZX250LC-6/ 250LCN-6
TTDDN50-EN-00	ZX300LC-6/ 300LCN-6
TTDDQ50-EN-00	ZX350LC-6/ 350LCN-6

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.



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