PART NO. TODBL90-EN-00

HITACHI

Reliable solutions

Technical Manual

Operational Principle

ZX160LC-5A

Hydraulic Excavator

Service Manual consists of the following separate Part No.

Technical Manual (Operational Principle)	: Vol. No.TODBL90-EN
Technical Manual (Troubleshooting)	: Vol. No.TTDBL90-EN
Workshop Manual	: Vol. No.WDBL90-EN
Engine Manual	: Vol. No.EDBL-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
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 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
Boom Foot Part Lower Side T1-2-15

Group 3 Component Specifications

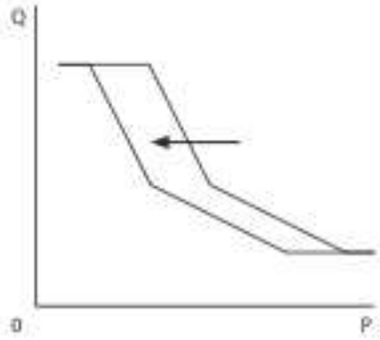
Engine T1-3-1
Engine Accessories T1-3-5
Hydraulic Component T1-3-6
Electrical Component T1-3-10

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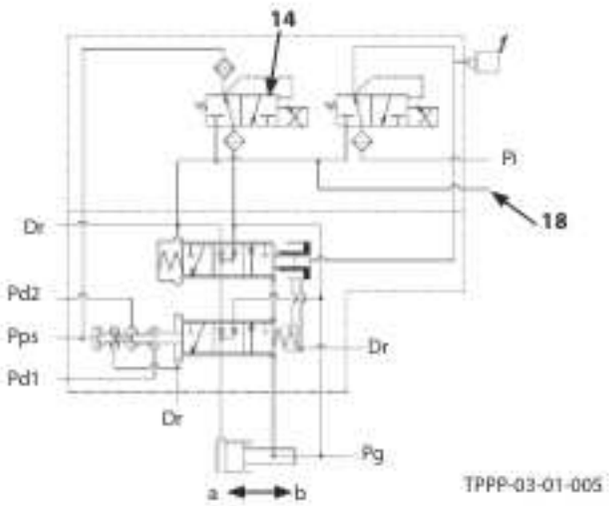
		Boom	Arm	Bucket
CYLINDER	Rod Diameter	80 mm (3.1")	90 mm (3.5")	75 mm (3.0")
	Cylinder Bore	110 mm (4.3")	120 mm (4.7")	105 mm (4.1")
	Stroke	1110 mm (3'8")	1365 mm (4'6")	935 mm (3'1")
	Fully Retracted Length	1655 mm (5'5")	1905 mm (6'3")	1460 mm (4'9")
	Plating Thickness	30 µm (1.18 µin)	30 µm (1.18 µin)	30 µm (1.18 µin)

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- Control by Pilot Pressure from Torque Control Solenoid Valve (14)
  MC (main controller) sends the signals to torque control solenoid valve (14) according to the engine speed and the signals from sensors.
  Torque control solenoid valve (14) delivers torque control pilot pressure Pps to the regulator in response to the signals from MC. When receiving torque control pilot 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
14- Torque Control Solenoid Valve
18- Air Bleeding Circuit

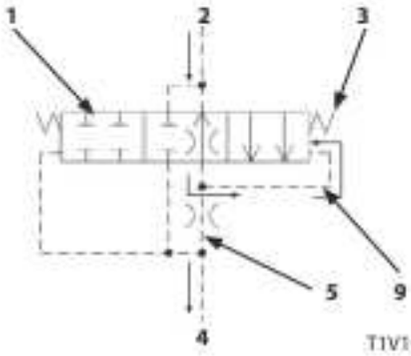
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Shockless Valve

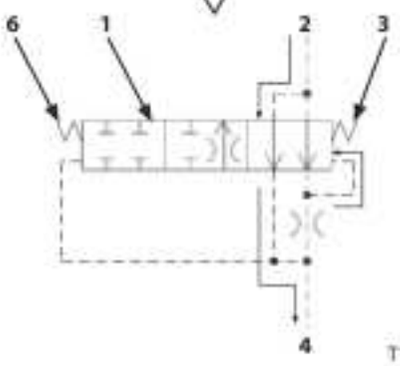
The shockless valve is provided in the boom raise circuit and functions during boom lowering operation or when stopping boom raise operation.

During boom raise operation

1. Boom raise pilot pressure is routed to spool (1) through port A (2).
2. Immediately after operation is started, low pilot pressure is routed to the spring B (3) chamber through clearance C between spool (1) and housing (7) and inner passage 3 (9). In addition, pilot pressure is also routed to port 1 (4) through inner passage 2 (5) at the same time.
3. When pilot pressure increases, pressure in the spring B (3) chamber also increases. Spool (1) pushes spring A (6) and is moved to the left.
4. As spool (1) is moved, port A (2) is connected to port 1 (4) and pressure in the port 1 (4) side increases, so that the control valve spool is moved.



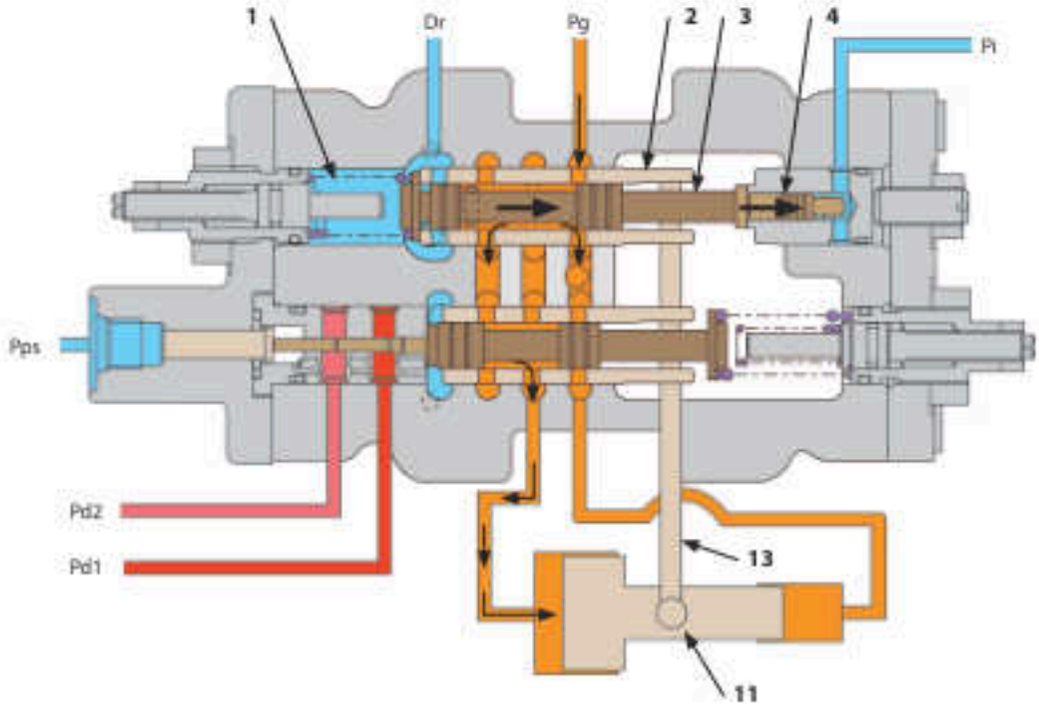
T1V1-03-06-003



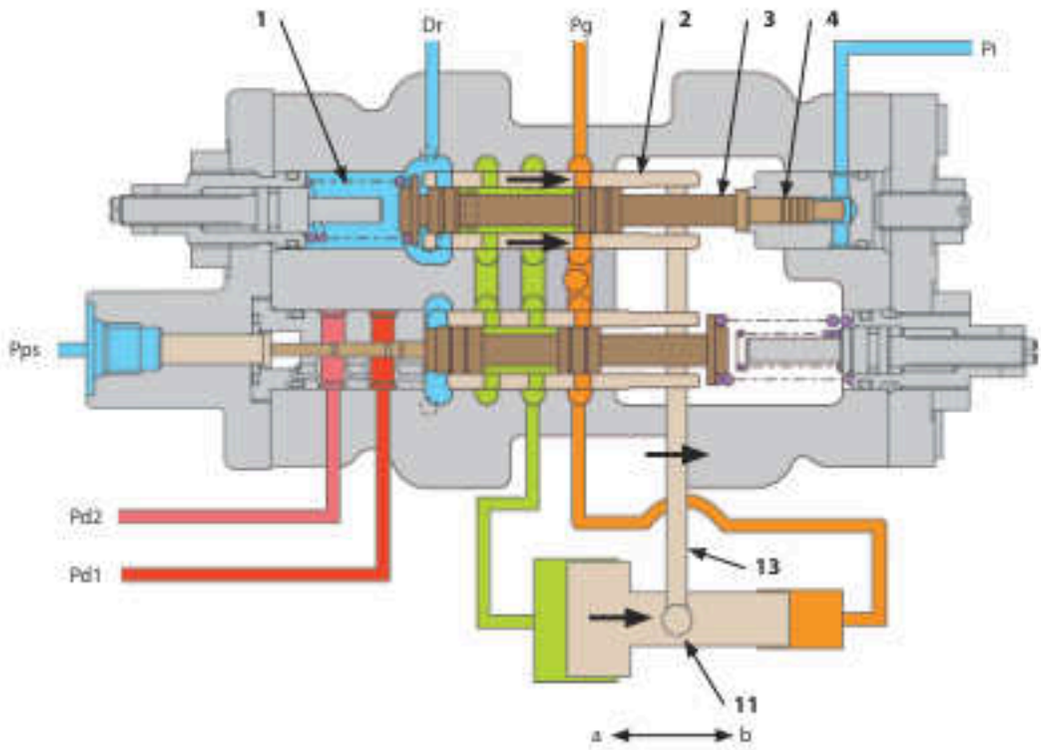
T1V1-03-06-002

1- Spool
2- Port A
3- Spring B
4- Port 1
5- Inner Passage 2
6- Spring A
9- Inner Passage 3

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TPPP-03-01-018



TPPP-03-01-019

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

Dr- Returning to Hydraulic Oil Tank

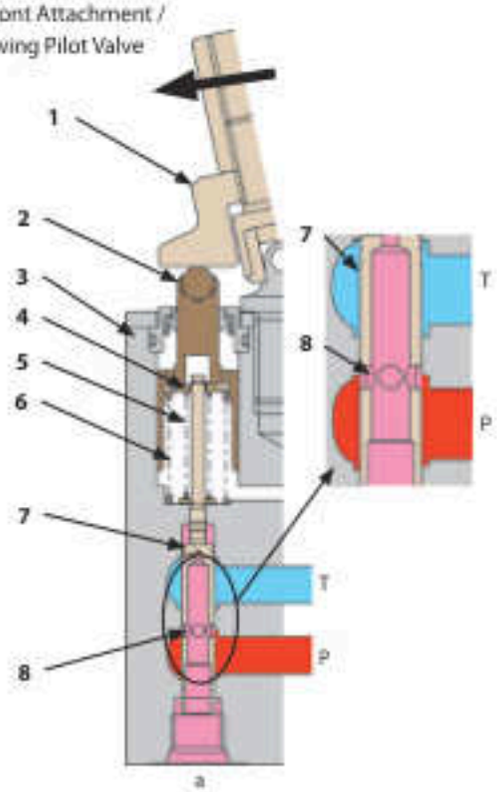
Pi- Pump Control Pressure
Pps- Torque Control Pressure

Pg- Primary Pilot Pressure (From Pilot Pump)

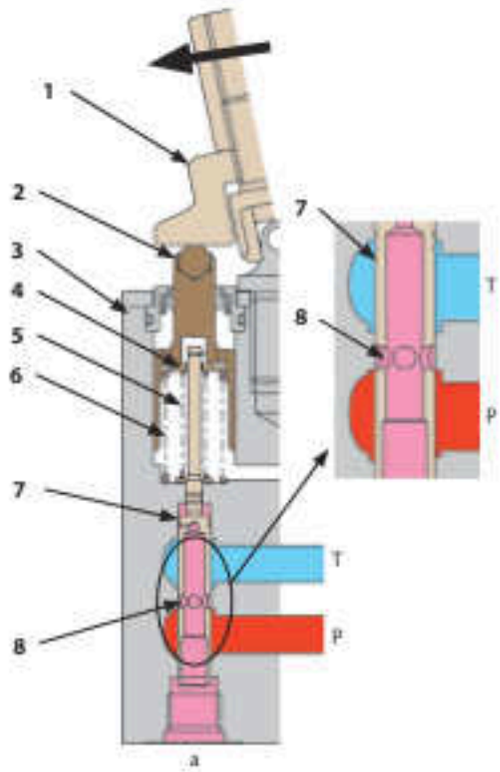
1- Spring
2- Sleeve A
3- Spool A
4- Piston
11- Servo Piston
13- Link

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Front Attachment /
Swing Pilot Valve

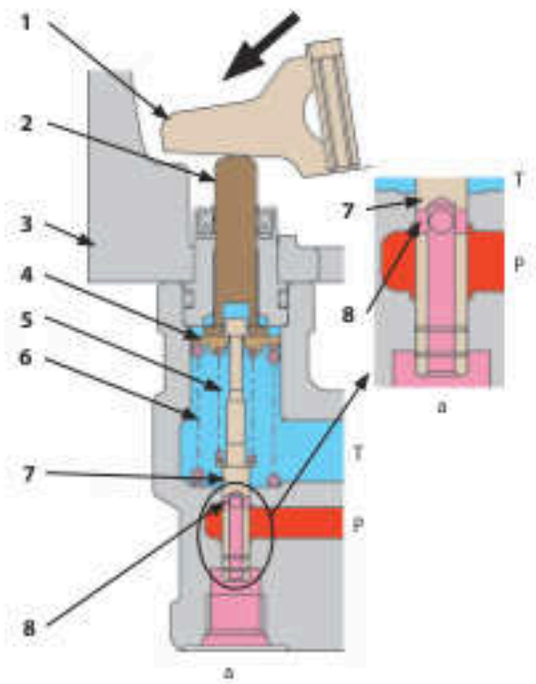


TPPP-03-04-007

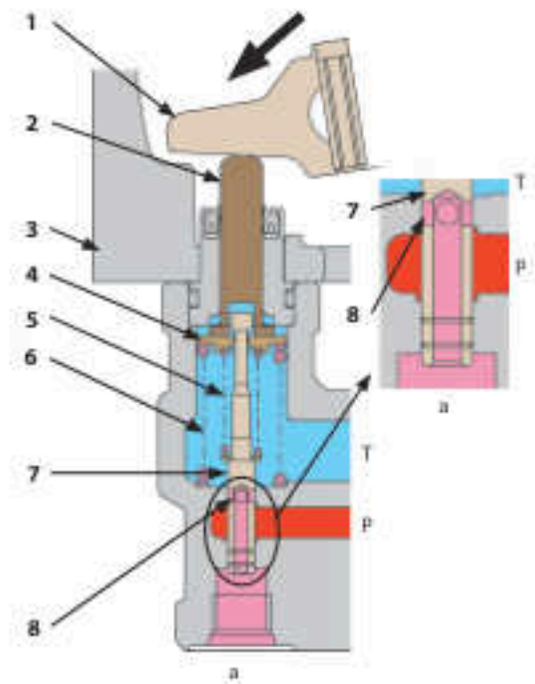


TPPP-03-04-008

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

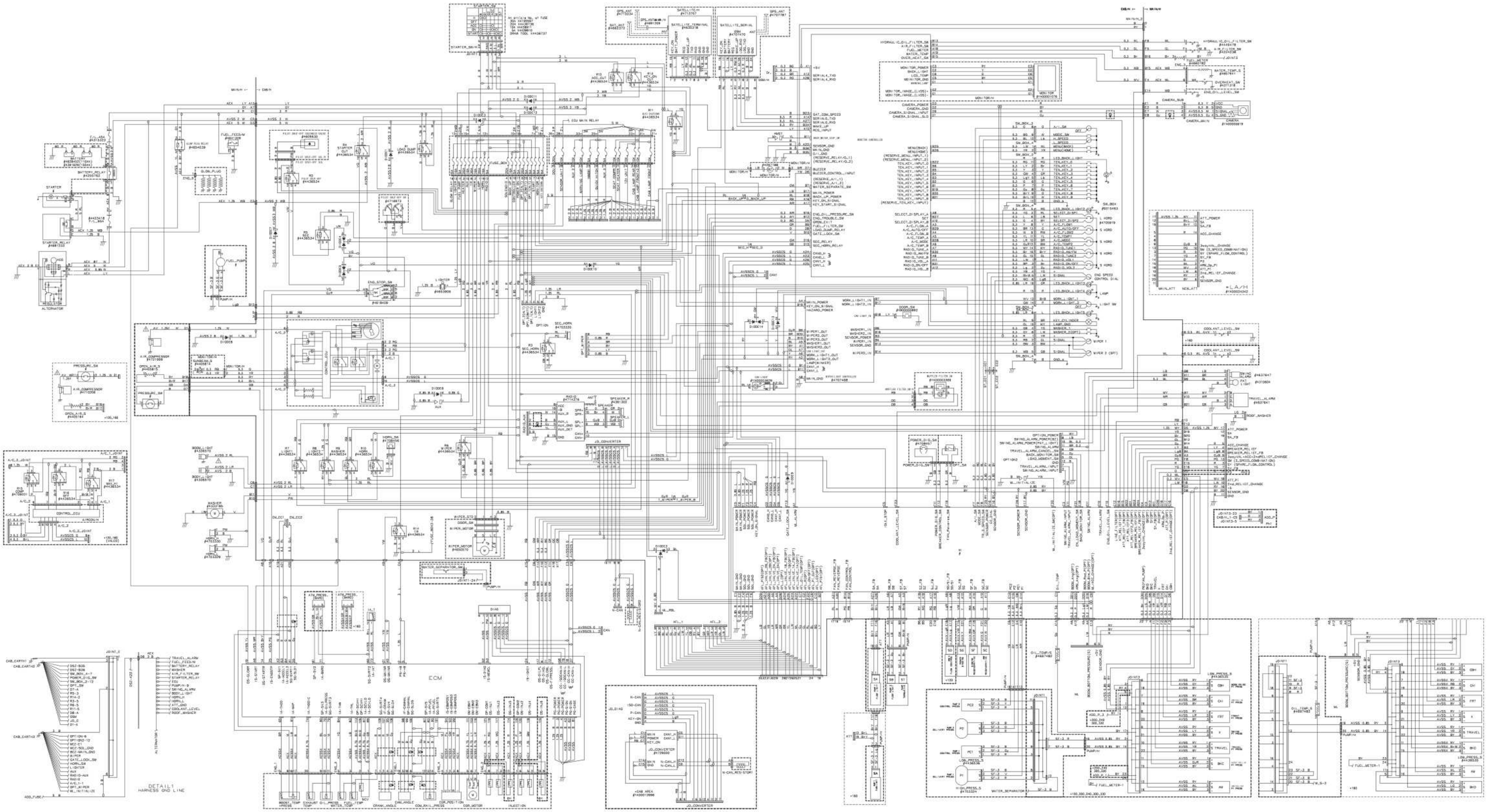
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ELECTRICAL CIRCUIT DIAGRAM

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.

Applicable Machine

Attach to vol. No.	Model
TTDAK90-EN-00	ZX130-5A
TTDBL90-EN-00	ZX160LC-5A
TTDCX90-EN-00	ZX200-5A/200LC-5A/210H-5A/210LCH-5A/210K-5A/210LCK-5A
TTDCY90-EN-00	ZX240-5A/240LC-5A/250H-5A/250LCH-5A/250K-5A/250LCK-5A
TTDDW90-EN-00	ZX300-5A/300LC-5A
TTDDK90-EN-00	ZX330-5A/330LC-5A/350H-5A/350LCH-5A/350K-5A/350LCK-5A



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