CASE

REPAIR MANUAL

Crawler Excavator

CX290

9-44510

MidWestTech | Case CX290 Crawler Excavator Service Manual | Publication 9-44510

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CX290 Crawler Excavators
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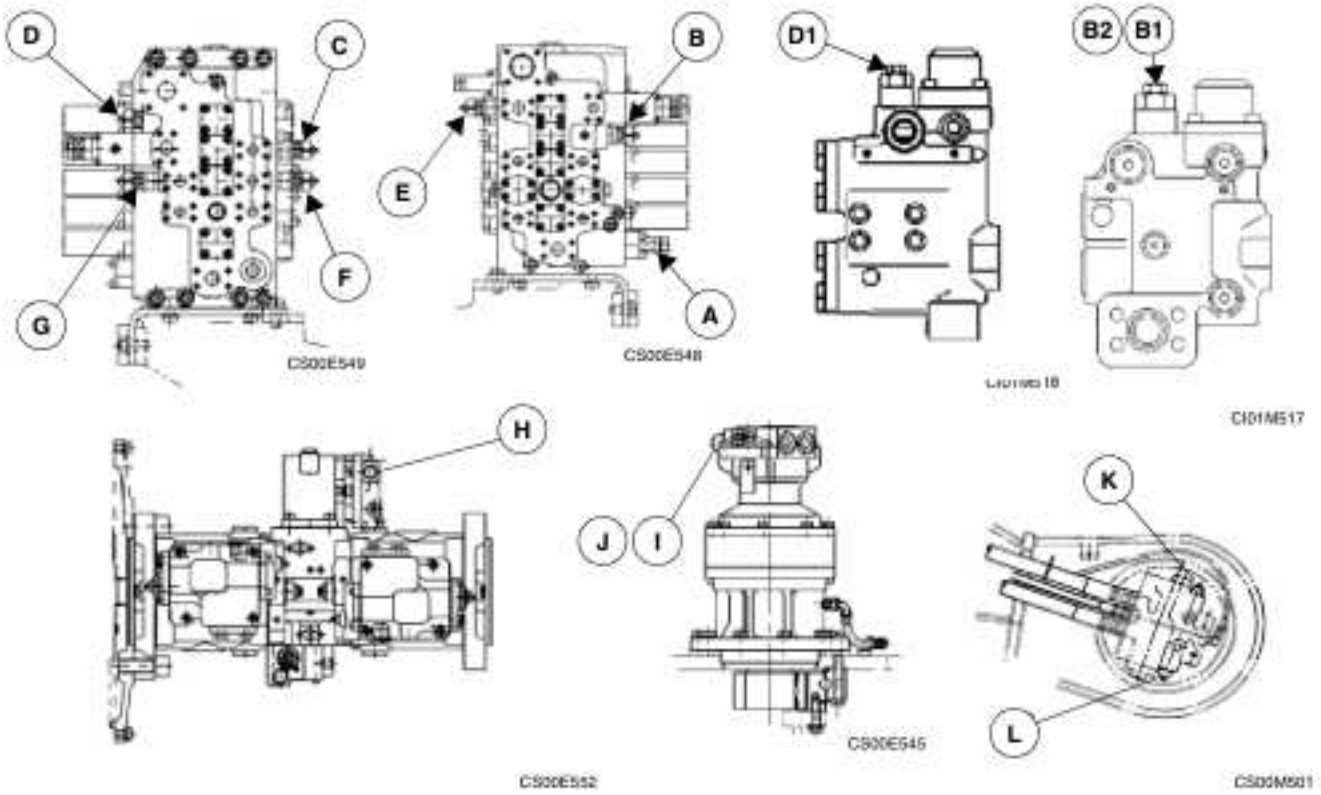
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CHECKING AND SETTING PROCEDURE

Location of secondary relief valves



Item	Description	Pressure for 1 turn of the screw (or for 1 shim*)
A	Main relief (standard pressure)	213 bar (21.3 MPa)
	Main relief (power boost)	284 bar (28.4 MPa)
B	Boom raising port secondary relief	212 bar (21.2 MPa)
C	Boom lowering port secondary relief	212 bar (21.2 MPa)
D	Dipper out port secondary relief	212 bar (21.2 MPa)
E	Dipper in port secondary relief	212 bar (21.2 MPa)
F	Bucket open port secondary relief	212 bar (21.2 MPa)
G	Bucket close port secondary relief	212 bar (21.2 MPa)
H	Pilot circuit main relief	20 bar (2 MPa)
I	RH swing port secondary relief	115 bar (11.5 MPa)
J	LH swing port secondary relief	115 bar (11.5 MPa)
K	Reverse travel secondary relief	60 bar (6 MPa)
L	Forward travel secondary relief	60 bar (6 MPa)

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STEP 23

Bucket cylinder

NOTE: *The numbers within brackets in the following steps refer to the bucket cylinder schematic on page 10.*

1. Install the circlip (17) on the cylinder barrel, using washers (16) and screws (15). Tighten the screws to torque (see "Specifications").
2. Install the hydraulic pipes (8) and (10) on the circlip (17), using clamps (7), washers (6) and screws (5). Tighten the screws to torque (see "Specifications").
3. Install the two new O-rings (9) and (11). Connect the hydraulic pipes (8) and (10) to the cylinder and fasten the pipes with screws (4). Tighten the screws to torque (see "Specifications").
4. Install the grease fittings (1) in the cylinder.

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Troubleshooting

The following table draws up a list of common problems, reasons for them and action that needs to be taken. However, in most cases, the problems are not due to the malfunction of only a single component but the malfunction of this and other related components. It is important to note that this list of measures is not exhaustive.

Problem	Cause	Action to be taken
The secondary coolant pressure does not increase.	1. Insufficient primary coolant pressure.	1. Getting the correct primary coolant pressure.
	2. Secondary coolant pressure control spring is worn or broken.	2. Use a new component.
	3. Excessive play between the spool and the guides.	3. Replace the spool or the guides assembly.
	4. End play in working component.	4. Removal, installation and replacement of parts.
The secondary coolant pressure is unstable.	1. The sliding parts are jammed.	1. Repair the jammed part.
	2. Variation in the line pressure at the reservoir.	2. Return directly to the reservoir.
	3. Mixture of air in the line.	3. Operate several times to drain the air.
The secondary coolant pressure is high.	1. Line pressure at the reservoir is too high.	1. Return directly to the reservoir.
	2. The sliding parts are jammed.	2. Repair the jammed part.
No discharge function.	1. Air trapped in the piston.	1. Operate several times and release the air.
	2. Sliding parts seized up.	2. Repair or replace the defective part.
	3. The seat of the springs (13) and (16) is defective (see section).	3. Replace the part.
	4. Gap between the discharge spring and the housing is abnormally large.	4. Replace the spring as well as the housing.
	5. Malfunction of the non-return check valve.	5. Repair or replace the non-return check valve.
	6. Calibrated port of the discharge piston is abnormally large.	6. Replace the discharge piston.
Discharge pressure is too high.	1. Sliding parts are seized up.	1. Repair or replace the defective part.
	2. Calibrated port of the discharge piston is blocked.	2. Repair or replace the piston.

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CX210 - CX240 - CX290 EXCAVATOR HYDRAULIC / ELECTRIC SCHEMATIC

ITEM	DESCRIPTION	PRESSURE SETTING
A =	MAIN RELIEF (STANDARD)	34.3 MPa / 343 bar / 4980 psi
A =	MAIN RELIEF (BOOST)	37.3 MPa / 373 bar / 5412 psi
B =	BOOM RAISING PORT SECONDARY RELIEF	39.2 MPa / 392 bar / 5688 psi
B1/B2 =	RELIEF ON BOOM HBCV	39.2 MPa / 392 bar / 5688 psi
C =	BOOM LOWERING PORT SECONDARY RELIEF	39.2 MPa / 392 bar / 5688 psi
D =	DIPPER OUT PORT SECONDARY RELIEF	39.2 MPa / 392 bar / 5688 psi
D1 =	RELIEF ON DIPPER HBCV	39.2 MPa / 392 bar / 5688 psi
E =	DIPPER IN PORT SECONDARY RELIEF	39.2 MPa / 392 bar / 5688 psi
F =	BUCKET OPEN PORT SECONDARY RELIEF	39.2 MPa / 392 bar / 5688 psi
G =	BUCKET CLOSE PORT SECONDARY RELIEF	39.2 MPa / 392 bar / 5688 psi
H =	PILOT PRESSURE RELIEF	3.92 MPa / 39.2 bar / 568 psi
I =	RIGHT-HAND SWING PORT SECONDARY RELIEF	27.5 MPa / 279 bar / 4048 psi
I =	(CX 290)	29.4 MPa / 294 bar / 4264 psi
J =	LEFT-HAND SWING PORT SECONDARY RELIEF	27.9 MPa / 279 bar / 4048 psi
J =	(CX 290)	29.4 MPa / 294 bar / 4264 psi
K1/K2 =	TRAVEL REVERSE PORT SECONDARY RELIEF	35.3 MPa / 353 bar / 5119 psi
L1/L2 =	TRAVEL FORWARD PORT SECONDARY RELIEF	35.3 MPa / 353 bar / 5119 psi
N1/N2 =	NEGATIVE CONTROL RELIEF	2.55 MPa / 25.5 bar / 370 psi
S1 =	ACCUMULATOR	1.5 MPa / 15 bar / 212 psi
O/P =	SECONDARY RELIEF (2pme OPTION)	23.5 MPa / 235 bar / 3410 psi
R =	MAIN RELIEF (2pme OPTION)	20.6 MPa / 206 bar / 2986 psi

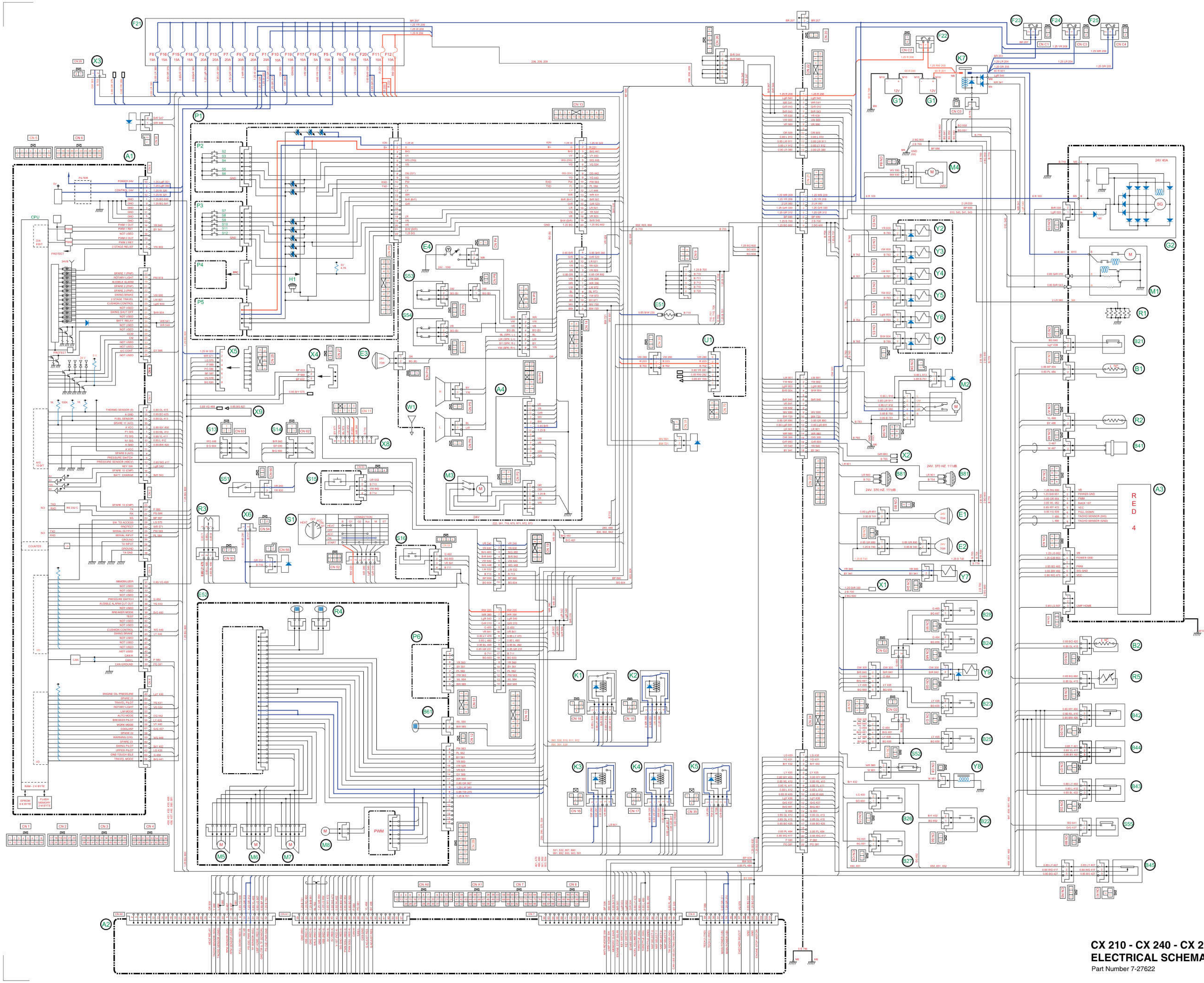
ITEM	DESCRIPTION
1.	HYDRAULIC RESERVOIR
2.	BREATHER
4.	BY-PASS VALVE
5.	SCREEN FILTER
6.	RETURN FILTER
10.	MAIN HYDRAULIC PUMP
15.	MAIN CONTROL VALVE
16.	HYDRAULIC SWIVEL
21.	TRAVEL MOTOR
22.	SWING MOTOR
23.	TRAVEL MOTOR BRAKE
25.	RIGHT BOOM CYLINDER
26.	LEFT BOOM CYLINDER
27.	DIPPER CYLINDER
28.	BUCKET CYLINDER
29.	BOOM SAFETY VALVE
30.	DIPPER SAFETY VALVE
31.	DIPPER LOAD HOLDING VALVE
32.	BOOM LOAD HOLDING VALVE
41.	FILTER (ULTRA-CLEAN)
42.	OIL COOLER
43.	RETURN MANIFOLD
44.	OIL COOLER BY-PASS VALVE
45.	NON-RETURN CHECK VALVE
51.	ACCUMULATOR
52.	6 SOLENOID VALVE BANK
53.	BOOM & BUCKET CONTROL LEVER
54.	SWING & DIPPER CONTROL LEVER
55.	TRAVEL CONTROL PEDAL
57.	BOOM & DIPPER CONTROL SHOCK ABSORBER
58.	PILOT AND RETURN SYSTEM MANIFOLD
59.	FILTER
60.	PILOT SYSTEM MANIFOLD
72.	CONTROL PEDAL (OPTIONAL)
75.	FLOW RE-INJECTION BLOCK (OPTIONAL)
76.	3-WAY SELECTOR (OPTIONAL)
77.	SAFETY VALVE RETURN SYSTEM MANIFOLD (OPTIONAL)
78.	RETURN FILTER (OPTIONAL)
79.	CONTROL SHUTTLE BLOCK (OPTIONAL)
81.	SWING SHUTTLE BLOCK
82.	PILOT CIRCUIT FILTER
83.	SHUT-OFF VALVE (OPTIONAL)
85.	HAND/FOOT CONTROL PILOT FILTER
86.	PILOT FILTER BYPASS VALVE
B22.	SWING PILOT PRESSURE SWITCH
B23.	BREAKER / CRUSHER PILOT PRESSURE SWITCH
B25.	BREAKER PILOT PRESSURE SWITCH
B26.	UPPER PILOT PRESSURE SWITCH (YELLOW BAND)
B27.	TRAVEL PILOT PRESSURE SWITCH
B42.	PUMP PRESSURE SENSOR (P1)
B43.	PRESSURE SENSOR (NEGA-CONT)
B44.	PUMP PRESSURE SENSOR (P2) (YELLOW BAND)
B45.	OVERLOAD INDICATOR PRESSURE SWITCH
Y1.	SWING PILOT SHUT-OFF SOLENOID VALVE (GREEN BAND)
Y2.	PILOT PRESSURE SOLENOID VALVE (BLUE BAND)
Y3.	SWING BRAKE SOLENOID VALVE (PINK BAND)
Y4.	2 STAGE TRAVEL SOLENOID VALVE (RED BAND)
Y5.	POWER-UP SOLENOID VALVE (YELLOW BAND)
Y6.	CUSHION CONTROL SOLENOID VALVE (LIGHT GREEN BAND)
Y7.	MAIN PUMP PROPORTIONAL SOLENOID
Y8	CRUSHER/BREAKER OPTION TWO FLOW SOLENOID VALVE

LEGEND

- PUMP 1
- PUMP 2
- PILOT SYSTEM PUMP
- RETURN TO RESERVOIR
- LEAK-OFF RETURN
- PILOT SYSTEM CIRCUIT
- COMPONENT BOUNDARY
- HOSE
- PIPING CONNECTION
- PIPING CROSS-OVER
- 41 — COMPONENT ITEM NO.
- COMPONENT NUMBER
- 15 Pb7 — CONNECTION ITEM NO.
- ★ OPTION ITEM NO.

CX210 - CX240 - CX290 EXCAVATOR
HYDRAULIC SCHEMATIC
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ITEM	DESCRIPTION
A1.	COMPUTER
A2.	ENGINE CONTROLLER
A3.	ELECTRONIC ACCELERATION
A4.	WIPER CONTROLLER
B1.	COOLANT TEMPERATURE SENSOR
B2.	HYDRAULIC OIL TEMPERATURE SENSOR
B21.	ENGINE OIL PRESSURE SWITCH
B22.	SWING PILOT PRESSURE SWITCH
B23.	BREAKER / CRUSHER PILOT PRESSURE SWITCH
B24.	SECOND OPTION PILOT CIRCUIT 2 PRESSURE SWITCH
B25.	BREAKER PILOT PRESSURE SWITCH
B26.	UPPER PILOT PRESSURE SWITCH (YELLOW BAND)
B27.	TRAVEL PILOT PRESSURE SWITCH
B28.	SECOND OPTION PILOT CIRCUIT 1 PRESSURE SWITCH
B41.	ENGINE RPM SENSOR
B42.	PUMP PRESSURE SENSOR (P1)
B43.	PRESSURE SENSOR (NEGA-CONT)
B44.	PUMP PRESSURE SENSOR (P2) (YELLOW BAND)
B45.	OVERLOAD INDICATOR PRESSURE SWITCH
B61.	SUNLOAD SENSOR
B81.	HORN
E1.	WORKING LIGHT (UPPERSTRUCTURE)
E2.	WORKING LIGHT (ATTACHMENT)
E3.	WORKING LIGHT (CAB)
E4.	CAB LIGHT
E51.	CIGARETTE LIGHTER
E52.	AIR CONDITIONER
F1.	FUSE 20A; ENGINE CONTROLLER
F10.	FUSE 10A; OPTION LINE AND LUBRICATOR CONNECTOR
F11.	FUSE 10A; BACK-UP
F12.	FUSE 10A; KEY SWITCH
F13.	FUSE 20A; HEATER / AIR CONDITIONER
F14.	FUSE 5A; AIR CONDITIONER COMPRESSOR
F15.	FUSE 10A; WORKING LIGHT
F16.	FUSE 15A; WORKING LIGHT (NOT USED)
F17.	FUSE 10A; DC-DC (24V-12V) CONVERTER
F18.	FUSE 15A; WIPER AND WASHER
F19.	FUSE 10A; HORN
F2.	FUSE 20A; COMPUTER CONTROL INSTRUMENT PANEL AND DIAGNOSTIC TEST SOCKET
F20.	FUSE 15A; CIGARETTE LIGHTER AND CAB SEAT COMPRESSOR ADJUSTMENT
F21.	FUSE BOX
F22.	FUSE 20A; MAIN FUSE FOR F11 AND F12 CIRCUITS
F23.	FUSE 65A; MAIN FUSE FOR F3 TO F10 AND F13 TO F20 CIRCUITS
F24.	FUSE 20A; MAIN FUSE FOR F2 CIRCUIT
F25.	FUSE 20A; MAIN FUSE FOR F1 CIRCUITS
F3.	FUSE 20A; COMPUTER POWER
F4.	FUSE 10A; HYDRAULIC FUNCTION CANCELLATION LEVER SWITCH
F5.	FUSE 15A; LUBRICATOR (NOT USED)
F6.	FUSE 10A; ROTARY LIGHT
F7.	FUSE 20A; FUEL FILLER PUMP
F8.	FUSE 10A; ENGINE STOP MOTOR
F9.	FUSE 30A; GLOW PLUG
G1.	BATTERY
G2.	ALTERNATOR
H1.	AUDIBLE WARNING DEVICE
K1.	RELAY-ENGINE EMERGENCY STOP
K2.	RELAY-GLOW PLUG
K3.	RELAY-HORN
K4.	RELAY-WORKING LIGHT
K5.	RELAY-ROTARY LIGHT
K7.	RELAY BATTERY
M1.	STARTER MOTOR
M2.	ENGINE EMERGENCY STOP MOTOR
M3.	WIPER MOTOR
M4.	WASHER MOTOR
M5.	MOTOR (AIR CHANGING)
M6.	AIR VENT DIRECTION CONTROL MOTOR
M7.	MOTOR ACT (AIR-MIX)
M8.	BLOWER MOTOR
P1.	INSTRUMENT PANEL
P2.	SWITCH PANEL (LEFT-HAND)
P3.	SWITCH PANEL (RIGHT-HAND)
P4.	MONITOR DISPLAY
P5.	HOURMETER
P6.	AIR CONDITIONER CONTROL PANEL
R1.	GLOW PLUG
R2.	FUEL FLOW ADJUSTMENT RESISTOR
R3.	THROTTLE VOLUME
R4.	THERMISTOR
R5.	FUEL SENSOR
S1.	KEY SWITCH
S10.	WORKING LIGHT SWITCH
S11.	WIPER SWITCH
S12.	WASHER SWITCH
S13.	OVERLOAD SWITCH
S14.	BREAKER / CRUSHER SWITCH
S15.	HORN SWITCH
S16.	ONE TOUCH IDLE
S2.	TRAVEL MODE SWITCH
S3.	WORK MODE SWITCH
S4.	AUTO MODE SWITCH
S5.	CUSHION CONTROL SWITCH
S51.	HYDRAULIC FUNCTION CANCELLATION LEVER SWITCH
S52.	AIR CONDITIONING COMPRESSOR CLUTCH SWITCH
S53.	DOOR LIMIT SWITCH
S54.	FRONT WINDOW LIMIT SWITCH
S55.	RESERVE TANK LSW
S6.	ROTARY LIGHT SWITCH
S7.	AUDIBLE ALARM CUT OUT SWITCH
S8.	SWING BRAKE SWITCH
S9.	ENGINE EMERGENCY STOP SWITCH
U1.	DC-DC (24V-12V) CONVERTER
W1.	ANTENNA
X1.	FUEL FILLER PUMP CONNECTOR
X2.	ROTARY LIGHT CONNECTOR
X3.	OPTINAL POWER CONNECTOR
X4.	ENGINE TEST POINT CONNECTOR
X5.	CONTROLLER TEST POINT CONNECTOR
X6.	CAB SEATCOMPRESSOR MOTOR CONNECTOR
X8.	RADIO CONNETOR
X9.	ANTI-THEFT SYSTEM CONNETOR
Y1.	SWING PILOT SHUT-OFF SOLENOID VALVE (GREEN BAND)
Y2.	PILOT PRESSURE SOLENOID VALVE (BLUE BAND)
Y3.	SWING BRAKE SOLENOID VALVE (PINK BAND)
Y4.	2 STAGE TRAVEL SOLENOID VALVE (RED BAND)
Y5.	POWER-UP SOLENOID VALVE (YELLOW BAND)
Y6.	CUSHION CONTROL SOLENOID VALVE (LIGHT GREEN BAND)
Y7.	MAIN PUMP PROPORTIONAL SOLENOID
Y8.	AIR CONDITIONER MAGNET CLUTCH
Y9.	CRUSHER/BREAKER OPTION TWO FLOW SOLENOID VALVE

LEGEND

- CONNECTED
- NOT CONNECTED
- BOOT GROUND
- CABLE GROUND
- SINGLE WIRE CONNECTOR
- HARNESS
- CONNECTOR (MALE)
- CONNECTOR (FEMALE)
- INSULATION AGAINST MAGNETISM
- INDICATES CONSTANT POWER
- INDICATES POWER WHEN KEY SWITCH IS ON

CN12 (R)

CONNECTOR NUMBER (IN CAB)
CONNECTOR LETTER LOCATED (OUTSIDE CAB)
COLOR OF CONNECTOR (IF NOT INDICATED COLOR IS WHITE)

60 B 001
AREA
COLOR
CIRCUIT NUMBER

TABLE OF COLOR SYMBOLS

SYMBOL	COLOR
B	BLACK
W	WHITE
Br	BROWN
P	PINK
V	VIOLET
G	GREEN
O	ORANGE
R	RED
Y	YELLOW
Lg	LIGHT GREEN
Sb	SKY BLUE
L	BLUE
Gr	GRAY

NOTE :
1. "BR" INDICATES BLACK CABLE WITH RED STRIPE.
2. WATERPROOF CONNECTORS USED OUTSIDE OF CAB.

CX 210 - CX 240 - CX 290 EXCAVATOR ELECTRICAL SCHEMATIC

Part Number 7-27622

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