CEBM000903

Shop Manual

KOMATSU®

PC200LC-8
PC220LC-8

HYDRAULIC EXCAVATOR

SERIAL NUMBERS	PC200LC-8	A88001	and UP
	PC220LC-8	A88001	
ENGINE	SAA6D107E-1		

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Classification And Troubleshooting Steps

Troubleshooting Classification

Mode	Contents
Display of code	Troubleshooting by failure code
E-mode	Troubleshooting electrical system
H-mode	Troubleshooting hydraulic and mechanical system
S-mode	Troubleshooting engine

Remark

Troubleshooting of engine electrical system (S-mode) is in the engine shop manual.

Troubleshooting steps

If a problem that appears to be a failure occurs on the machine, identify the relevant troubleshooting No. by performing the following steps and proceed to the main body of troubleshooting.

1. Procedure for troubleshooting to be taken when action code is displayed on machine monitor:
   When action code is displayed on machine monitor, press [ ] switch at panel switch section to display failure code. Carry out the troubleshooting for the corresponding [Display of code] according to the displayed failure code.

2. Procedure for troubleshooting to be taken when failure code is recorded in abnormality record:
   If an action code is not displayed on the machine monitor, check a failure code with the abnormality record function of the machine monitor. If a code is recorded, carry out troubleshooting for the corresponding [Display of code] according to the recorded code.
   - ★ If an electrical system failure code is recorded, delete all the codes and reproduce them, and then see if the trouble is still detected.
   - ★ An error code of the mechanical system cannot be deleted.

3. Procedure for troubleshooting to be taken when action code is not displayed and no failure code is recorded in abnormality record:
   If an action code is not displayed on the machine monitor and no failure code is recorded in the abnormality record, a trouble that the machine cannot find out by itself may have occurred in the electrical system or hydraulic and mechanical system.
   In this case, check the phenomenon resembling a problem again and select the same phenomenon from the table of "Possible Problems and Troubleshooting No." and then carry out troubleshooting corresponding to that phenomenon in the "**E-mode**", "**H-mode**", or "**S-mode**".

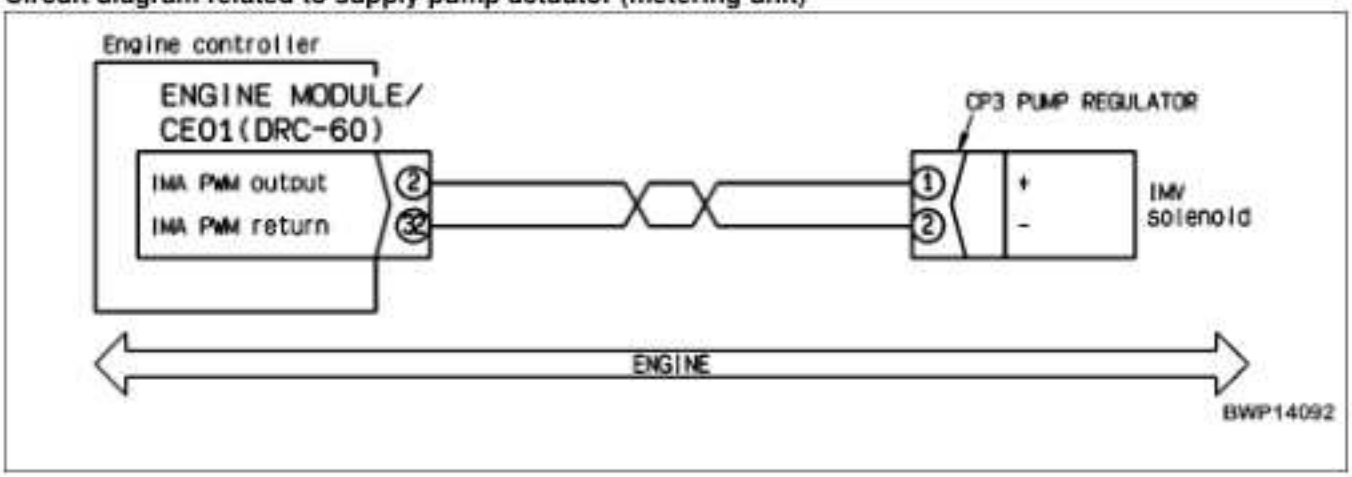
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CA271 IMV/PCV1 Short Error

User code	Failure code	Trouble	IMV/PCV1 short circuit error (Engine controller system)
E10	CA271		
Contents of trouble	• Short circuit was detected in drive circuit of supply pump actuator.		
Action of controller	• None in particular.		
Problem that appears on machine	• Engine speed does not rise from low idle. • Engine output lowers. • Common rail fuel pressure rises above command value.		
Related information	• Method of reproducing failure code: Turn starting switch ON.		

	Cause		Standard value in normal state/Remarks on troubleshooting			
Possible causes and standard value in normal state	1	Defective supply pump actuator	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.			
			CP3 PUMP REGULATOR (male)	Resistance		
			Between (1) – chassis ground	Min. 100 kΩ		
	2	Ground fault in wiring harness (Short circuit with GND circuit)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.			
			Wiring harness between CE01 (female) (2) – CP3 PUMP REGULATOR (female) (1) and chassis ground	Resistance	Min. 100 kΩ	
	3	Short circuit in wiring harness (with another wiring harness)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.			
			Wiring harness between CE01 (female) (2) – each of CE01 (female) pins (With all wiring harness connectors disconnected)	Resistance	Min. 100 kΩ	
	4	Defective wiring harness connector	Connecting parts between supply pump actuator – engine wiring harness – engine controller may be defective. Check them. • Looseness of connector, breakage of lock, or breakage of seal • Corrosion, bend, breakage, push-in, or expansion of pin • Moisture or dirt in connector or defective insulation			
	5	Defective engine controller	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.			
			CE01 (female)	Resistance		
			Between (2) – chassis ground	Min. 100 kΩ		

Circuit diagram related to supply pump actuator (metering unit)



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H-21 Travel Speed Does Not Shift or Is Too Slow or Too Fast

Trouble	• Travel speed does not change or travel speed is low/high
Related information	• Carry out all troubleshooting in power mode (P) of working mode.

<table>
<tr><td rowspan="15">Possible causes and standard value in normal state</td><td colspan="2">Cause</td><td colspan="3">Standard value in normal state/Remarks on troubleshooting</td></tr>
<tr><td rowspan="9">1</td><td rowspan="9">Malfunction of LS-EPC valve</td><td colspan="3">★ Run engine at high idle and carry out troubleshooting (with monitoring function).</td></tr>
<tr><td>Travel speed</td><td>Travel lever</td><td>Monitoring code: 01500</td></tr>
<tr><td>Lo</td><td rowspan="3">Operated</td><td>663 mA (PC200LC-8)
578 mA (PC220LC-8)
(* Reference)</td></tr>
<tr><td>Mi</td><td>424 mA (PC200LC-8)
641 mA (PC220LC-8)</td></tr>
<tr><td>Hi</td><td>0 mA</td></tr>
<tr><td colspan="3">★ Prepare with engine stopped, then run engine at high idle and carry out troubleshooting.</td></tr>
<tr><td>Travel speed</td><td>Travel lever</td><td>LS-EPC valve output pressure</td></tr>
<tr><td>Lo</td><td>Neutral</td><td>Approximately 420.61 psi {Approximately 30 kg/cm^2}</td></tr>
<tr><td>Hi</td><td>Operated</td><td>0 psi {0 kg/cm^2}</td></tr>
<tr><td rowspan="4">2</td><td rowspan="4">Malfunction of travel speed shifting solenoid valve</td><td colspan="3">★ Prepare with engine stopped, then run engine at high idle and carry out troubleshooting.</td></tr>
<tr><td>Travel speed</td><td>Travel lever</td><td>Travel speed shifting solenoid valve output pressure</td></tr>
<tr><td>Lo</td><td>Neutral</td><td>0 psi {0 kg/cm^2}</td></tr>
<tr><td>Hi</td><td>Operated</td><td>Approximately 420.61 psi {Approximately 30 kg/cm^2}</td></tr>
<tr><td>3</td><td>Malfunction of travel motor (speed shifting section)</td><td colspan="3">Speed shifting section of travel motor may have malfunction. Check it.</td></tr>
</table>

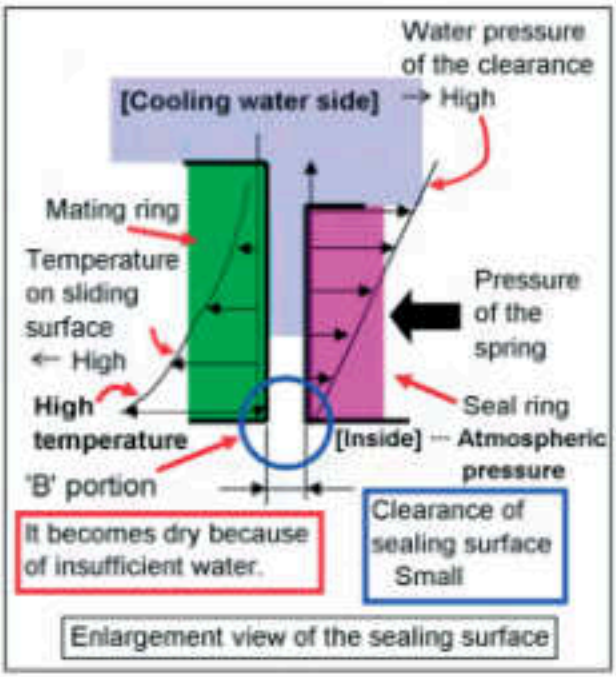
*: Travel speed Lo can be adjusted with the adjusting function of the machine monitor. Accordingly, if the initial value has been changed, the measured value varies more or less.

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6. If the clearance between sliding surfaces is small.
If the clearance of sliding surfaces is small because of certain a reason (defective mounting of the water seal, etc.) lubrication by water will be insufficient. As a result, mating ring and seal ring are contacting fully and sliding with dry condition on "B portion".

⇓

Seal ring is made of carbon whose self lubricating ability is good. But if this condition continues, abnormal wear and crack(s) will occur by heat, and water leakage occur.

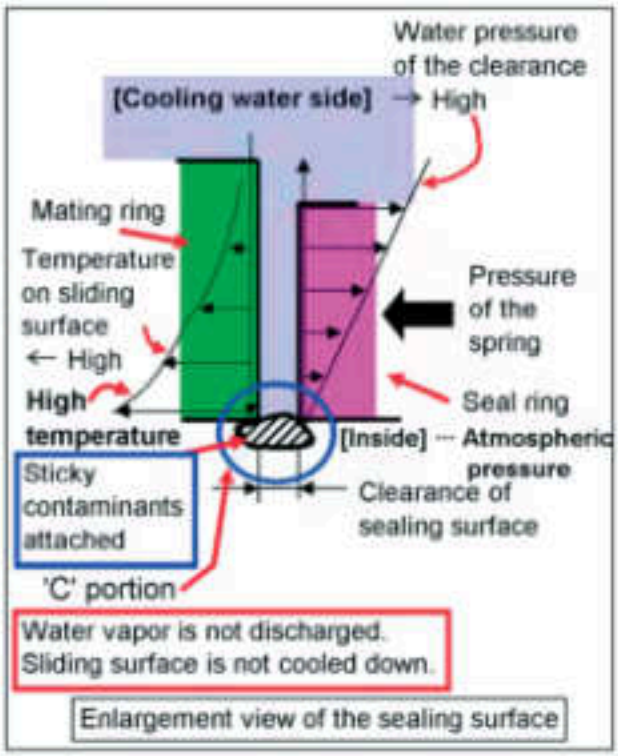


CVPSN00189A

7. If any sticky contaminants attach inside the water seal (oil, dirt, etc.
Water vapor is not discharged at "C portion" and cooling down of the sliding surfaces becomes insufficient.

⇓

Same as above, if this condition continues, abnormal wear and crack(s) will occur by heat, and water leakage will occur.



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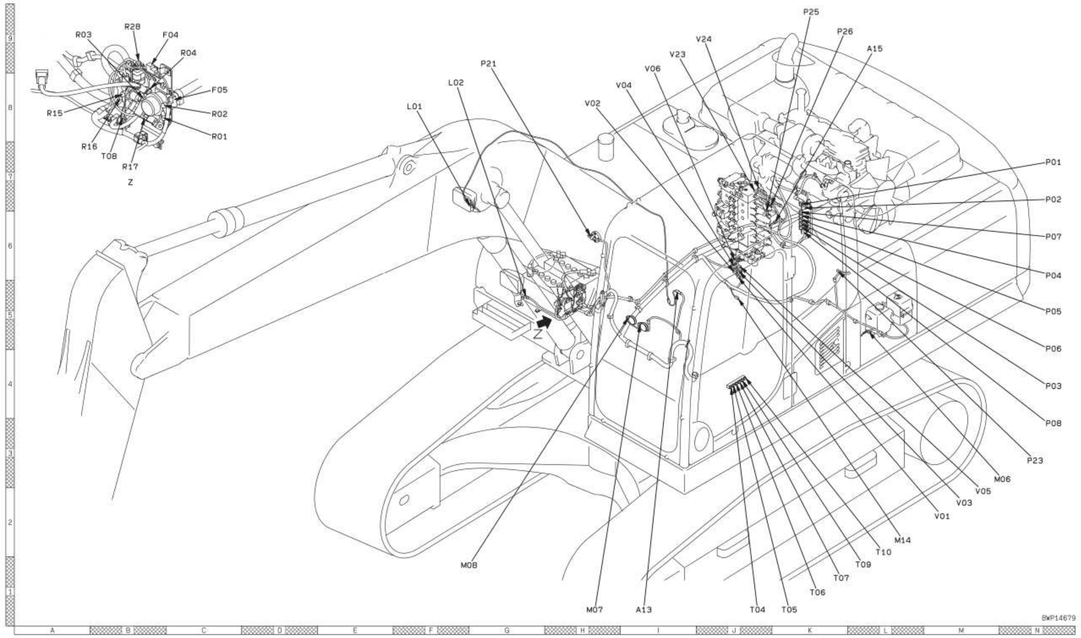
When replacing the water seal, observe the following:

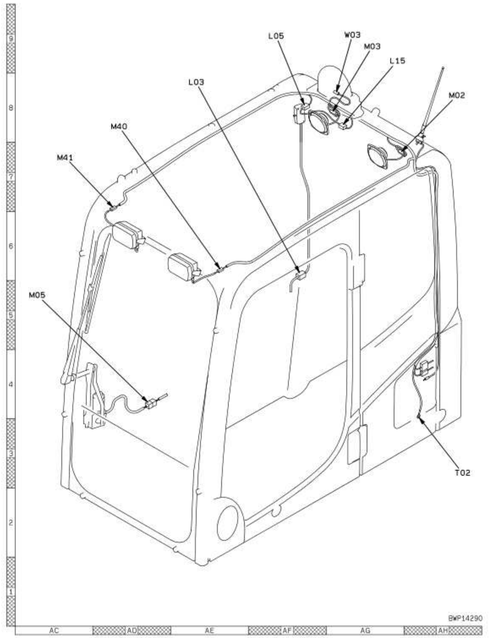
- Install the water seal to the specified position when assembling the water pump.
If the seal ring of the water seal is installed floated, installed length of the spring of the seal ring becomes too small. And then, surface pressure of the sliding surface becomes high which leads to the failures described above.
- Take care not to allow any oil, dust, etc. to attach the sliding surface of the water seal.

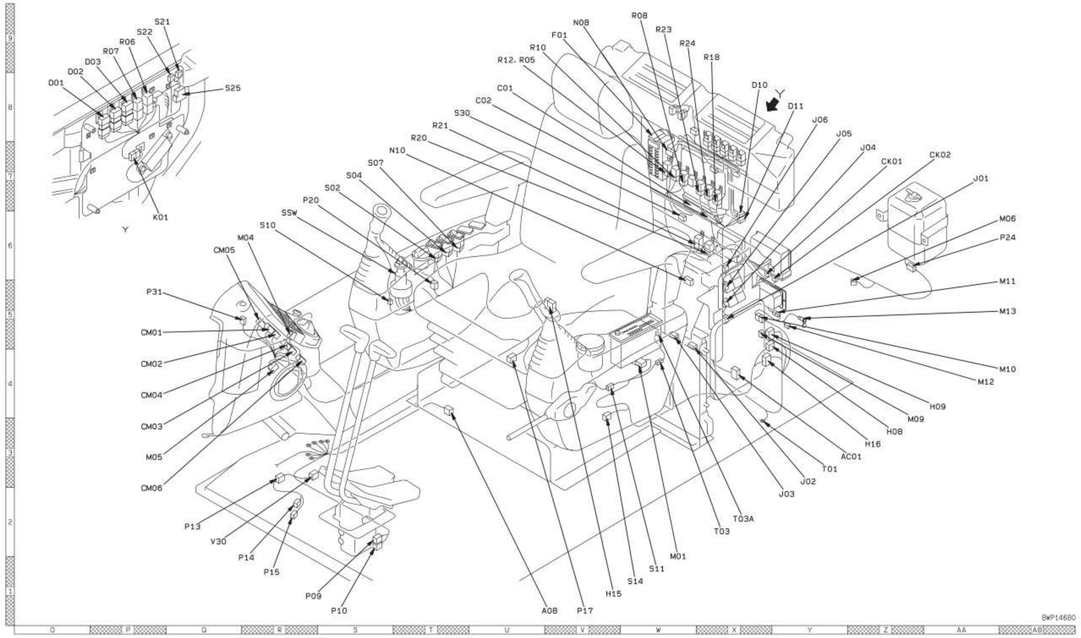
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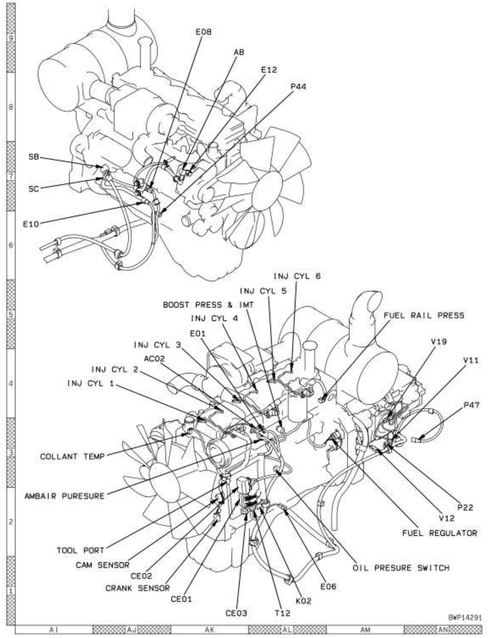
Connector No.	Model	Number of pins	Component name	Address of stereogram
A08	SWP	12	Intermediate connector	V-1
A13	DT	2	Intermediate connector	I-1
A15	DT	2	Intermediate connector	L-9
AB	Terminal	2	Alternator (Terminal B)	AK-9
AC01		8	Air conditioner unit	Y-3
AC02	X	1	Air conditioner compressor electromagnetic clutch	AJ-4
AMBAIR PRESSURE		3	Ambient pressure sensor	AJ-2
BOOST PRESS & IMT		3	Boost pressure/temperature sensor	AK-5
C01	AMP	81	Pump controller	U-8
C02	AMP	40	Pump controller	U-8
CAM SENSOR		3	Engine Bkup speed sensor	AJ-1
CE01	DRC	60	Engine controller	AK-1
CE02	DRC	50	Engine controller	AJ-1
CE03	DTP	4	Engine controller	AK-1
CK01	AMP	14	KOMTRAX communication module	Z-7
CK02	AMP	10	KOMTRAX communication module	AA-7
CM01	070	18	Machine monitor	P-5
CM02	070	12	Machine monitor	P-4
CM03	070	18	Machine monitor	P-3
CM04	070	12	Machine monitor (Unconnected)	P-4
CM05	070	8	Machine monitor (For connection of camera)	Q-6
CM06	070	4	Machine monitor (GPS antenna)	P-2
COOLANT TEMP		2	Engine coolant temperature sensor	AJ-3
CRANK SENSOR		3	Engine Ne speed sensor	AJ-1
D01	SWP	8	Assembled-type diode	O-8
D02	SWP	8	Assembled-type diode	O-8
D03	SWP	8	Assembled-type diode	P-9
D10		2	Diode	X-8
D11		2	Diode	Y-8
E01	Terminal	1	Electrical intake air heater	AK-5
E06	DT	2	Intermediate connector	AL-1
E08	X	1	Intermediate connector	AK-9
E10	D	1	Intermediate connector	AI-6
E12		2	Alternator (Terminals IG and L)	AL-9
ENGINE BRAKE		2	(Spare connector for engine used as brake)	
F01	—	—	Fuse box	V-9
F04	L	2	Fusible link	C-9
F05	M	2	Fusible link	C-8
FUEL RAIL PRESS		3	Common rail pressure sensor	AM-5
FUEL REGULATOR			Supply pump solenoid (IMV)	AN-2
H08	M	4	Intermediate connector	Z-3
H09	M	8	Intermediate connector	AA-4
H15	090	22	Intermediate connector	V-1
H16	S	12	Intermediate connector	Z-3
INJ CYL 1	DT	2	Injector #1	AJ-4
INJ CYL 2	DT	2	Injector #2	AJ-4
INJ CYL 3	DT	2	Injector #3	AK-5
INJ CYL 4	DT	2	Injector #4	AK-5
INJ CYL 5	DT	2	Injector #5	AL-5
INJ CYL 6	DT	2	Injector #6	AL-6
J01		20	Junction connector (Black)	AA-7
J02		20	Junction connector (Black)	Y-3
J03		20	Junction connector (Green)	Y-2
J04		20	Junction connector (Green)	Z-7
J05		20	Junction connector (Pink)	Y-8
J06		20	Junction connector (Orange)	Y-8
JC01		16	Junction connector	
JC02		16	Junction connector	
JC03		16	Junction connector	
K01	M	2	Pump (PC) resistor	P-6
K02	DT	3	CAN terminal resistance	AL-1
L01	DT	2	Working lamp (Boom)	F-8
L02	DT	2	Right headlamp	F-8
L03		2	Room lamp	AE-8
L05		2	Intermediate connector [Rotary lamp specification]	AF-9
L09	DT	2	Rear working lamp [Rear working lamp specification]	
L15		2	Rotary lamp [Rotary lamp specification]	AG-9
LPP		2	(Spare connector for fuel lift pump)	
M01	PA	9	Radio	W-2
M02		2	Speaker (Left)	AH-8
M03		2	Speaker (Right)	AG-9
M04		2	Cigarette lighter	R-6
M05	M	6	Wiper motor	P-3, AC-5
M06	KES0	2	Window washer motor	M-3, AB-6
M07	090	2	Horn (High tone)	H-1
M08	090	2	Horn (Low tone)	G-1
M09	M	2	Optional power supply connector (1)	Z-4
M10	M	2	Optional power supply connector (2)	AB-4
M11	M	4	DC/DC converter	AB-5
M12	M	2	Optional power supply connector (12 V)	AA-4
M13	M	2	12V outlet	AB-5
M14	D	2	Travel alarm	L-2
M40		2	Headlamp [Headlamp specification]	AD-8
M41		2	Headlamp [Headlamp specification]	AC-7
N08	D	12	Service connector	V-9
N10		4	Air conditioner unit	T-7
OIL PRESSURE SWITCH		Terminal	Engine oil pressure switch (Low pressure)	AM-1
P01	AMP	3	Bucket curl PPC pressure sensor	N-7

Connector No.	Model	Number of pins	Component name	Address of stereogram
P02	X	2	Boom lower PPC pressure switch	N-7
P03	AMP	3	Swing left PPC pressure sensor	N-4
P04	AMP	3	Arm curl PPC pressure sensor	N-6
P05	AMP	3	Bucket dump PPC pressure sensor	N-5
P06	AMP	3	Boom raise PPC pressure sensor	N-5
P07	AMP	3	Swing right PPC pressure sensor	N-6
P08	X	2	Arm dump PPC pressure switch	N-3
P09	X	2	Travel PPC pressure switch	S-1
P10	X	2	Travel steering PPC pressure switch	S-1
P13	X	2	Intermediate connector	Q-2
P14	X	2	Attachment pedal front PPC pressure switch [Attachment specification]	R-2
P15	X	2	Attachment pedal rear PPC pressure switch [Attachment specification]	R-1
P16	X	2	Attachment pedal front PPC pressure switch [Attachment specification]	
P17		2	Air conditioner high/low pressure switch	V-1
P20	M	3	Fuel control dial	R-7
P21	X	1	Fuel level sensor	G-9
P22	D	2	Hydraulic oil temperature sensor	AN-2
P23	D	2	Air cleaner clogging switch	N-3
P24	X	2	Radiator coolant level switch	AB-6
P25	AMP	3	F pump pressure sensor	K-9
P26	AMP	3	R pump pressure sensor	K-9
P30	X	2	Attachment pedal rear PPC pressure switch [Attachment specification]	
P31		2	Air conditioner daylight sensor	P-5
P44	D	2	Engine oil level sensor	AL-8
P47	DT	2	Water-in-fuel sensor	AN-4
R01	Terminal	1	Battery relay (Terminal E)	C-8
R02	Terminal	1	Battery relay (Terminal BR)	C-8
R03	Terminal	1	Battery relay (Terminal M)	A-9
R04	Terminal	1	Battery relay (Terminal B)	C-9
R05	Relay	5	Light relay	U-9
R06	Relay	5	Starting motor cutout relay (PPC lock)	P-9
R07	Relay	5	Starting motor cutout relay (Personal code)	P-9
R08	Relay	5	Horn relay	W-9
R10	Relay	5	Rear light relay [Rear light specification]	U-9
R12	Relay	5	Cab light relay [Cab light specification]	U-9
R15	Terminal	1	Electrical intake air heater relay (Coil circuit)	A-8
R16	Terminal	1	Electrical intake air heater relay (Contact circuit)	B-8
R17	X	2	Starting motor safety relay (Terminals S and R)	B-7
R18	Relay	5	Automatic preheater relay	X-9
R28	Terminal	1	Starting motor safety relay (Terminal C)	B-9
R20	Relay	5	Air conditioner blower relay	T-8
R21	Relay	5	Air conditioner compressor relay	T-8
R23	Relay	5	Engine controller relay (1)	W-9
R24	Relay	5	Engine controller relay (2)	W-9
S02	SWP	6	Light switch	S-7
S04	SWP	6	Swing lock switch	S-7
S07	SWP	6	Rotary lamp switch [Rotary lamp specification]	S-7
S10	090	2	Right knob switch	R-6
S11		2	Left knob switch	W-1
S14	M	3	PPC oil pressure lock switch	W-1
S21	—	12	Emergency pump drive switch	P-9
S22	—	6	Swing holding brake release switch	P-9
S25	090	8	Intermediate connector	Q-8
S30	S	8	Model selection connector	T-8
SB	Terminal	2	Starting motor (Terminal B)	AI-7
SC	Terminal	1	Starting motor (Terminal C)	AI-7
T01	Terminal	2	Floor frame ground	Y-3
T02	Terminal	1	Cab ground	AH-3
T03		1	Intermediate connector	X-2
T03A	Terminal	1	Radio body ground	X-2
T04	Terminal	1	Revolving frame ground	J-1, V-1
T05	Terminal	1	Revolving frame ground	K-1
T06	Terminal	1	Revolving frame ground	K-1
T07	Terminal	1	Revolving frame ground	K-1
T08	Terminal	1	Revolving frame ground	B-7
T09	Terminal	1	Revolving frame ground	L-1
T10	Terminal	1	Revolving frame ground	L-2
T12	Terminal	1	Engine cylinder block ground	AL-1
TOOL PORT			Communication connector	AJ-2
V01	D	2	PPC lock solenoid valve	M-2
V02	D	2	2-stage relief solenoid valve	H-8
V03	D	2	Swing holding brake solenoid valve	M-2
V04	D	2	Travel speed shifting solenoid valve	I-8
V05	D	2	Travel junction solenoid valve	M-2
V06	D	2	Attachment return selector solenoid valve [Attachment specification]	I-9
V11	D	2	F-PC-EPC valve	AN-4
V12	D	2	R-PC-EPC valve	AN-2
V19	D	2	LS-EPC valve	AN-5
V23	D	2	Merge-divider EPC valve (Main)	I-9
V24	D	2	Merge-divider EPC valve (LS)	J-9
V30	DT	2	Attachment flow regulator EPC valve [Attachment specification]	Q-2
W03	M	2	Window rear limit switch	AG-9









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