Specifications

Specifications

	SH225X-3
1. Main data:	
Model name	SH225X-3 Ultra Small Tail Swing Hydraulic Excavator
Operating weight	22300 kg (600 mm grouser shoe)
Engine output	103 kw / 1950 rpm
Bucket capacity	Heaped 0.80 m^3 Leveled 0.57 m^3
2. Performance	
Standard weight	10.3 kN
Swing speed	11.2 rpm
Travel speed	Low Speed 3.1 km/h High Speed 5.0 km/h
Maximum drawbar pull	191 kN
Grade ability	70% (35°)
Ground pressure	50 kPa (600 mm grouser shoe)
3. Complete machine dimensions	
	Standard arm (3.0 m)
Length	8710 mm
Width	2800 mm
Height	2970 mm
4. Main body dimensions	
Main body length	4150 mm
Main body width	2800 mm
Upper swing body width	2800 mm
Cab width	1000 mm
Main body height	2970 mm
Tail swing radius	1680 mm
Distance of rear swing body	1680 mm
Ground clearance for upper structure	1020 mm
Center-to-center of wheels	3370 mm
Overall track length	4150 mm
Overall track width	2800 mm
Center-to-center for track	2200 mm
Width of track shoe	600 mm
Minimum ground clearance	460 mm (to bottom of lower frame)

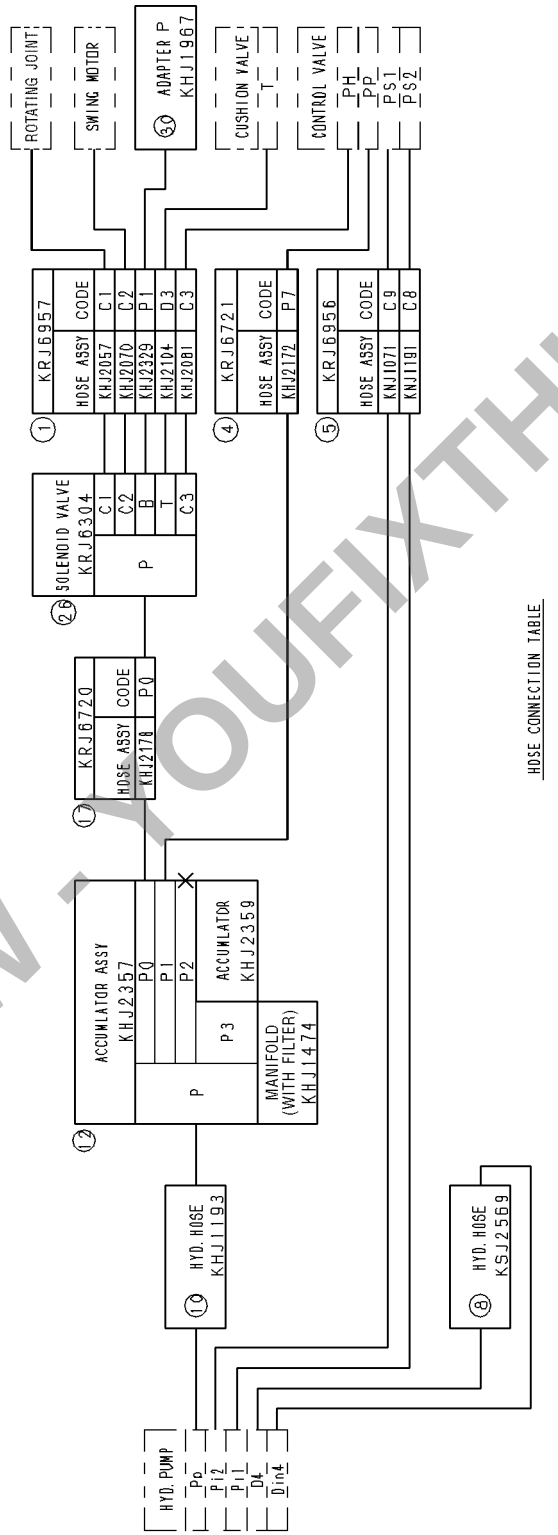
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Pilot Hose Connection Diagrams

First Edition: 09/2001

Pilot P&T Lines



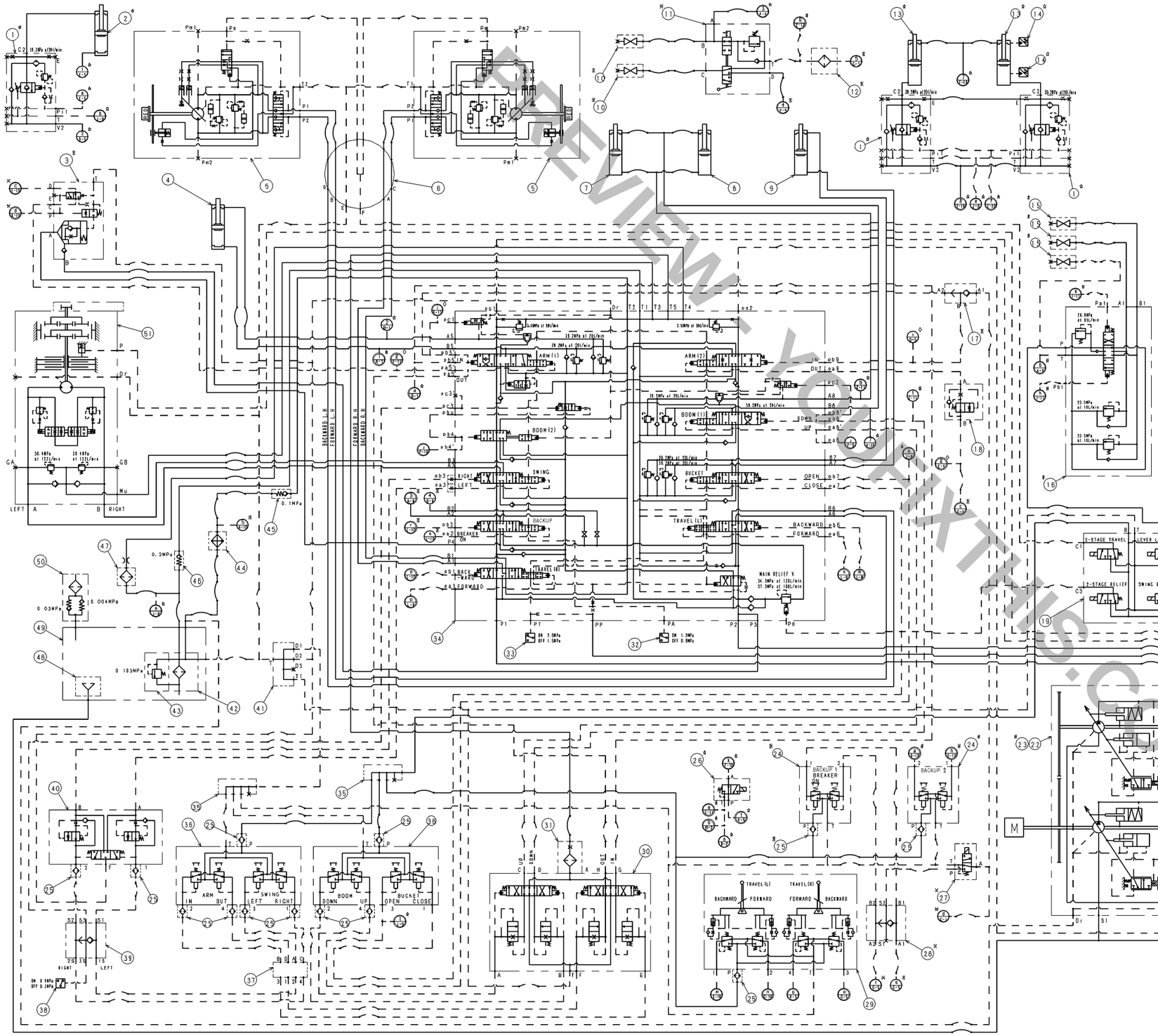
KRJ6955Z-E00

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Hydraulic Circuit Diagram

First Edition: 09/2001



	DESCRIPTION	SYMBOL	QTY.
☆	HOLDING VALVE	1	3
☆	ARM CYLINDER (CRANE)	2	1
※	HOLDING VALVE	3	1
	ARM CYLINDER (EMS)	4	1
	TRAVEL UNIT MOTOR	5	2
	ROTATING JOINT ASSEMBLY	6	1
	BOOM CYLINDER (EMS, L)	7	1
	BOOM CYLINDER (EMS, R)	8	1
	BUCKET CYLINDER (EMS)	9	1
※	STOP VALVE G1	10	2
※	DIRECTION VALVE	11	1
※	LINE FILTER	12	1
☆	BOOM CYLINDER (HBCV EMS, L)	13	2
☆	PRESSURE SENSOR	14	2
#	STOP VALVE G1/2	15	3
#	BLADE CONTROL VALVE	16	1
※	SHUTTLE VALVE	17	1
	CUSHION VALVE	18	1
	SOLENOID VALVE (4-WAY)	19	1
	ACCUMULATOR 0.32 L	20	1
	MANIFOLD (WITH FILTER)	21	1
	HYDRAULIC PUMP	22	1
#	HYDRAULIC PUMP (FOR SECOND BACKUP)	23	1
# ※	REMOTE CONTROL VALVE (FOR BACKUP)	24	2
# ※	NIPPLE (WITH FILTER)	25	13
☆	SOLENOID VALVE	26	1
※	SOLENOID VALVE	27	1
※	SHUTTLE VALVE	28	1
	REMOTE CONTROL VALVE (FOR TRAVEL)	29	1
	CUSHION VALVE (FOR HEAT CIRCUIT)	30	1
	HOSE ADAPTER (FILTER WITH DIA. 3.0 OF ORIFICE)	31	1
	PRESSURE SWITCH (FOR ATTACHEMNTS)	32	1
	PRESSURE SWITCH (FOR TRAVEL)	33	1
	CONTROL VALVE	34	1
	HOSE ADAPTER (5-WAY)	35	2
	REMOTE CONTROL VALVE (FOR OPERATION)	36	2
	2-WAY SELECTOR VALVE	37	1
	PRESSURE SWITCH	38	1
	SHUTTLE VALVE	39	1
	CUSHION VALVE (SWING)	40	1
	MANIFOLD	41	1
	RETURN FILTER	42	1
	RELIEF VALVE	43	1
	RADIATOR	44	1
	CHECK VALVE	45	1
	CHECK VALVE	46	1
	NEPHRON FILTER	47	1
	STRAINER	48	1
	SUMP TANK DELIVERY SPEC.	49	1
	AIR BREATHER	50	1
	SWING REDUCTION GEAR ASSMBLY	51	1

NOTES

1. VALUES IN UPPER HALF OF CIRCLE ⊖ SHOW CONNECTIVE POINTS, AND VALUES IN LOWER HALF SHOW ZONE NUMBERS OF THIS DRAWING.
2. PARTS MARKED WITH ※, #, AND ☆ ARE OPTIONAL.
   ※: COMBINED CIRCUIT
   #: SECOND BACKUP LINE
   ☆: CRANE
3. PARTS MARKED WITH ◇ ARE INSTALLED ONLY ON MACHINES WITHOUT BACKUP LINES.

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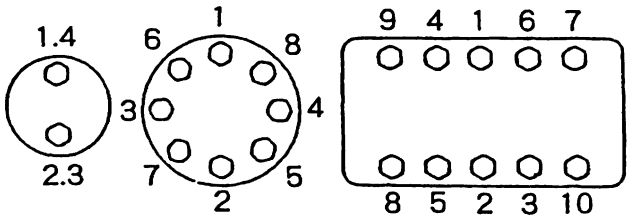
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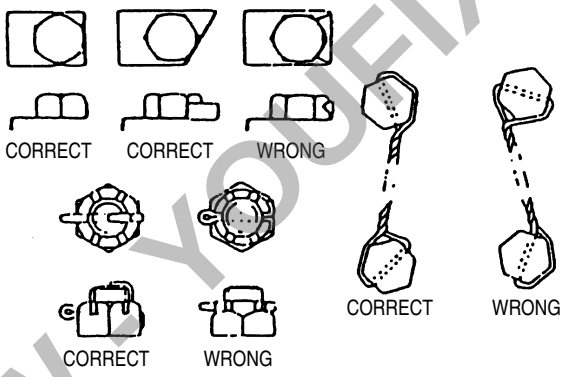
Tightening Torque

1. Tightening Bolts and Nuts

- Tighten bolts and nuts right to left and up and down alternately so that tightening force is applied evenly.



- For bolts on important areas, apply engine oil on the threaded portion so that tightening force is applied evenly without unnecessary engagement on the thread.
- For bolts and nuts in the areas that it is difficult to check from outside or bolts and nuts in important areas, secure them using wires, cotter pins or folding washers.



- Clean bolts to which Loctite was applied (identified as bolts with white substances when removed) with light oil and trichlene, and dry them. After that, apply two or three drops of Loctite to the threaded portion of the bolts and fasten them.

2. Retightening Torque Table

The tightening torque for the bolts and nuts not indicated in the manual is as follows:

Bolt Diameter (size)			M6	M8	M10	M12	M14	M16	M18	M20
Hex. Bolt	Wrench	(mm)	10	13	17	19	22	24	27	30
	Tightening Torque	(kgf·m)	0.7	1.6	3.3	6.0	10.0	14.0	20.0	28.0
		(N·m)	6.9	15.7	32.3	58.8	98.0	137.2	196.0	274.4
Hex. Socket Head Cap Screw	Wrench	(mm)	5	6	8	10	12	14	14	17
	Tightening Torque	(kgf·m)	0.9	2.2	4.3	8.0	12.0	18.0	25.0	35.0
		(N·m)	8.8	21.6	42.1	78.4	117.6	176.4	245.0	343.0

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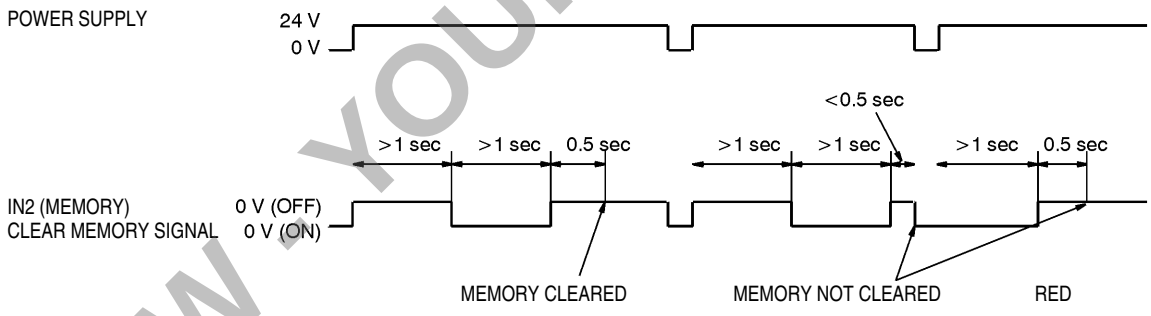
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3. Error code list

Error code	Name of error	Lamp comes on at error?
32	Rack sensor error	Yes
31	Governor internal circuit error Linear servo motor error	Yes
41	TDC sensor error	Yes
42	Backup sensor error	Yes
21	Throttle sensor error	No
15	Coolant temperature sensor error	No
25	Q-adjusting resistor error	No

4. Clearing memory

All the previous and the current diagnosis results will be cleared if the engine controller receives the clear memory signal (IN2) being ON (=0 V) for 1 second or longer followed by the OFF (≠0 V) signal for 0.5 seconds or longer.



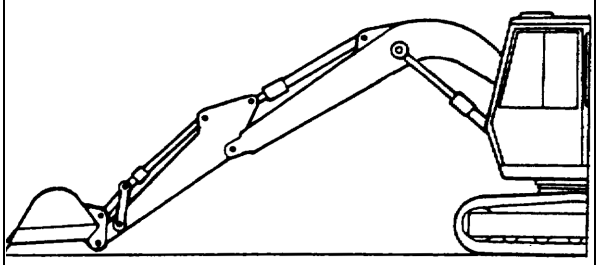
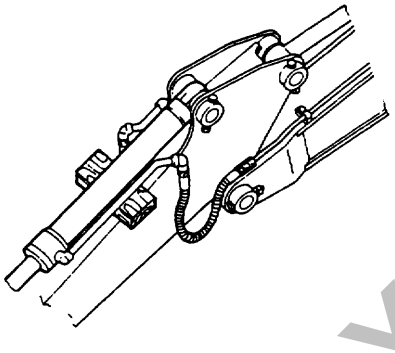
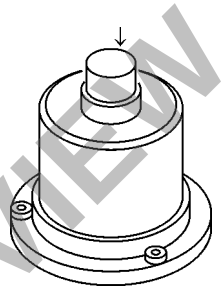
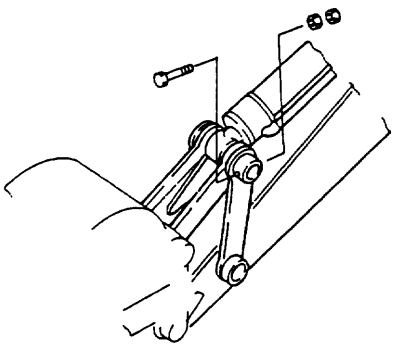
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Attachments

1. Bucket Cylinder Removal and Installation

1-1. Removal

1		Lower the attachment to the ground.
2		Put a block between the bucket cylinder and the arm.
3	 UPPER SIDE OF HYDRAULIC OIL TANK	Stop the engine and release pressure in the hydraulic circuit. NOTE: Refer to the procedures for bleeding the hydraulic pressure in *05 Precautions for Use* in *Chapter 0* (page 10/18). When releasing pressure from the tank, stop the engine and press the button to completely release the internal pressure. The hydraulic oil may be hot, so be careful not to get burned.
4		Remove nuts and bolt.

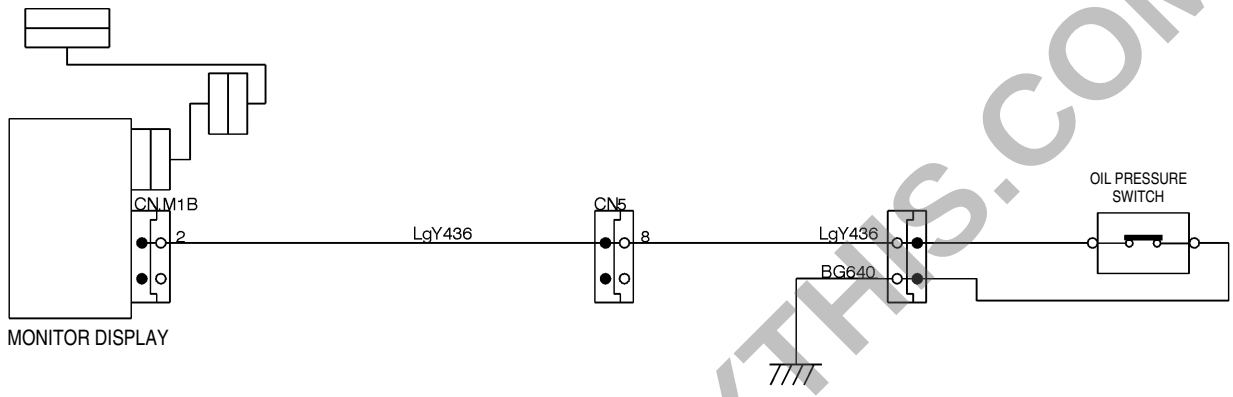
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Abnormal Engine Oil Pressure

Problem symptom (Problem No. 1)

- Lamp stays on even after engine oil level is corrected.



TROUBLESHOOTING	CAUSE	REMEDY
CHECK THE FOLLOWING ITEMS 2 SECONDS AFTER ENGINE START-UP.		
DISCONNECT OIL PRESSURE SWITCH CONNECTOR TO SEE IF LAMP GOES OUT. — YES	DEFECTIVE OIL PRESSURE SWITCH	REPLACE SWITCH.
NO → DISCONNECT CN5 CONNECTOR TO SEE IF LAMP GOES OUT. — YES	SHORT CIRCUIT OF WIRE LGY BETWEEN OIL PRESSURE SWITCH AND CN5	REPAIR WIRE LGY.
NO → DISCONNECT CN.M1B CONNECTOR TO SEE IF LAMP GOES OUT. — YES	SHORT CIRCUIT OF WIRE LGY BETWEEN CN5 AND CN.M1B	REPAIR WIRE LGY.
NO	DEFECTIVE MONITOR	REPLACE MONITOR.

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Fuel / Lubricants and Filters

4. SH225X-3 Grease / Oil and Elements Replacement

Symbol	Where to grease (parts to be replaced)		Quantity Oil level	Grease / Oil (replacement parts)	Intervals for greasing / oiling (or replacement) 50	250	500	1000	2000	5000	10000
①	Front attachment pin		17 places	Extreme pressure grease No. 2	○						
	(EM System specifications)							○			
②	Turntable bearing		2 places				○				
③	Swing ring gear		14 kg				○				
④	Swing reduction gear		4.5 L	Gear oil		△		◎			
⑤			0.6 kg	Extreme pressure grease No. 2						○	
⑥	Engine oil pan		24 L	Engine oil			◎				
⑦	Travel reduction gear		4.7 x 2 L	Gear oil		△		◎			
⑧	Hydraulic oil tank		205 L	Hydraulic oil							◎
⑨	Radiator		23 L	Soft water (long life coolant)	Every two years (when using long life coolant)						
⑩	Fuel tank		265 L	Diesel fuel	Refill at end of operation						
A	Pilot oil filter		1	Element (KHJ1493)	△				◎		
B	Fuel filter		1	Element (KSP0281)			◎				
C	Engine oil filter	Full flow	1	Element (KRH1253)			◎				
D		Bypass	1	Element (KRH1254)			◎				
E	Return filter		1	Element (KRJ3836)	△				◎		
F	Suction filter		1	Element (KRJ6624)				□		◎	
G	Air cleaner		1	Element (KRH0652)		□		◎			
H	Air breather		1	Element (KRJ3461)				◎			
I	Nephron filter		1	Element (KHJ1400)					◎		

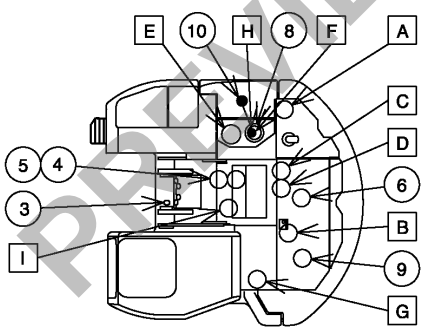
○ Grease / oil. ◎ Change oil or replace element. △ Replace when machine is new. □ Clean.

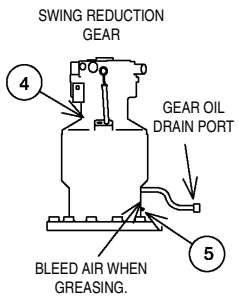
Use the grease / oil specified below.

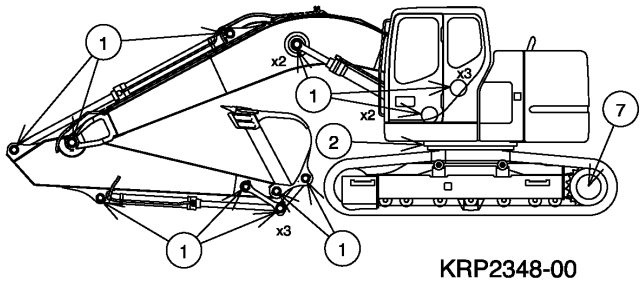
Extreme pressure grease:	Lithium grease, viscosity No. 2
Engine oil:	API CD, SAE 15W-40
Gear oil:	API GL-4, SAE 90
Hydraulic oil:	ISO VG-46

Note)
1. Grease or oil after excavating in water, or in wet / damp conditions.
2. Grease or oil every 10 hours when Sumitomo bucket is not used (when using breaker or crusher).
3. Refer to Instructions for Use for recommended grease and oil.
4. Note that this table takes priority over Instructions for Use from the engine manufacturer.
5. For recommended service intervals in the table above, choose whichever occurs first in the table to the right.
6. Unplug the air bleeding plug when greasing the swing reduction gear (5). Refer to Instructions for Use for specific details.

50 hrs. (or every week)	2000 hrs. (or every 1 year)
250 hrs. (or every month)	5000 hrs. (or every 2-1/2 years)
500 hrs. (or every 3 months)	10000 hrs. (or every 5 years)
1000 hrs. (or every 6 months)	







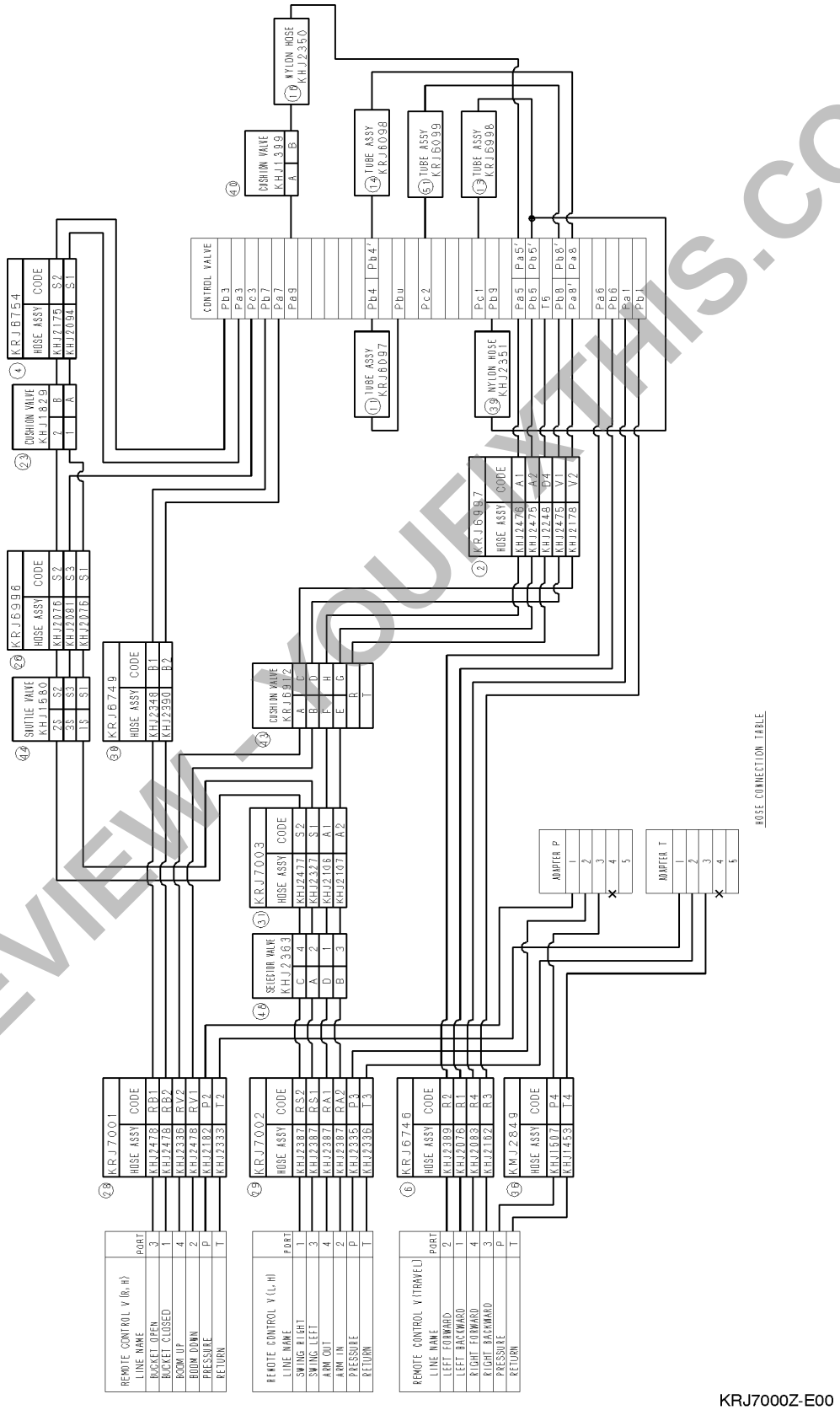
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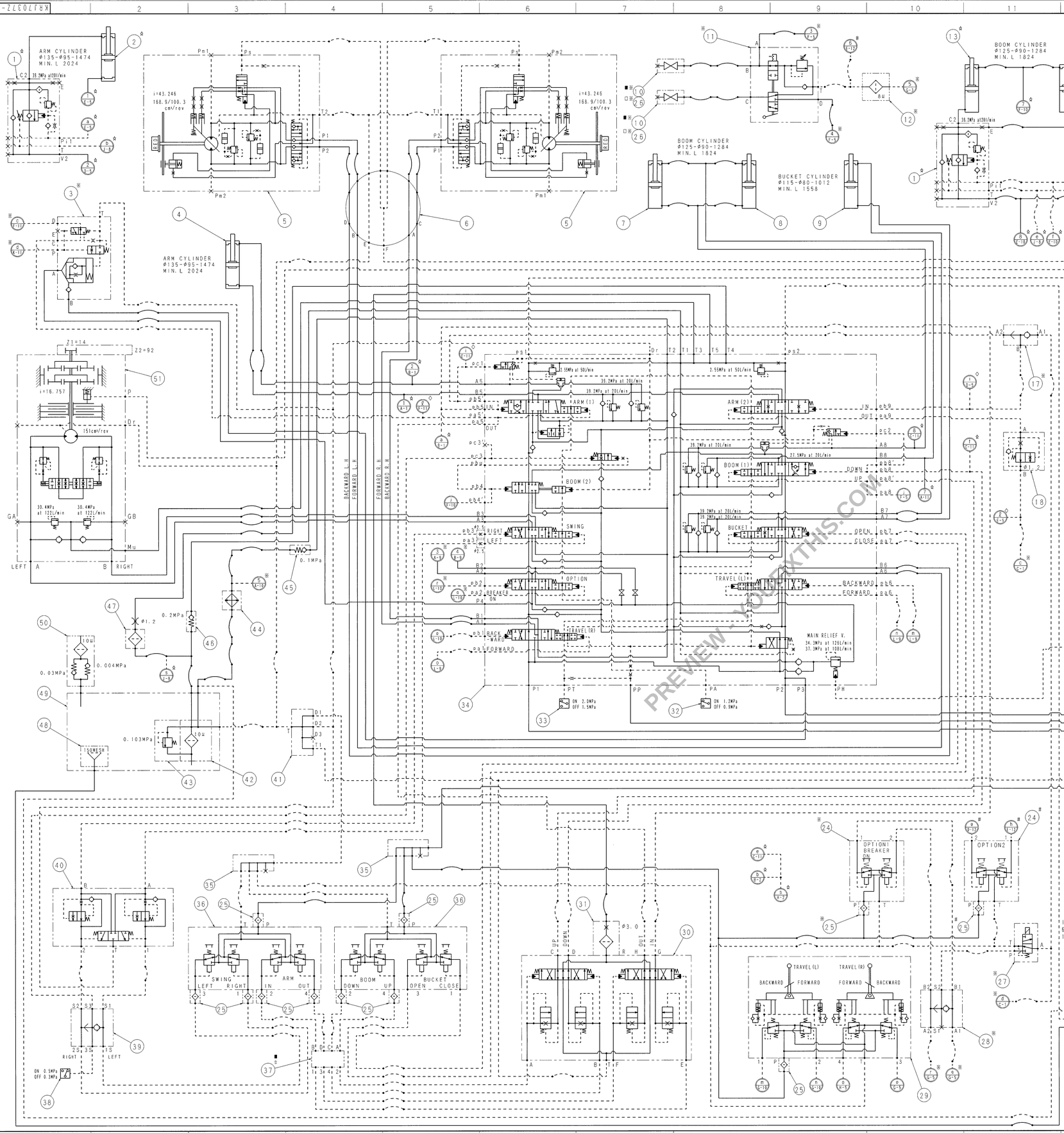
Pilot Hose Connection Diagrams

Pilot Control Lines



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PART NO.	DESCRIPTION	SYM	MATERIAL GROUP	QTY	TOTAL WT.(kg)	STANDARD NO.	REMARKS
KRV3725Y-B	VALVE:HOLDING バルブ:ホールディング	1		1	.		OIL CONTROL
KRV3239Y-B	CYL.:BM シリンダ:ブーム(HBCV,組合)	2		1	.		KAYABA カヤバ
KRV3240Y-B	VALVE:HOLDING バルブ:ホールディング	3		1	.		NISHINA 二和技
KRV3236Y-B	CYL.:AM シリンダ:アーム(組合)	4		1	.		KAYABA カヤバ
KRA1336Y-A	MOTOR:TRACTION UNIT モータ:走行ユニット	5		2	.		KAYABA カヤバ
KRA1875Y-C	JOINT:CTR ジョイント:センタ(組)	6		1	.		
KRV3484Y-B	CYL.:BOOM(L) シリンダ:ブーム(L)(組合)	7		1	.		KAYABA カヤバ
KRV3483Y-B	CYL.:BOOM(R) シリンダ:ブーム(R)(組合)	8		1	.		KAYABA カヤバ
KRV3237Y-B	CYL.:BUCKET シリンダ:バケット(組合)	9		1	.		KAYABA カヤバ
KRV0452Y-A	VALVE:STOP バルブ:ストップ G1/2	10		2	.		HIROSE VALVE 広瀬バルブ
KRJ2358Y-B	VALVE:DIRECTION バルブ:ディレクショナル	11		1	.		NISHINA 二和技
KRJ3545U-A	FILTER:LINE フィルタ:ライン	12		1	.		TAISEI 大成工業
KRV3485Y-B	CYL.:BOOM(L) シリンダ:ブーム(L)(HBCV,組合)	13		2	.		KAYABA カヤバ
KHR2919Y-B	SENSOR:PRESS. センサ:プレッシャ	14		1	.		NAGANO 長野計器
KRV0391Y-A	VALVE:STOP バルブ:ストップ G1/2	15		3	.		HIROSE VALVE 広瀬バルブ
KRJ5560Y-A	VALVE:BLADE CONTROL バルブ:ブレード コントロール	16		1	.		KAYABA カヤバ KYS-65-1
KHJ0578U-A	VALVE:SHUTTLE バルブ:シャトル	17		1	.		HIROSE 広瀬製作所
KRJ1399Y-A	VALVE:CUSHION バルブ:クッション	18		1	.		NISHINA 二和技
KRJ5304Y-B	VALVE:SOLENOID バルブ:ソレノイド(組合)	19		1	.		UCHIDA 内田油圧
KHJ2359Y-A	ACCUMULATOR アキュムレータ:0.32L	20		1	.		HYDAC ハイダック
KHJ1474Y-B	MANIFOLD マニホールド(4ヶ所)	21		1	.		NAKO 南光
KRJ7385Y-B	PUMP:HYD ポンプ:油圧	22		1	.		TOSHIBA 東芝機械
KRJ7387Y-B	PUMP:HYD ポンプ:油圧(電装品用)	23		1	.		TOSHIBA 東芝機械
KHJ1955Y-B	VALVE:REMOTE CONT バルブ:リモコン(組合)	24 #	※1	2	.		KAWASAKI 川崎重工
CNA0584Y-A	NIPPLE ニップル(4ヶ所)	25	STD 9 ※1,#1	11	.		JAPAN A.W.C. GK A.W.C.
KRV0389Y-A	VALVE:STOP バルブ:ストップ G1-1/4	26		2	.		HIROSE VALVE 広瀬バルブ
KRJ3557U-A	VALVE:SOLENOID バルブ:ソレノイド	27		1	.		NISHINA 二和技
KHJ1655Y-B	VALVE:SHUTTLE バルブ:シャトル	28		1	.		HIROSE 広瀬製作所
KHJ1969Y-B	VALVE:REMOTE CONT バルブ:リモコン(組合)	29		1	.		KAWASAKI 川崎重工
KRJ5912Y-B	VALVE:CUSHION バルブ:クッション(ヒートショック付)	30		1	.		YANAGISAWA 柳沢製作所
KHJ2135X-B	ADAPTER:HOSE アダプタ:ホース(フェイスオーセブン)	31		1	.		
~~KHR10800~~	SWICH:PRESS スイッチ:プレッシャ(1.18MPa)	32		1	.	KHR10790-B	NAGANO KEIKI 長野計器
~~KHR10810~~	SWICH:PRESS スイッチ:プレッシャ(1.96MPa)	33		1	.	KHR10790-B	NAGANO KEIKI 長野計器
KRJ1222Q-B	VALVE:CONTROL バルブ:コントロール	34		1	.		KAYABA カヤバ
KHJ1967	ADAPTER:HOSE アダプタ:ホース(5本)	35		2	.	KHJ1966X-B	
KHJ1925X-B	VALVE:REMOTE CONT バルブ:リモコン(手動)	36		2	.		KAWASAKI 川崎重工
KRJ2555Y-A	VALVE:SELECTOR バルブ:セレクタ 3WAY	37		1	.		NISHINA 二和技
KHR10790-B	SWICH:PRESS スイッチ:プレッシャ(0.43MPa)	38		1	.		NAGANO KEIKI 長野計器
KHJ1580X-B	VALVE:SHUTTLE バルブ:シャトル	39		1	.		HIROSE 広瀬製作所
KRJ2618	VALVE:CUSHION(SWING) バルブ:クッション(旋回)	40		1	.	KHJ1524X-A	NISHINA 二和技
KRJ6101Y-B	MANIFOLD マニホールド	41		1	.		
KRJ3836Y-A	FILTER:RETURN フィルタ:リターン	42		1	.		YAMASHIN 山信工業
KRJ2246Y-A	VALVE:RELIEF バルブ:リリーフ	43		1	.		YAMASHIN 山信工業
KRH1519Y-A	RADIATOR ラジエータ	44		1	.		TOKYO RADIATOR 東京ラジエータ
KRJ3823	VALVE:CHECK バルブ:チェック	45		1	.	KNJ1621U-A	YAMASHIN 山信工業
KRJ5992	VALVE:CHECK バルブ:チェック	46		1	.	KRJ3515Y-A	YAMASHIN 山信工業
KHJ1400X-A	FILTER:SPL フィルタ:ドレン	47		1	.		SUMIMOTO 住友精工
KRJ5624Y-A	STRAINER ストレーナ:サクション	48		1	.		YAMASHIN 山信工業
KRJ5644Y-B	TANK:SUMP OIL TANK VERY SPEC タンク:ドレン(特注品)	49		1	.		
KHJ1491Y-A	BREATHER:AIR ブレーサ:エア	50		1	.		YAMASHIN 山信工業
KRC0216Z-C	REG.GEAR:SWING ASSY 減速機:旋回 組立	51		1	.		

注記/NOTES

1) 本図中の、⊖記号の上段は接続先を表わし下段はゾーン記号を表わす。
ON MARK ⊖, UPPER VALUES SHOW THE CONNECTIVE POINTS AND LOWER VALUES SHOW THE ZONE NUMBER OF THIS DRAWING.

2) ※、#、◇、☆印の部品は、オプションを示す。
PARTS MARKED ※,#,◇,☆ ARE OPTIONAL.
※：併用回路
※:MULTI-PURPOSE + 3WAY VALVE
#：第2予備ライン
#:SECOND OPTION LINE
◇：HBCV
◇:HBCV
☆：セレクタバルブ（2WAY）
☆:SELECTOR VALVE (2WAY)

3) □印の部品は、EU向けを示す。
PARTS MARKED □ INDICATE FOR EU.

4) ■印の部品は、NA，LBX向けを示す。
PARTS MARKED ■ INDICATE FOR NA LBX.

5) ◇印は、予備ライン付かない時にのみ取り付く。
◇ ARE PARTS ONLY ASSEMBLED INTO MACHINE WITHOUT OPTION LINE.

REVISION	
引替区	
DATE	2004.11.30

△ '05年2月報告~

△	04.11.30	LH0474	3	プレッシャスイッチ部品番変更	光野
△	04.10.6	LH0475	2	符号⑩部品番及び圧力変更	片山
△	04.6.4	LH0061	2	符号⑩部品番及び圧力変更	光野
△	04.3.1	LG9849	5	符号⑤,⑥ 部品番変更	飯田
△	03.8.29	LG9503	1	符号⑫フィルタラインから承継変更	飯山
△	03.7.18	LG9461	3	符号⑩,⑪部品番変更	光野
△	03.6.24	LG9066	4	部品番変更	鈴木義
△	02.5.17	LG8573	5	部品番及び、数量変更	鈴木義
SYM	DATE	CN NUMBER	NO.	REVISION	BY

SUMITOMO (S.H.I.)
CONSTRUCTION MACHINERY CO.,LTD.

MODEL	SH225X-3 EU/NA/LBX
GROUP	KRJ
CODE	DZ1601
WEIGHT(kg)	-
N.T. ISEE NOTE	
PAINT	NN
DRAWN	鈴木義
CHK'D	飯田
INSP.	飯田
APPR.	飯田
SCALE	-
DATE	2002.1.28
NAME	SCHEM DIAGRAM:HYD. 回路図：油圧
DWG. NO.	KRJ7037Z-E
225 MSR	
CUSTOMER	
MFG NO. QTY	
PRODUCTION QTY	個付区
DATE	2002.1.28
鈴木義	

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2. Retightening Torque Table

No.	Tightening Point	Bolt Diameter	Wrench Size	Tightening Torque (N·m)
(1)	Travel Unit	M16	24 mm	267 to 312
(2)	Drive Sprocket	M16	24 mm	267 to 312
(3)	Take-up Roller	M16	24 mm	267 to 312
(4)	Upper (Carrier) Roller	M20	30 mm	521 to 608
(5)	Lower (Track) Roller	M18	27 mm	371 to 432
(6)	Front Guard	M18	27 mm	380 to 443
7	Shoe Bolt	M20	30 mm	After tightening at 300 N·m, tighten 120° ± 5° additionally.
8	Counterweight	M36	55 mm	2750 to 2940
9	Turntable Bearing (Lower Frame)	M20	30 mm	468 to 545
(10)	Turntable Bearing (Swing Frame)	M20	30 mm	468 to 545
(11)	Swing Unit	M20	30 mm	521 to 608
(12)	Engine (Engine Mount)	M16	24 mm	265 to 313
(13)	Engine Bracket	M10	17 mm	64 to 74
(14)	Radiator	M16	24 mm	147 to 176
(15) (16)	Hydraulic Pump	M10 M20	17 mm 30 mm	63 to 73 367 to 496
(17)	Hydraulic Oil Tank	M20	30 mm	412 to 471
(18)	Fuel Tank	M20	30 mm	412 to 471
(19)	Control Valve	M16	24 mm	267 to 312
(20)	Rotating Joint	M12	19 mm	109 to 127
21	Cab	M16	24 mm	71 to 86
22	Battery	M10	17 mm	20 to 29

NOTE: Numbers in parentheses are numbers that are circled in the drawings on the following pages. Apply Loctite No. 262 or the equivalent to those parts and then tighten to the torque specified above.
N·m ÷ 9.8 = tightening torque in kgf·m.

Tightening torques for bolts and nuts not listed above are as follows:

Bolt Diameter (size)		M6	M8	M10	M12	M14	M16	M18	M20
Hex. Bolt	Wrench Size (mm)	10	13	17	19	22	24	27	30
	Tightening Torque (N·m)	6.9	19.6	39.2	58.8	98.1	157.0	196.0	274.0
Hex. Socket Head Cap Screw	Wrench Size (mm)	5	6	8	10	12	14	14	17
	Tightening Torque (N·m)	8.8	21.6	42.1	78.4	117.6	176.4	245.0	343.0

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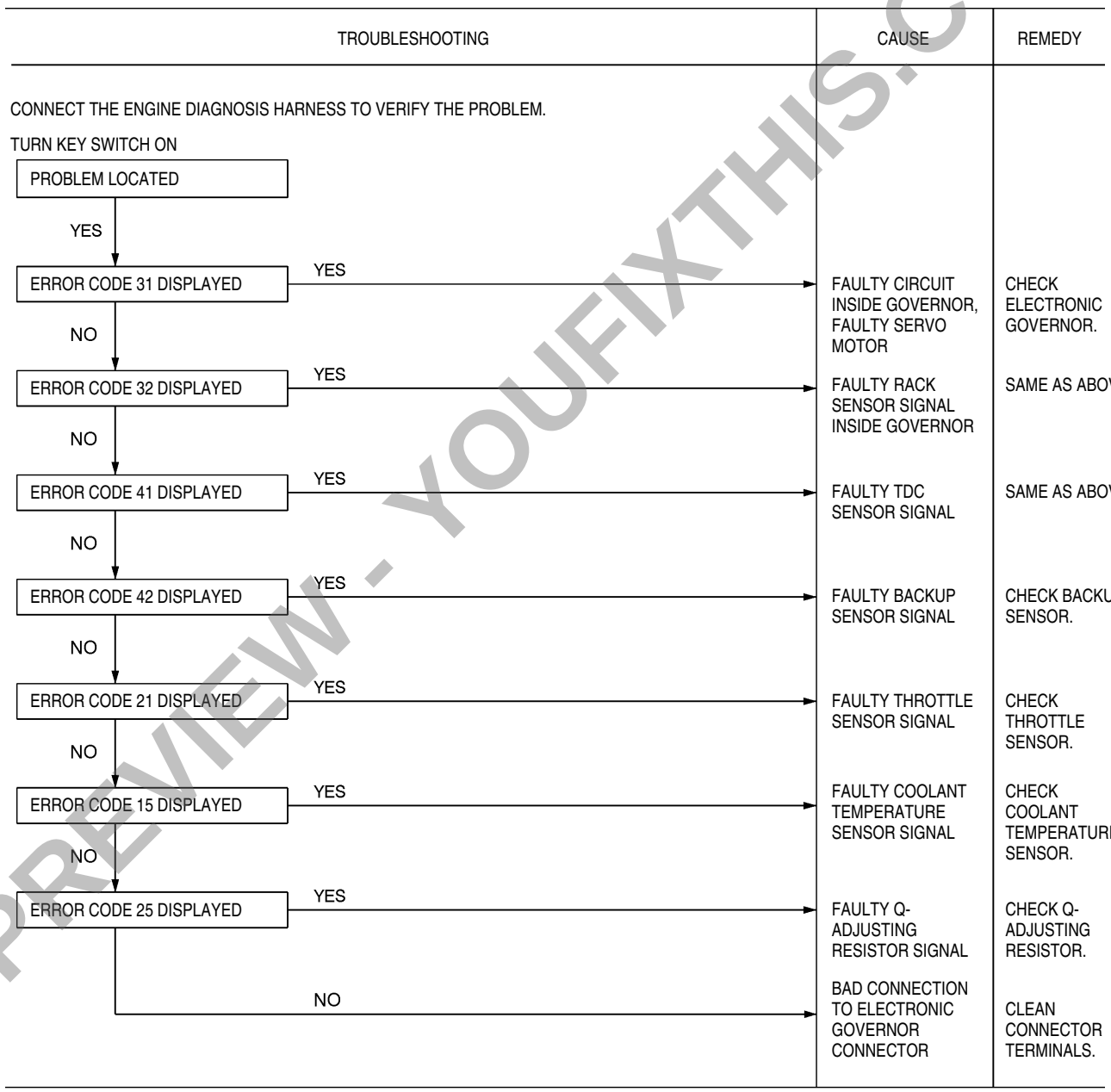
Engine Electrical System Faults

Problem symptom (Problem No. 4)

- Lamp stays on.

Precautions

1. Verify that the Engine Electrical System Fault indicator lamp is on.



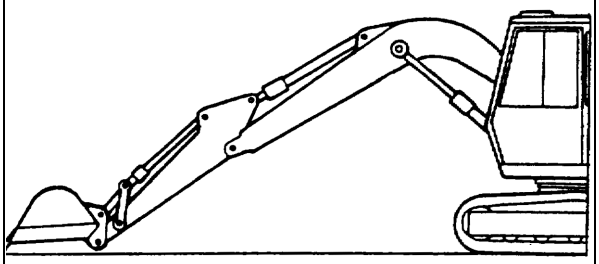
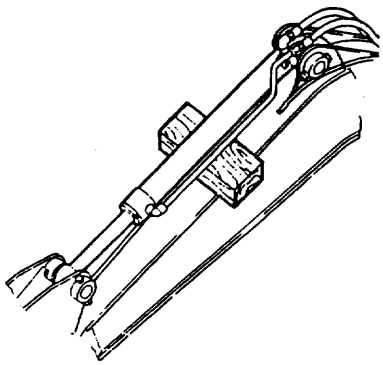
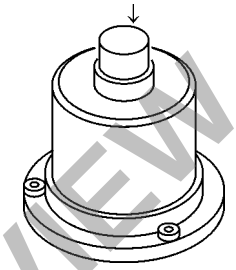
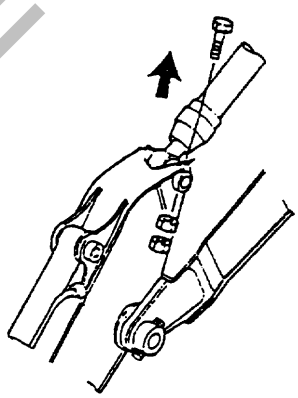
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Attachments

2. Arm Cylinder Removal and Installation

2-1. Removal

1		Lower the attachment to the ground.
2		Put a block between the arm cylinder and the boom.
3	 UPPER SIDE OF HYDRAULIC OIL TANK	Stop the engine and release pressure in the hydraulic circuit. NOTE: Refer to the procedures for bleeding the hydraulic pressure in *05 Precautions for Use* in *Chapter 0* (page 10/18). When releasing pressure from the tank, stop the engine and press the button to completely release the pressure. The hydraulic oil may be hot so be careful not to get burned.
4		Remove nuts and bolt.

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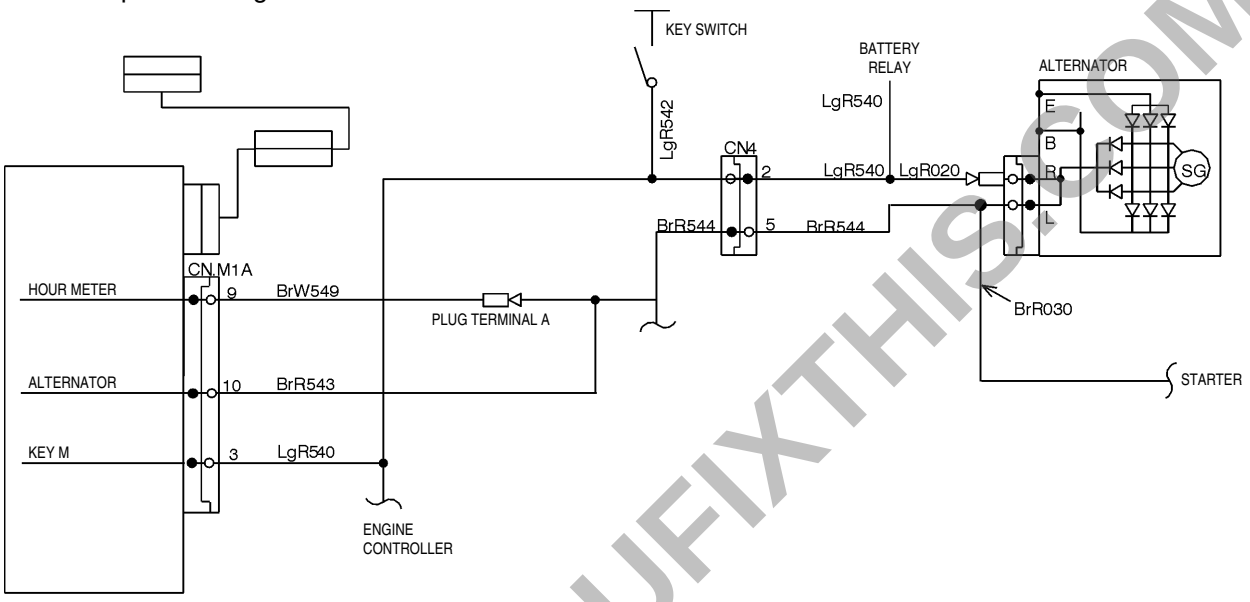
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Troubleshooting

Abnormal Battery Charge

Problem symptom (Problem No. 2)

- Lamp does not go out.



TROUBLESHOOTING	CAUSE	REMEDY
HOUR METER IS FUNCTIONING. YES → MEASURE VOLTAGE BETWEEN TERMINAL 10 BRR OF CN.M1A AND GROUND: ≥10 V. YES	BAD CONNECTION ON CN.M1A OR DEFECTIVE MONITOR DISPLAY	CLEAN CONNECTOR TERMINAL OF CN.M1A OR REPLACE MONITOR DISPLAY.
NO / NO → MEASURE THE VOLTAGE BETWEEN MALE SIDE TERMINAL BRR OF PLUG TERMINAL A AND GROUND: ≥10 V. YES	BREAK IN BRR WIRE BETWEEN CN.M1A AND PLUG TERMINAL A	REPAIR BROKEN WIRES.
NO → DISCONNECT THE CN4 CONNECTOR TO MEASURE THE VOLTAGE BETWEEN MALE SIDE TERMINAL BRR AND GROUND: ≥10 V. YES	BAD CONNECTION ON CN4 OR BREAK IN BRR WIRE BETWEEN CN4 AND PLUG TERMINAL A	CLEAN TERMINAL OR REPAIR WIRING.
NO → DISCONNECT THE CONNECTOR OF ALTERNATOR L TERMINAL TO MEASURE THE VOLTAGE BETWEEN ALTERNATOR SIDE AND GROUND: ≥10 V. YES	BREAK IN BRR WIRE BETWEEN CN4 AND ALTERNATOR OR BAD CONNECTION ON CONNECTOR OF ALTERNATOR	REPAIR WIRING OR CLEAN TERMINALS.
NO →	DEFECTIVE ALTERNATOR	REPLACE ALTERNATOR.

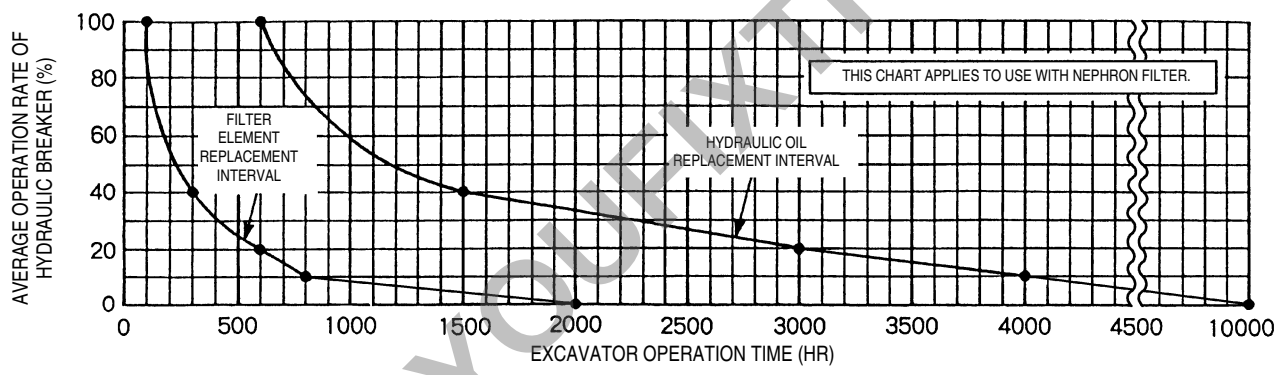
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Fuel / Lubricants and Filters

5. Replacement Intervals for Hydraulic Oil and Filters when Using Breaker

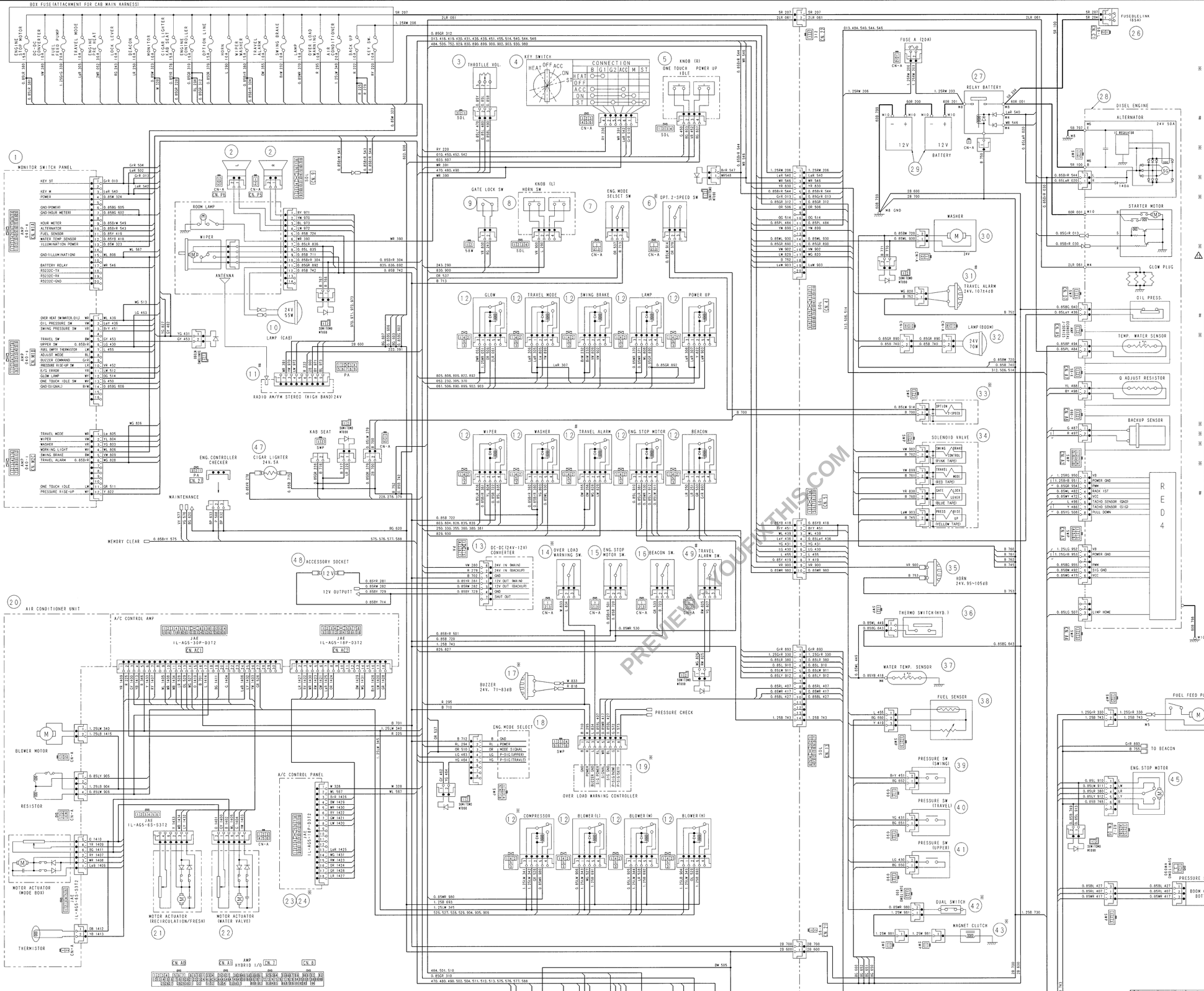
- When a hydraulic breaker is used, deterioration and/or contamination of hydraulic oil progresses faster than during ordinary digging work. Service the machine frequently. In addition, when replacing the hydraulic filters, measure the cleanliness and deterioration of the oil.
- Replace the hydraulic oil and filter element, using the graph below as a guideline, depending on the frequency of operation of the breaker.
- When breaker work is performed continuously over a short period of time, replace the element each time the hour meter exceeds 100 hours during that period.
- Replace the return filter for the breaker at the same intervals as for the element. Additionally, if using a filter with an indicator, change the filter according to the indicator.



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KRR15757-E



PART NO.	DESCRIPTION	SYM	MATERIAL GROUP	QTY	TOTAL WT. (kg)	STANDARD NO.	REMARKS
KRR4104Y-B	MONITOR モニタ- 24V	1		1	.		NIPPON SEIKI 日本精機
KRR33659-B	LOUDSPEAKER スピーカ	2		2	.		CLARION クラリオン
KRR27519-B	SWITCH:SPL スイッチ 2ロット	3		1	.		TOKYO COSMOS ELEC. 東京特殊電機
KRR32709-B	SWITCH:STARTER スイッチ:スタータ ASSY.(1HU)	4		1	.		KOMATSU KIRIKA 小松製作所
KRJ23719-B	KNOB ノブ(左) スイッチ用	5		1	.		NISHIYAMA ニシヤマ
※ KRR3121	SWITCH:SPL スイッチ:ロック+方向2段目	6		1	.	KRR2519K-C	U-SHIN ユーシン
KRR33965	SWITCH:SPL スイッチ:ロック-E-ドア用	7		1	.	KRR2519K-C	U-SHIN ユーシン
KRJ17459-B	KNOB ノブ(右) スイッチ用	8		1	.		NISHIYAMA ニシヤマ
KRR18737-A	SWITCH:LIMIT スイッチ:リミット	9		1	.		NILES PARTS ナイルス部品
KRR33629-B	LAMP:WORKING ライト:ワーキング	10		1	.		LIGHT BEAM ライトビーム
# KRR39459-A	RADIO SET ラジオユニット AM/FM ステレオセット(12/24V)	11		1	.		ESPERIA エスペリア
KRR38027-B	RELAY:SPL リレー ウインカーパー	12		# 1	.		MITUBA 三つば電機株式会社
KRR24479-B	CONVERTER:DC-DC コンバータ:DC-DC	13		1	.		EIKOU DENKI 永晃電機工業
KRR3183	SWITCH:SPL スイッチ ロック-【解除警報】	14		1	.	KRR2519K-C	U-SHIN ユーシン
KRR3987	SWITCH:SPL スイッチ ロック-【警告用】	15		1	.	KRR2519K-C	U-SHIN ユーシン
KRR3886	SWITCH:SPL スイッチ ロック-【接地警報】	16		1	.	KRR2519K-C	U-SHIN ユーシン
KRR38509-B	BUZZER ブザー24V	17		1	.		NIKKO ニッコー
KRR19669-B	CONTROLLER コントローラ:モード切換	18		1	.		EIKOU DENKI 永晃電機工業
KRR33189-B	CONROLLER コントローラ:油温警報用 SH225.	19		1	.		EIKOU DENKI 永晃電機工業
KRR3547	UNIT ユニット エアコン	20		1	.	KRR37459-A	SANDEN サンデン
KRR39419-B	DUCT:SPL ダクト:吸気口	21		1	.		SANDEN サンデン
KRR3549	BOX:CONTROL ボックス:コントロール	22		1	.	KRR39289-A	SANDEN サンデン
KRR3932	PANEL:CONTROL パネル:コントロール(モード)	23		1	.	KRR39289-A	SANDEN サンデン
※ KRR39310	PANEL:CONTROL パネル:コントロール(フェン)	24		1	.	KRR39269-A	SANDEN サンデン
⚠1 KRH10850	CONT:SPL ENGINE コントロ-ラ:エンジン	25		1	.	KRH1633K-C	ISUZU イスズ(マエカワ)
KRR1592	FUSE ヒューズ(ヒューズBOX 25A)	26		1	.	KRR1589K-A	MITSUBA JIDOUSYA 矢作自動車(マツダ)
KRR21127-A	RELAY:BATTERY リレー:バッテリ	27		1	.		FURUHASHI 古橋電機
KRH1641	ENGINE:DIESEL エンジン:ディーゼル(4HK1)	28		1	.	KRH1637K-C	ISUZU イスズ
KRR39449-A	BATTERY バッテリ 130E41R	29		2	.		DELCO デルコ
KRR27619-B	TANK:WASHER タンク:ウォッシャ ASSY	30		1	.		MITUBA 三つば電機株式会社
# KRR38529-B	ALARM:SPL アラーム:お知(英語)	31		1	.		NIKKO ニッコー
KRR27459-B	LAMP:WORKING ライト:ワーキング 24V-70W	32		1	.		SUZUKI YOUHIN 鈴木商品
※ KRJ13557U-A	SOLENOID:SOLENOID ソレノイド:ソレノイド	33		1	.		NISHINA 二精工業
KRJ6304Y-B	VALVE:SOLENOID バルブ:ソレノイド 4本	34		1	.		UTIDA 内田油圧
KRR27427-B	HORN ホーン 電気(LOW)	35		1	.		NIKKO ニッコー
KRR19601-A	SWITCH:THERMO スイッチ:サーモ	36		1	.		NIPPON THERMO 日本サーモ
KRR18809-A	SENSOR:THERMO センサ:サーモ	37		1	.		NIPPON SEIKI 日本精機
KRR40119-B	SENSOR:FUEL センサ:フューエル	38		1	.		NIPPON SEIKI 日本精機
KRR10790-B	SWITCH:PRESS. スイッチ:プレッシャ (0.49MPa)	39		1	.		NAGANO KEIKI 長野計器
KRR10810	SWITCH:PRESS. スイッチ:プレッシャ (1.96MPa)	40		1	.	KRR10790-B	NAGANO KEIKI 長野計器
KRR10800	SWITCH:PRESS. スイッチ:プレッシャ (1.18MPa)	41		1	.	KRR10790-B	NAGANO KEIKI 長野計器
KRR3751	RECEIVER:DRIER タンク:ドライア	42		1	.	KRR3747Y-A	SANDEN サンデン
KRR3197	COMPRESSOR コンプレッサ(エアコン)	43		1	.	KRR2785X-A	SANDEN サンデン
※ KRR0181	PUMP:SPL ポンプ:燃料	44		1	.	KRR3948X-A	HITACHI DENSOW 日立電子
※ KRH0676	MOTOR:STOP モータ:ストップ	45		1	.	KMH0826X-C	ISUZU イスズ
※ KRR29314-B	SENSOR:PRESS. センサ:プレッシャ(5MPa)	46		1	.		NAGANO KEIKI 長野計器
KRR24889-A	LIGHTER:CIGAR シガー:オ-ト(12V)	47		1	.		KOUKARIRKA 幸福商会
KRR2501X-A	SOCKET ソケット アクセサリ(DC12V)	48		1	.		KOUKARIRKA 幸福商会
# KRR3156	SWITCH:SPL スイッチ ロック-【警報解除】	45		1	.	KRR2519K-C	U-SHIN ユーシン

注記/NOTES.

1) ※は、オプション部品を示す。
※ IS OPTIONAL PART.

2) #の部品は、欧州仕様機には搭載されません。
MARKED # PARTS IS NOT USED AT EUROP MODEL.

3) 図中に記せるアース記号及び、配線交差図上記の通りである。
EARTH LINE SYMBOLS AND CROSS POINT OF LINES IN THIS DRAWING SHOWS THE FOLLOWING.

束線 HARNESS	ボディアース BODY EARTH	アース線付 EARTH WITH CABLE	2線は接続する CONNECTED EACH OTHER	2線は接続せず NOT CONNECTED EACH OTHER

4) 配線図上の記号は電線色を示し、記号前に付記した数値は回路番号及び、電線の断面積を示す。 図示以外は、0.5sqである。
THE SYMBOL AT EACH LINE SHOWS COLOR OF CABLE AND THE FIGURE BEFORE THE SYMBOL SHOWS THE CIRCUIT No. AND THE AREA OF CABLE. THE AREA OF CABLE NOT INDICATED IS 0.5 mm².

例 EX. 断面積 AREA 色 COLOR 回路番号 CIRCUIT NO.
0.5 B 001

5) コネクタ表示は、下記の通りである。
THE SYMBOL OF CONNECTOR IN THIS DRAWING SHOWS THE FOLLOWING.

メス端子 FEMALE TERMINAL　オス端子 MALE TERMINAL
SWP コネクタ名称 CONNECTOR'S NAME
CN. コネクタNo. CONNECTOR No.

色記号表
TABLE OF COLOR SYMBOLS

記号 SYMBOL	色 COLOR	記号 SYMBOL	色 COLOR
B	黒 BLACK	R	赤 RED
W	白 WHITE	Y	黄 YELLOW
Br	茶 BROWN	Lg	若葉 LIGHT GREEN
P	桃 PINK	Sb	空色 SKY BLUE
V	紫 VIOLET	L	青 BLUE
G	緑 GREEN	Gr	灰 GRAY
O	橙 ORANGE		

3ろは 色ろの電線下地に 色ちのストライプを表す。
例) B R : 黒の下地に 赤のストライプ。
ab MEANS CABLE COLOR a STRIPED BY b.
EX.) Bb MEANS CABLE COLOR BLACK STRIPED BY RED.

SYM.	DATE (IN NUMBER)	NO.	REVISION	BY
⚠5	05. 2.23	LN0827	1	許可⑤コントローラ:エンジン部品変更	片 山
⚠4	05. 2.18	LR0751	2	ラジオ部品変更(メーカ変更)	加藤木
⚠3	04.11.30	LH0474	3	プレッシャスイッチ部品番変更	元 野
⚠2	04.10. 4	LH0446	8	回路2203、206線種及びヒューズ変更	森 主
⚠1	04. 6. 1	LG9945	1	コントローラ:エンジン部品番変更	福 田
⚠	04. 2.20	LG9739	2	部品番変更	福 田
⚠	02.10.18	LG8922	2	許可25部品番変更	森 田
⚠	02. 7. 9	LG8674	4	鍵設定変(ハーネスメーカ転注)	野 元
⚠	02. 5.27	LG8577	2	部品番変更	鈴木義
⚠	02. 4.23	LG8615	1	走行アラームSW回路変更(ダイオード追加)	野 元
⚠	02. 4. 4	LG8104	10	電線径、色変更(ハーネス熱硬化製造対策)	野 元
⚠	01.11.27	LG7861	10	シガライター、ソケット、アラームSW追加	野 元

SUMITOMO (S.H.I.) CONSTRUCTION MACHINERY CO., LTD.

MODEL	GROUP	CODE	WEIGHT(kg)	H.T. (SEE NOTE)	PAINT
SH225-3 NA/EU	-	DZ1701	-	-	N

DRAWN	CHK'D	INSP.	APPR.
野元	福田	野元	野元

SCALE -　DATE 2001.10.31

NAME ELECTRIC CIRCUIT DRAWING
回路図:電気 SH225-3NA/EU

DWG. NO. KRR15757-E

作成区分	名	千	LB	次	改	40 M

参考図番 KMR0500Z-E
有 無 G.T. コード
住友建設機械株式会社 (東京ロー1041による)

REVISION 引替 DATE:2005.2.23
⚠'05年3月増2~

METRIC

CUSTOMER WFG NO. QTY
PRODUCTION QTY (備付)
DATE:2001.10.31 野元

225 MSR

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Travel Unit

4-2. Tightening torque

Tightening torque for each connecting part is shown in Table 5.

Table 5. Tightening torque for each connecting part

Reference No.	Part name	Screw size	Width across flats	Tightening torque
1-2-2-4	Plug	M24 X 1.5	14	137 ± 10 N·m
1-2-6-3	Socket head bolt	M12 X 1.75 X 40L	10	108 ± 10 N·m
1-2-6-5	Plug	G 1/8	14	20.6 ± 1.0 N·m
1-2-6-6	Orifice	M5 X 0.8 X 5L	2.5	2.45 ± 0.49 N·m
1-2-7	Relief valve assembly	1-5/16 12UNF	27	373 ± 20 N·m
1-2-8	Plug	NPTF 1/16	4	9.8 ± 1.0 N·m
1-2-11	Plug	G 1/2	10	118 ± 6 N·m
1-2-14	Plug	G 12	10	118 ± 6 N·m
1-2-17	Orifice	M5 X 0.8 X 5L	2.5	2.45 ± 0.49 N·m
1-2-18	Orifice	M5 X 0.8 X 5L	2.5	2.45 ± 0.49 N·m
1-2-19	Orifice	M5 X 0.8 X 5L	2.5	2.45 ± 0.49 N·m
1-2-20	Plug	G 1/4	6	36.8 ± 2.5 N·m
1-11	Socket head bolt	M14 X 2.0 X 35L	12	205 ± 10 N·m
8	Bolt	M20 X 2.0 X 70L	Torx T90	539 ± 28 N·m
14	Bolt	M20 X 2.0 X 130L	Torx T90	539 ± 28 N·m
24	Screw	M10 X 1.5	Torx T50	58.8 ± 4.9 N·m
28	Socket head bolt	M10 X 1.5 X 16L	8	73.4 ± 3.63 N·m
29	Plug	G 3/4	12	157 ± 8 N·m

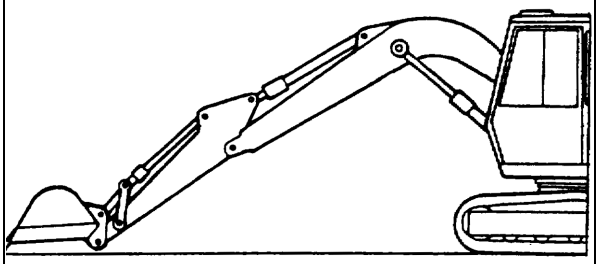
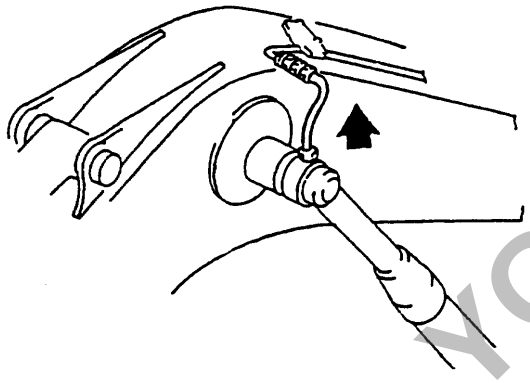
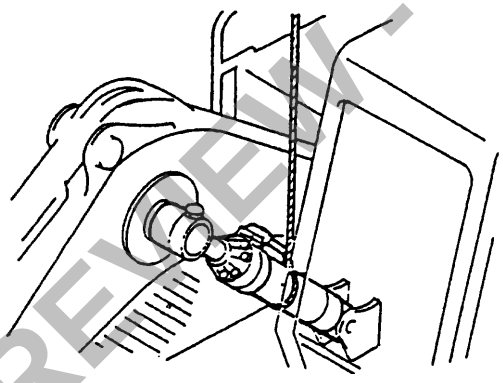
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Attachments

3. Boom Cylinder Removal and Installation

3-1. Removal

1		Lower the attachment to the ground.
2		Remove the grease tube.
3		Attach a sling to the boom cylinder.

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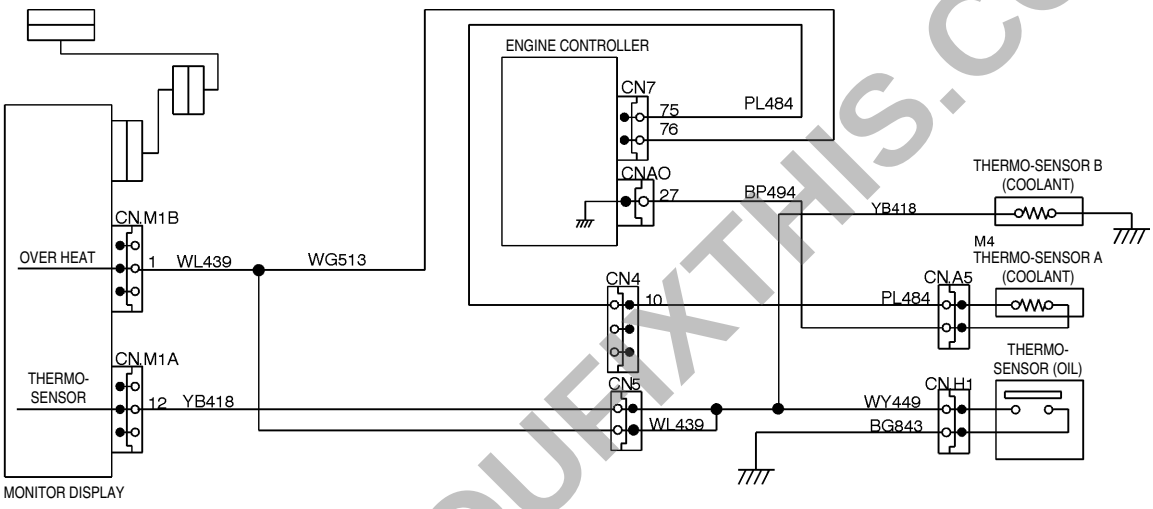
Overheat

Problem symptom (Problem No. 3)

- Lamp stays on even when the hydraulic oil temperature is 98°C or less and engine coolant temperature is 105°C or less.

Precautions

1. Verify that the coolant temperature gauge reading is in the H zone.



TROUBLESHOOTING	CAUSE	REMEDY
1) COOLANT TEMPERATURE GAUGE READING IS IN THE H ZONE. TURN KEY SWITCH ON CONNECT HARNESS FOR ENGINE PROBLEM DIAGNOSIS. COOLANT TEMPERATURE SENSOR ERROR CODE E0015 APPEARS. NO → (A) YES DISCONNECT CONNECTOR CN.A5 FROM THERMO-SENSOR A (COOLANT) AND MEASURE CONNECTOR RESISTANCE ON SENSOR SIDE. (REFER TO TABLE ON NEXT PAGE FOR RESISTANCE.) NO	DEFECTIVE THERMO-SENSOR (COOLANT)	REPLACE SENSOR.
YES DISCONNECT CONNECTORS CN4 AND CNA0 AND MEASURE RESISTANCE BETWEEN MALE SIDE OF PL AND BP. (REFER TO TABLE ON NEXT PAGE FOR RESISTANCE.) NO	BAD THERMO-SENSOR (COOLANT) CONNECTOR CONNECTION	CLEAN SENSOR CONNECTOR TERMINAL.
YES DISCONNECT CONNECTORS CN7 AND CNA0 AND MEASURE RESISTANCE BETWEEN FEMALE SIDE OF PL AND BP. (REFER TO TABLE ON NEXT PAGE FOR RESISTANCE.) NO	BAD CONNECTION TO CN24	CLEAN CN24 CONNECTOR TERMINAL.
YES	DEFECTIVE ENGINE CONTROLLER OR BAD CONNECTION OF CN7 AND CNA0	REPLACE ENGINE CONTROLLER OR CLEAN CN7 AND CNA0 CONNECTOR TERMINALS.

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Fuel / Lubricants and Filters

Inspection and maintenance when using the breaker: we recommend having the hydraulic oil checked by specialists (sampling)

Contamination and deterioration of hydraulic oil tends to progress quickly since breaker work is much harder on the hydraulic excavator than excavation work.

If the machine is used continuously with contaminated or deteriorated hydraulic oil, it can cause malfunctioning of the control valves, earlier wear of the hydraulic pumps and damage to the hydraulic circuits as a whole. Carry out inspection and maintenance of hydraulic oil periodically as outlined below:

Inspection and Maintenance of Hydraulic Oil and Filters Based on Frequency of Breaker Use												
	Recommended Hydraulic Oil Servicing Intervals (hours)											
	100% use			40% use			20% use			10% use		
Inspection/Maintenance Location	10	100	600	10	300	1500	10	600	3000	10	800	4000
Hydraulic Oil	○		◎	○		◎	○		◎	○		◎
Return Filter		◎			◎			◎			◎	
Suction Filter		✧	◎		✧	◎		✧	◎		✧	◎
Drain Filter		◎			◎			◎			◎	
Pilot Filter		◎			◎			◎			◎	
Nephron Filter		◎			◎			◎			◎	
Line Filter		◎			◎			◎			◎	
Measure hydraulic oil contamination	Every 200 Hrs			Every 300 Hrs			Every 600 Hrs			Every 800 Hrs		

○ Inspect, add ◎Replace ✧Clean or replace

When breaker work is performed continuously over a short period of time, replace the element each time the hour meter exceeds 100 hours during that period.

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225 Spin Ace Shop Manual

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3. **Performances**
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5. **Disassembling and Maintenance Instructions for the Main Body**
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Schematics

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Safety

Sections marked with this symbol address extremely important safety issues.
Make sure to read and fully understand the sections before starting operations.

1. Before starting maintenance work, **read carefully and fully understand materials (instruction manual and maintenance manual)**.
2. Before disassembling and assembling, **take sufficient safety measures** to prevent accidents such as falling loads, being caught in or under the machine and burns.
   When working under the machine, use safety blocks to support the machine to avoid workers getting caught.
3. Cranes and other hoist equipment **must be operated by licensed operators**.
   a. Crane operators and slinging workers must be licensed.
   b. Make sure to inspect rigging.
4. **Wear proper clothing and protective gear** as necessary during inspection or maintenance (safety shoes, helmets, protective goggles, gloves, earplugs, dust mask and other protective devices).
5. **Always keep the work area clean** to avoid accidents such as skidding during travel and falling objects.
6. **Make sure to ventilate properly** when inspecting or servicing a machine indoors.
7. **Be prepared for any emergencies and take necessary fire preventative measures.**

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SH225X-3 Shop Manual WLSM225X3-00J

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New Machine Performance

New Machine Performance Evaluation Tables

Purpose: These new machine performance tables for the SH Series are provided as reference data for the new models.

Cautions:

1. The evaluation process is a team effort.
   Before starting the evaluation, a meeting should be held to discuss procedures and signals to be used during evaluation. Communicate well with team members and follow all safety rules when working.
2. Take around three readings and calculate the average, as the final measured value.
   Errors may occur, especially when measuring the operation speed. Therefore, multiple readings should be taken.
3. Prior to taking any readings, ensure that the machine is at its normal operating temperature and that it is functioning properly. Should there be any malfunctioning, stop the testing and make necessary repairs.

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5. Maintenance Standards

5-1. Maintenance standards for motor parts

The maintenance standards for motor parts are shown in Table 6.

Check each part following the maintenance standards shown in Table 6. If the parts exceed or approach the tolerance limits, replace or repair them according to the instructions for repairs / remedy measures.

Table 6. Maintenance standards for motor parts

Parts to be applied	Inspection and measurement locations	Tolerance limits 	Instructions for repairs and remedy measures
1-4-2 Piston assembly	1. Shoe sliding faces	Roughness: 0.8a Rough faces or scratches ≥0.02 mm deep	Lap shoe sliding faces (#1000). If scratches cannot be removed, replace cylinder block assembly (4).
	2. Piston outside surface	Roughness: 1.2a Rough faces or scratches ≥0.02 mm deep	Replace cylinder block assembly (4).
	3. Piston outside surface and inside surface of cylinder block (4-1) bore	Clearance: 0.060 mm	
	4. Looseness of shoe ball	Looseness: 0.4 mm	
1-4-1 Cylinder block	1. Sliding faces with valve plate	Roughness: 0.8a Rough faces or scratches ≥0.02 mm deep	Lap sliding faces (#1000) If scratches cannot be removed, replace cylinder block assembly (4).
	2. Inside surface of bore	Roughness: 1.6a Rough faces or scratches ≥0.02 mm deep	Replace cylinder block assembly (4).
	3. Inside surface of bore and outside surface of piston assembly (4-2)	Clearance: 0.060 mm	
	4. Shaft fitting spline	Between diameter: 38.749 mm Pin diameter for measurement: dia. 3.333 mm (V1=2.80) Obvious breakage	
1-21 Valve plate	Sliding faces	Roughness: 0.8a Scratches ≥0.02 mm deep on sliding faces or obvious seizure Abnormal wear on sliding faces	Lap sliding faces (#1000) If scratches cannot be removed, replace valve plate (22).

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