1. GENERAL PRECAUTIONS FOR MAKING REPAIRS



1.1 PREPARATION BEFORE DISASSEMBLING

(1) Knowledge of operating procedure
Read Operator's Manual carefully to understand the operating procedure.

(2) Cleaning machines
Clean machines of soil, mud, and dust before carrying into the repair shop.
Carrying a soiled machine into the repair shop, causes making less efficient work and damage of parts, and interferes with rust prevention and dust protection while reassembling.

(3) Inspecting machines
Confirm the disassembling section before starting work, determine the disassembly procedure taking the conditions in work shop into account, and request to procure necessary parts in advance.

(4) Recording
Record the following items to keep contact and prevent malfunction from recurring.

1) Inspecting date, place
2) Model name, Applicable machine No., Records on hour meter
3) Trouble condition, place, cause
4) Visible oil leakage, water leakage and damage
5) Clogging of filters, etc., oil level, oil quality, oil contamination and looseness which can be inspected.
6) Examine the problems on the basis of operation rate with the last inspection date and records on hour meter.

(5) Arrangement and cleaning in repair shop

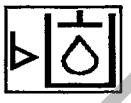
1) Tools required for repair work.
2) Specify places to put the disassembled parts on in advance.
3) Prepare oil pans for leaking oil, etc.



1.2 SAFETY WHEN DISASSEMBLING AND ASSEMBLING

(1) Safety

1) Wear appropriate clothing, safety shoes, safety helmet, goggles, and clothes with long sleeves.
2) Suspend warning tag "Don't operate" from lever, and begin preliminaries before getting down to work.
3) Before starting inspection and maintenance which contain the danger of being caught in machine, stop the engine.
4) Confirm the position of first-aid box and fire extinguisher, and also where to make contact for emergency measure and ambulance to prepare for accidents and fire.
5) Choose a hard, flat and safe place, and put attachment on the ground without fail.
6) Use crane, etc. to remove parts of heavy weight (20kg [44 lbs] or more).
7) Use proper tools, and change or repair defective tools.
8) Machine and attachment required to work in the lifting condition should be supported with supports or blocks securely.



1.3 DISASSEMBLING AND ASSEMBLING HYDRAULIC EQUIPMENT

(1) Removing hydraulic equipment assy

1) Before removing pipes, release the pressure of hydraulic oil tank, or open the cover on the return side to tank, and take out the filter.
2) Put the oil in the removed pipes in reservoir taking care it is not spilled on the ground.
3) Pipes with plugs or caps to prevent oil leaking, entry of dust, etc.
4) Clean the outside surface of equipment, etc. before disassembling, and drain hydraulic oil and gear oil before putting them on working bench.

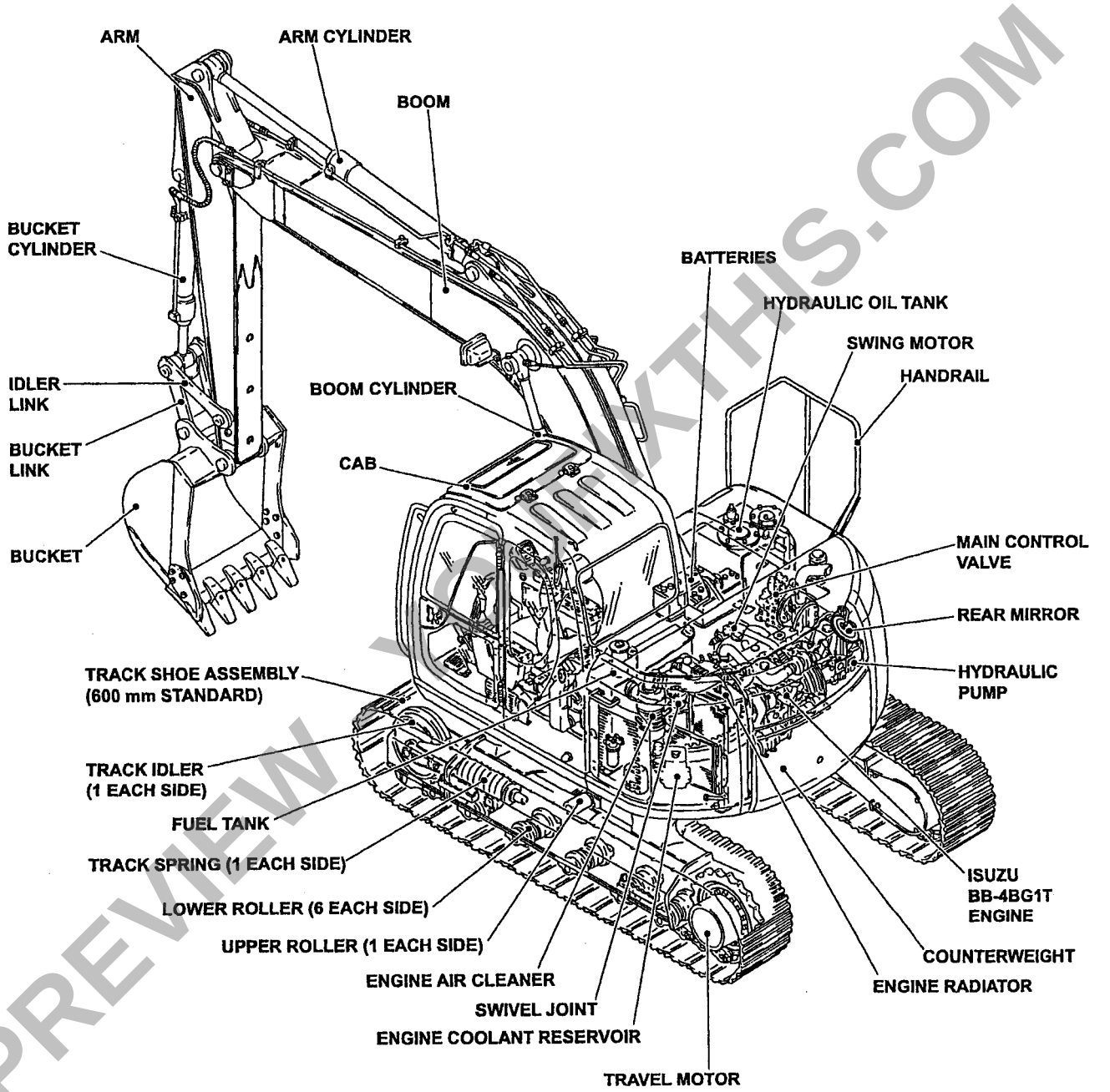
(2) Disassembling hydraulic equipment

1) Since performance and function of hydraulic equipment after disassembly and assembly results in immunity from responsibility on the manufacture's side, disassembly, assembly and conversion without permission are strictly prohibited.
2) If it is unavoidably necessary to disassemble and convert, it should be carried out by experts or personnel authorized through service training.
3) Make match mark on parts for reassembling.
4) Before disassembling, read Disassembling Instruction supplied with equipment in advance, and determine if the disassembly and assembly are permitted or not.
5) For parts which are required to use jig and tools, don't fail to use the specified jig and tools.
6) For parts which can not be removed in the specified produre, never force removzl. First check for the cause.

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1. NAME OF COMPONENTS



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1.2 BOOM MAINTENANCE STANDARD

(1) Clearance of pin and bushing on boom section

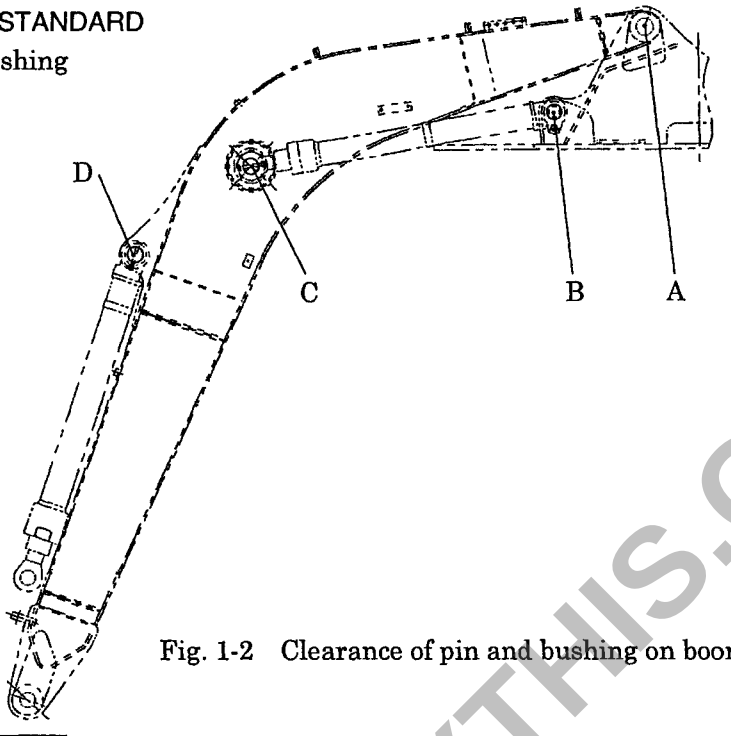


Fig. 1-2 Clearance of pin and bushing on boom section

1) SK135SR(LC)-1E, SK135SRL-1E

Table 1-2 (1/2)

Unit : mm (in)

Sym-bol	Item	Pin part No.	Standard value			Clearance			Remedy
			Pin dia.	Pin dia. tolerance	Bushing i.d. tolerance	Standard value	Repairable level	Service limit	
A	Boom foot	YY02B01014P1	Ø70 (2.7559)	0 (0) −0.030 (−0.0012)	+0.231 (+0.0091) +0.160 (+0.0063)	+0.291 (+0.0115) +0.160 (+0.0063)	More than 1.2 (0.05)	2.0 (0.08)	Replace bushing or pin
B	Boom cylinder (Head side)	YY02B01017P1		+0.030 (+0.0012) 0 (0)	+0.180 (+0.0071) +0.100 (+0.0039)	+0.180 (+0.0071) +0.070 (+0.0028)			
C	Boom cylinder (Rod side)	YY02B01016P1	Ø80 (3.1496)	+0.030 (+0.0012) 0 (0)		+0.180 (+0.0071) +0.070 (+0.0028)			
D	Arm cylinder (Head side)	YY02B01063P1	Ø70 (2.7559)	+0.030 (+0.0012) 0 (0)		+0.180 (+0.0071) +0.070 (+0.0028)			

2) SK115SR-1E

Table 1-2 (2/2)

Unit : mm (in)

Sym-bol	Item	Pin part No.	Standard value			Clearance			Remedy
			Pin dia.	Pin dia. tolerance	Bushing i.d. tolerance	Standard value	Repairable level	Service limit	
A	Boom foot	YY02B01014P1	Ø70 (2.7559)	0 (0) −0.030 (−0.0012)	+0.231 (+0.0091) +0.160 (+0.0063)	+0.261 (+0.0103) +0.160 (+0.0063)	More than 1.2 (0.05)	2.0 (0.08)	Replace bushing or pin
B	Boom cylinder (Head side)	YY02B01017P1		+0.030 (+0.0012) 0 (0)	+0.180 (+0.0071) +0.100 (+0.0039)	+0.180 (+0.0071) +0.070 (+0.0028)			
C	Boom cylinder (Rod side)	YV02B01023P1	Ø75 (2.9528)	+0.030 (+0.0012) 0 (0)		+0.180 (+0.0071) +0.070 (+0.0028)			
D	Arm cylinder (Head side)	YY02B01063P1	Ø70 (2.7559)	+0.030 (+0.0012) 0 (0)		+0.180 (+0.0071) +0.070 (+0.0028)			

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1. TIGHTENING TORQUES FOR CAPSCREWS AND NUTS

Tables 1-1 and 1-2 indicate tightening torques applicable to cases where no special note is given. Overtightening of bolts may result in a twist-off and a fracture under load. Insufficient tightening may lead to a loosening or loss of bolts. Always tighten bolts to proper torques.

Table 1-1 Tightening torque for coarse thread metric screws (not plated) unit : kgf·m (lbf·ft)

Strength grade / Size / Use	4.8 T		7 T		10.9 T	
	No lubrication	Oil lubrication	No lubrication	Oil lubrication	No lubrication	Oil lubrication
M 6 P=1	0.45±0.05 (3.3±0.4)	0.38±0.04 (2.7±0.3)	0.98±0.1 (7.1±0.7)	0.83±0.08 (6.0±0.6)	1.77±0.18 (13±1)	1.5±0.15 (11±1)
M 8 P=1.25	1.09±0.11 (7.9±0.8)	0.92±0.09 (6.7±0.7)	2.4±0.2 (17±1)	2.0±0.2 (14±1)	4.3±0.4 (32±3)	3.6±0.4 (26±3)
M10 P=1.5	2.2±0.2 (16±1)	1.83±0.18 (13±1)	4.7±0.5 (34±4)	4.0±0.4 (29±3)	8.5±0.9 (61±7)	7.2±0.7 (52±5)
M12 P=1.75	3.7±0.4 (27±3)	3.2±0.3 (23±2)	8.1±0.8 (59±6)	6.8±0.7 (49±5)	14.6±1.5 (110±11)	12.3±1.2 (89±9)
M14 P=2	5.9±0.6 (43±4)	5.0±0.5 (36±4)	12.8±1.3 (93±9)	10.8±1.1 (78±8)	23±2 (170±14)	19.5±1.9 (140±14)
M16 P=2	9.0±0.9 (65±7)	7.6±0.7 (55±5)	19.5±2.0 (140±14)	16.4±1.6 (120±12)	35±4 (250±29)	29±3 (210±22)
M18 P=2.5	12.4±1.2 (90±9)	10.5±1.0 (76±7)	27±3 (200±22)	23±2 (170±14)	49±5 (350±36)	41±4 (300±29)
M20 P=2.5	17.5±1.7 (130±12)	14.7±1.4 (110±10)	38±4 (270±29)	32±3 (230±22)	68±7 (490±51)	57±6 (410±43)
M22 P=2.5	23±2 (170±14)	19.6±2.0 (140±14)	51±5 (370±36)	43±4 (310±29)	92±9 (670±65)	77±8 (560±58)
M24 P=3	30±3 (220±22)	24±3 (170±22)	65±7 (470±51)	53±5 (380±36)	118±12 (850±87)	96±10 (690±72)
M27 P=3	44±4 (320±29)	36±4 (260±29)	96±10 (690±72)	78±8 (560±58)	173±17 (1300±120)	140±14 (1000±100)
M30 P=3.5	60±6 (430±43)	50±5 (360±36)	131±13 (950±94)	110±11 (800±80)	235±24 (1700±170)	198±20 (1400±140)
M33 P=3.5	81±8 (590±58)	68±7 (490±51)	176±18 (1300±130)	148±15 (1100±110)	317±32 (2300±230)	266±27 (1900±200)
M36 P=4	105±10 (760±72)	88±9 (640±65)	227±23 (1600±170)	190±19 (1400±140)	409±41 (3000±300)	343±34 (2500±250)

Table 1-2 Tightening torques for fine threads metric screws (not plated) unit : kgf·m (lbf·ft)

Strength grade / Size / Use	4.8 T		7 T		10.9 T	
	No lubrication	Oil lubrication	No lubrication	Oil lubrication	No lubrication	Oil lubrication
M 8 P=1	1.15±0.11 (8.3±0.8)	0.97±0.1 (7.0±0.7)	2.5±0.2 (18±1)	2.1±0.2 (15±1)	4.5±0.4 (33±3)	3.8±0.4 (27±3)
M10 P=1.25	2.3±0.2 (17±1)	1.91±0.19 (14±1)	4.9±0.5 (35±4)	4.2±0.4 (30±3)	8.9±0.9 (64±7)	7.5±0.7 (54±5)
M12 P=1.25	4.0±0.4 (29±3)	3.4±0.3 (25±2)	8.7±0.9 (63±7)	7.3±0.7 (53±5)	15.7±1.6 (110±12)	13.2±1.3 (95±9)
M16 P=1.5	9.4±0.9 (68±7)	7.9±0.8 (57±6)	20±2 (140±14)	17.2±1.7 (120±12)	37±4 (270±29)	31±3 (220±22)
M20 P=1.5	19±1.9 (140±14)	15.8±1.6 (110±12)	41±4 (300±29)	34±3 (250±22)	74±7 (540±51)	62±6 (450±43)
M24 P=2	32±3 (230±22)	27±3 (200±22)	70±7 (510±51)	58±6 (420±43)	126±12 (910±87)	105±10 (760±72)
M30 P=2	65±6 (470±43)	54±5 (390±36)	142±14 (1000±100)	118±12 (850±87)	255±26 (1800±190)	212±21 (1500±150)
M33 P=2	87±9 (630±65)	72±7 (520±51)	190±19 (1400±140)	158±16 (1100±120)	341±34 (2500±250)	284±28 (2100±200)
M36 P=3	109±11 (790±80)	91±9 (660±65)	238±23 (1700±170)	198±20 (1400±140)	428±43 (3100±310)	357±36 (2600±260)

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Applicable Machines

SK115SR-1E	YV02-01701～
SK135SR-1E	YY02-03001～
SK135SRLC-1E	YH02-01301～
SK135SRL-1E	LK02-01041～
SK115SR-1E	YV03-02194～
SK135SR-1E	YY03-04464～
SK135SRLC-1E	YH03-02077～
SK135SRL-1E	LK03-01107～

PREFACE

(1) Working condition
1) Workers :
More than one worker shall be 1st class service technician (having five years or more of field experience and having received training in the operation).
2) Equipment :
Jigs, tools, apparatuses and testers used in field service work shall be available commercially. The maintenance plant shall be equipped with a service shop, a crane and inspection apparatuses necessary for specific self inspection activities.
3) Place :
A flat land where work may be performed and to which a service car or a truck crane is accessible.
(2) Range of standard maintenance time
1) Standard maintenance time=Direct maintenance time+Preparation time
2) Direct maintenance time : Net time actually spent for maintenance
3) Spare time :
Time needed to move machines for service, prepare safety operations, discuss work, and process the needs of the body.
(3) Extra time (not included in the standard service time)
1) Repair time :
Machining, sheet metal, welding, melt cutting, folding and extracting bolts, servicing parts, and painting.
2) Items excluded from service time because of uncertainty in time :
Receiving a vehicle into shop, transfer, delivery, inspection on completion, investigation of causes of faults, diagnosis, and inspection.
3) Indirect time :
Time for ; field work, preparation of necessary parts before leaving for work, return for field work, waiting time because of user' s convenience in the field, paper work after returning to shop, and preparation of bills.
4) Special time : Work at early morning, at midnight and on holidays are to be calculated separately.
5) Separate calculation : The operating time for service cars, trucks with a crane and crane trucks.
(4) Applicable machine for estimation of standard maintenance time
1) Standard machine
2) A well maintained and controlled machine with a standard combination of attachments which is used in a general environment.

Revision	Date of Issue	Remarks
First edition	February, 2002	S5YY1204E K
First revision	December, 2003	S5YY1204E① K

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1. HOW TO USE THE MAINTENANCE STANDARD AND CAUTIONS TO BE EXERCISED

(1) Application

1) When the machine is new ;
Confirm that the performances are in accordance with standard specifications as compared to the performance standards.

2) At specific self inspection ; (Rule by country)
Use the data for the criterion, for the purpose of correction, adjustment and replacement.

3) When performances are deteriorated ;
Determine whether it is caused by a fault or end of service life after long hours of operation, to be used for safety and economical considerations.

4) When main components are replaced ;
For example, use data to restore performances of pumps and others.

(2) Terminology

1) Standard values ;
Values to be used to condition or assemble a new machine. Where special notes are not given, these values represent standard specifications (machine with standard attachments and standard shoes).

2) Reference values for remedy ;
Values at which readjustment is required. In order to ensure performance and safety it is strictly prohibited to use the machine over the specified values.

3) Service limit ;
This is the limit value at which reconditioning is impossible without replacement of parts. If the value is expected to exceed the service limit before next inspection and correction are performed, replace the parts immediately. The operation over the specified values causes increase of damage and requires the down time of machine, and also causes safety problems.

(3) Cautions to be Exercised at Judgment

1) Evaluation of measured data ;
Disagreement of measuring conditions, variations of data peculiar to a new machine, and measuring errors are to be evaluated. Determine generally at what levels measured values are located, instead of determining whether or not values fall within or run out of the reference values.

2) Determining correction, adjustment or replacement ;
Machine performances deteriorate with time as parts wear and some deteriorated performances may be restored to new levels. Therefore, determine correction, adjustment or replacement, depending upon the operating hours, kind of work and circumstances in which the machine is placed, and condition the machine performances to its most desirable levels.

(4) Other Cautions to be Exercised

1) Parts liable to degrade ;
Rubber products, such as, hydraulic hoses, O rings, and oil seals deteriorate with time ; replace them at regular intervals or at overhauls.

2) Parts requiring regular replacement ;
Out of critical hoses that are necessary to secure safety, we designate Very Important Parts (V.I.P) and recommend that they should be replaced regularly.

3) Inspection and replacement of oils and greases ;
In performing maintenance, it is necessary for the user to familiarize himself with how to handle the machine safely, cautions to be exercised and inspection/lubrication procedures. Refer to the operators manuals as well.

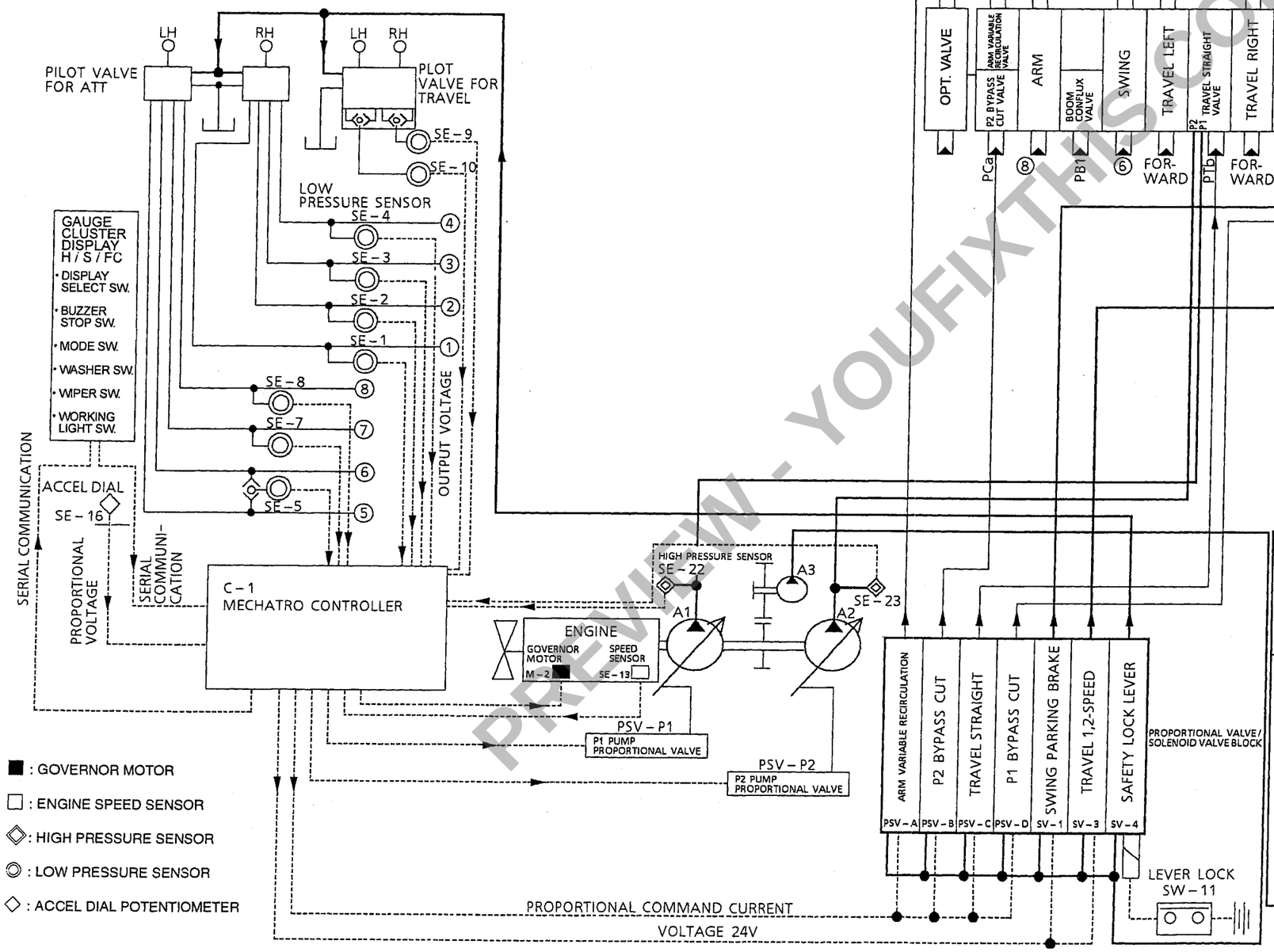
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1. SUMMARY OF MECHATRO CONTROL SYSTEM

1.1 MECHATRO CONTROL SYSTEM IN GENERAL

ELECTRIC — CONTROLLER INPUT SIGNAL ------- HYDRAULIC — PILOT SECONDARY PRESSURE; SOLENOID PROPORTIONAL VALVE SECONDARY PRESSURE; PILOT PRIMARY PRESSURE MAIN CIRCUIT



System summary	Furtures		Purpose
P1, P2 pump is controlled by proportional valve.	1	P1 pump is controlled by proportional valve.	A) The power curve shall be an ideal curve.
	2	P2 pump is controlled by proportional valve.	B) Supply an optimum flow for each operation.
Part of the control valve is controlled by the proportional valve. The main spool is controlled hydraulically.	3	The travel straight valve is controlled by proportional valve.	● Make the changeover soft.
	4	The bypass cut valve is controlled by proportional valve.	● Make the changeover soft.
	5	The arm variable recirculation valve is controlled by proportional valve.	● Control the arm speed as you desire.
	6	The swing action is controlled by P2 bypass cut valve(=proportional valve.)	● Make the controllability soft.
	7	The open and close actions of the swing P/B are controlled by solenoid valve.	

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1. SUMMARY

The hydraulic circuits are built up with the following functions and features in order to achieve easy operability, safety, mass volume handling and low fuel consumption.

Table 1

Perfor-mance	Device	Function	Features
Easy operability and safety	Travel	• Travel straight • 2 speed travel changeover • Auto parking brake • Motor overrun protection • Travel pilot operation	• Travel straight at combined operation. • 2 speed changeover of travel speed. • Automatic braking when parking. • Prevents overrunning of travel motor on the slope. • Prevents hunting by the built in travel shockless mechanism.
	Swing	• Reverse rotation protective function • Swing priority circuit (simultaneous operation of arm digging and swing motions) • Automatic swing parking brake	• Easy positioning to protect it from swinging back when stops swinging. • Easy operation of stable swing speed, arm slanted leveling, swing press digging. • Protect it from swing drift on the slope.
	Attachment	• Hydraulic pilot control system • Pilot safety lock system • Lock valve (boom / arm)	• Delicate operability. • Cut out of hydraulic pilot circuit by safety lock lever. • Protect boom and arm from unexpected drop.
	Others	• Pressurized hydraulic oil tank • Suction strainer • Line filter ; pilot circuit • Return filter ; return circuit • Cooling hydraulic oil by oil cooler • Pressure release circuit	• To prevent hydraulic oil from being contaminated and to promote self suction ability of pump. • Remove dust on suction side. • To prevent pilot operating circuit from malfunctioning. • Hydraulic oil contamination. • To prevent hydraulic oil from fouling • To prevent hydraulic oil from being deteriorated.
Mass handling capability	Pump	• Variable displacement pump of electric flow control type.	• Use engine power effectively with 2 variable pumps (2delivery sides).
	Attachment	• Boom raise conflux circuit • Arm conflux circuit • Dozer blade (OPT.)	• Speed up of boom raise operation. • Speed up of arm operation. • Dozing operation.
Low fuel consumption	Micro computer	• Auto accel	• Reduce fuel consumption and noise by lowering engine speed when control lever is in neutral position.

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1A. ELECTRIC CIRCUIT DIAGRAM

;YY03Z00004P1

Applicable machine

YH02-01301～

LK02-01041～

YV02-01701～

YY02-03001～

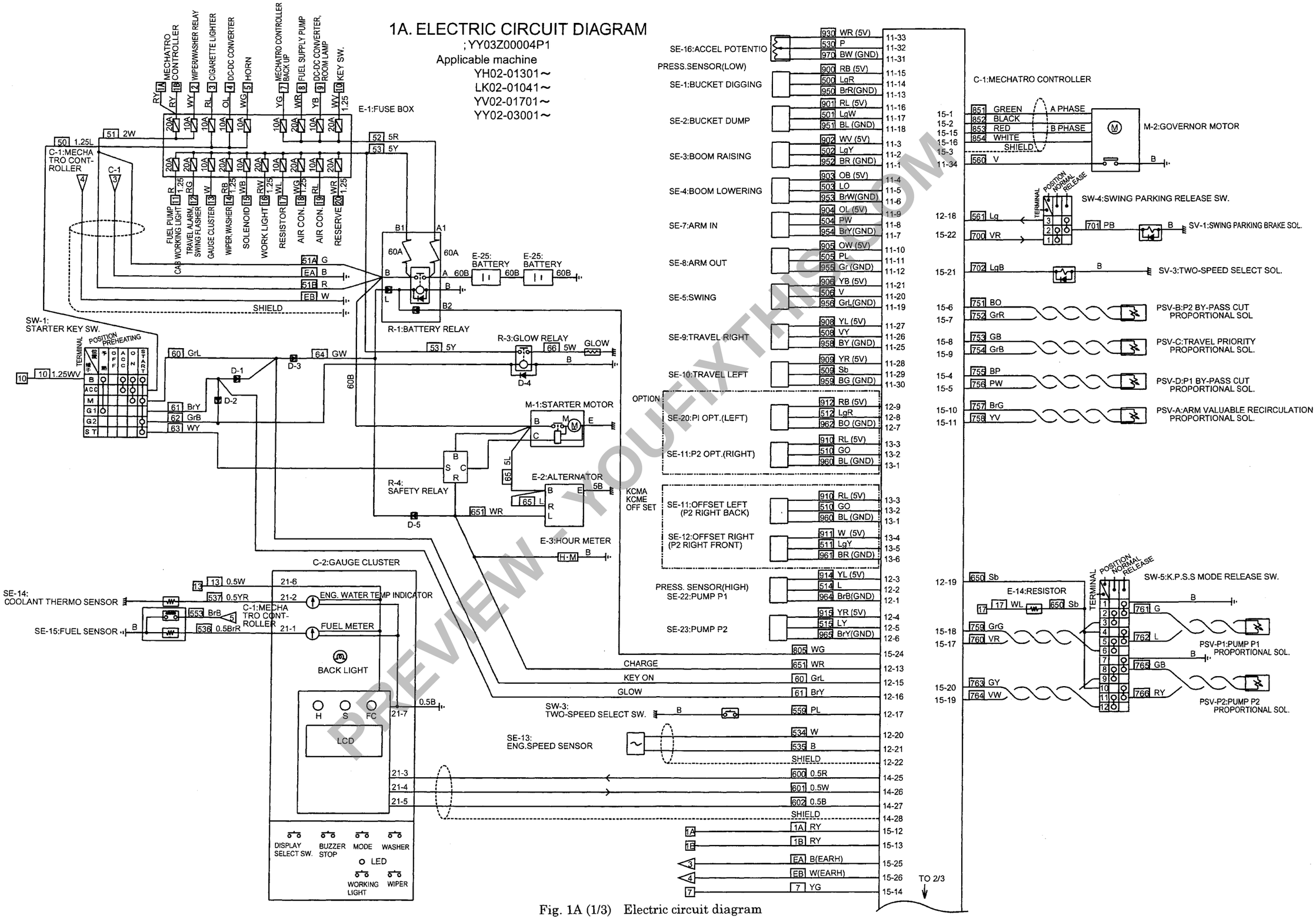


Fig. 1A (1/3) Electric circuit diagram

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1.2 HYDRAULIC PUMP

1.2.1 CONSTRUCTION

(1) Main pump

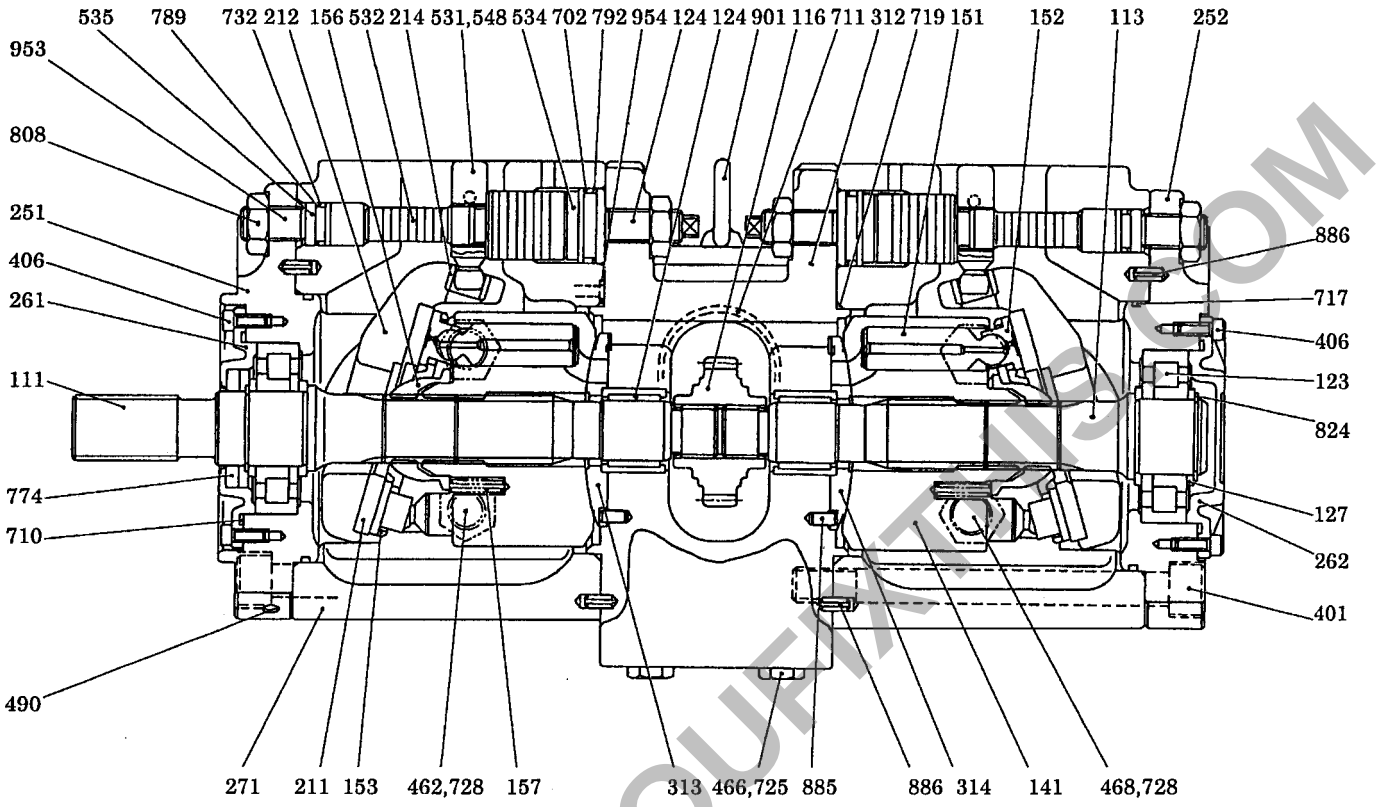


Fig. 1-2 Construction of main pump

No.	NAME	Q'TY	No.	NAME	Q'TY	No.	NAME	Q'TY
111	SHAFT(F)	1	262	SEAL COVER(R)	1	711	O RING : 1B G95	1
113	SHAFT(R)	1	271	PUMP CASING	2	717	O RING : 1B G120	2
116	1st GEAR	1	312	VALVE BLOCK	1	719	O RING : 1B G115	2
123	ROLLER BEARING	2	313	VALVE PLATE (For clockwise)	1	724	O RING : 1B P8	18
124	NEEDLE BEARING	2	314	VALVE PLATE (For counter clockwise)	1	725	O RING : 1B P11	2
127	BEARING SPACER	4	401	SOCKET BOLT : M16×175	8	728	O RING : 1B P18	4
141	CYLINDER BLOCK	2	406	SOCKET BOLT : M6×16	8	732	O RING : 1B P16	2
151	PISTON	18	466	VP PLUG : PF1/4	2	774	OIL SEAL	1
152	SHOE	18	467	VP PLUG : PF1/2	3	789	BACKUP RING	2
153	RETAINER PLATE	2	468	VP PLUG : PF1/2	1	792	BACKUP RING	2
156	SPHERICAL BUSHING	2	490	PLUG : NPTF1/16	15	808	HEX. NUT : M16	4
157	CYLINDER SPRING	18	531	TILTING PIN	2	824	SNAP RING	2
211	SHOE PLATE	2	532	SERVO PISTON	2	885	VALVE PLATE PIN	2
212	SWASH PLATE	2	534	STOPPER : L	2	886	SPRING PIN	4
214	TILTING BUSHING	2	535	STOPPER : S	2	901	EYE BOLT : M10	2
251	SWASH PLATE SUPPORT(F)	1	548	FEED BACK PIN	2	953	SET SCREW : M16	2
252	SWASH PLATE SUPPORT(R)	1	702	O RING : 1B G30	2	954	SET SCREW : M16	2
261	SEAL COVER(F)	1	710	O RING : 1B G85	2			

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1. CONSTRUCTION AND PIPING

1.1 CONSTRUCTION (AIR-CONDITIONER GROUP)

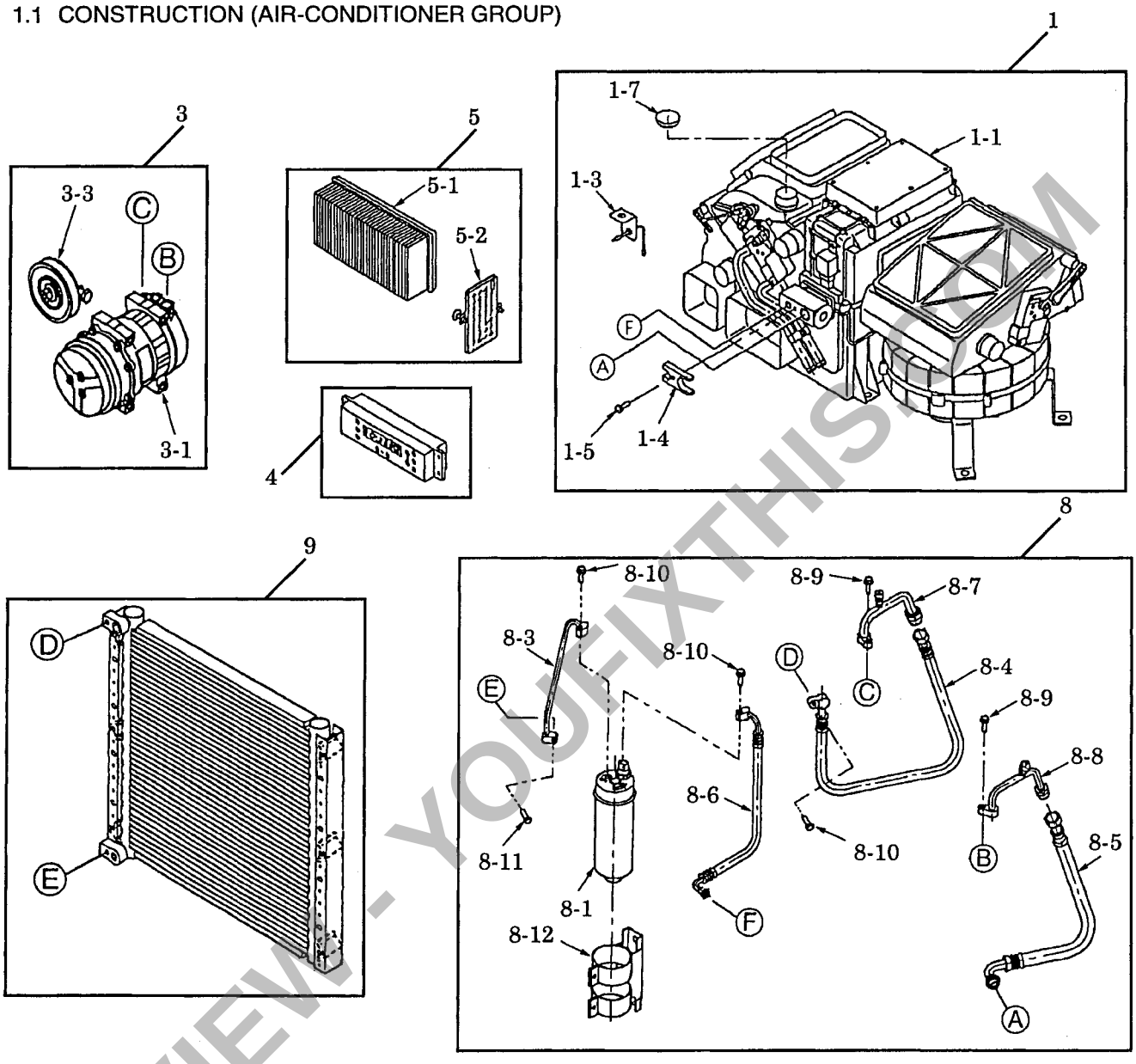


Fig. 1 Air-conditioner group

AIR-CONDITIONER GROUP		YV20M00003F3					
No.	NAME	Q'TY	REMARKS	No.	NAME	Q'TY	REMARKS
1	AIR-CONDITIONER ASSY	1	YT20M00009F1	8	AIR DRYER ASSY	1	YV96V00001F3
1-1	AIR-CONDITIONER	1	YT20M00004F1	8-1	RECEIVER	1	
1-3	SENSOR	1		8-3	L TUBE	1	
1-4	PLATE	1		8-4	D HOSE	1	
1-5	MACHINE SCREW	1		8-5	S HOSE	1	
1-7	CAP	1		8-6	L HOSE	1	
3	COMPRESSOR ASSY	1	YX91V00002F2	8-7	D TUBE	1	
3-1	AIR-COMPRESSOR	1		8-8	S TUBE	1	
3-3	PULLEY ASSY	1		8-9	CAPSCREW	2	
4	PANEL ASSY	1	YT20M01104F1	8-10	CAPSCREW	3	
5	AIR FILTER ASSY	1	YT95V00001F1	8-11	CAPSCREW	1	
5-1	COVER	1		8-12	BRACKET	1	
5-2	FILTER	1		9	CONDENSER	1	YT20M01060P2

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KOBELCO

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SHOP MANUAL

SK115SR-1E
SK135SR(LC)-1E
SK135SR L-1E

DISASSEMBLING AND ASSEMBLING

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1. EXPLAINING CHAPTER OF WHOLE DISASSEMBLY & ASSEMBLY

1.1 From for Chapter of Disassembly & Assembly ····· 1

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3. ARM

3.1 REMOVING ARM

(1) Put the machine in position to remove arm.
Extend the arm cylinder, retract the bucket cylinder to a maximum and bring the arm down on the ground.

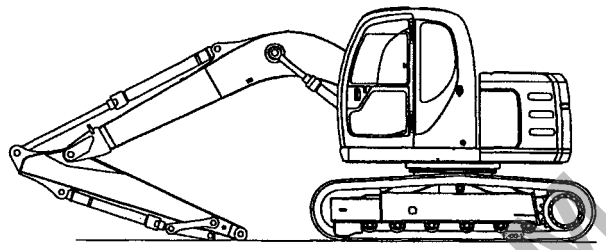


Fig. 3-1 Position to remove arm

(2) Disconnecting piping of bucket cylinder
Release pressure of hydraulic tank, place oil pan to prepare for oil leaking, and separate pipes.

⚠ Plug both section of separated pipes.
Plug : 4-(4)

When the removal of bucket cylinder is not required, skip to procedure (6).

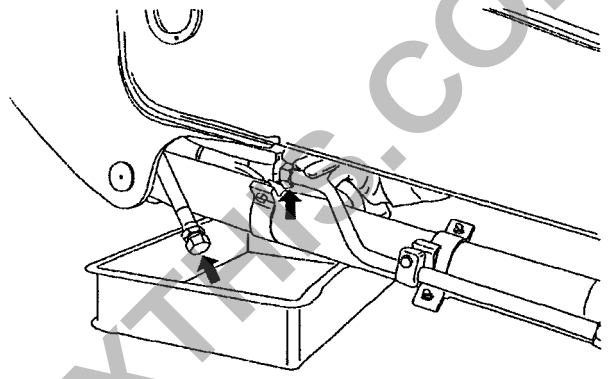
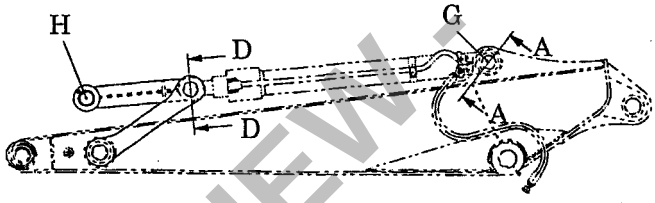


Fig. 3-2 Disconnecting piping of bucket cylinder

(3) Removing bucket cylinder rod pin (H)

1) Loosen nut (8), remove capscrew M14×115 (7), and push out pin (H).
: 22mm

2) Retract cylinder rod.



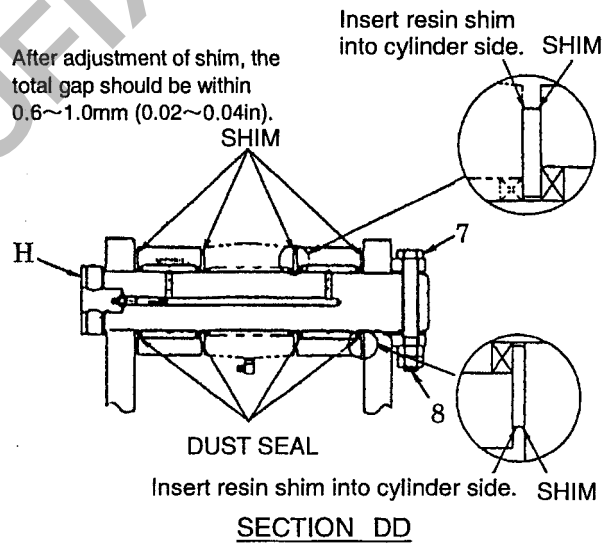


Fig. 3-3 Detail of bucket cylinder rod pin (H)

(4) Removing cylinder head pin (G)
Loosen nut (3), remove capscrew M12×110 (2), and push out pin (G).
: 19mm

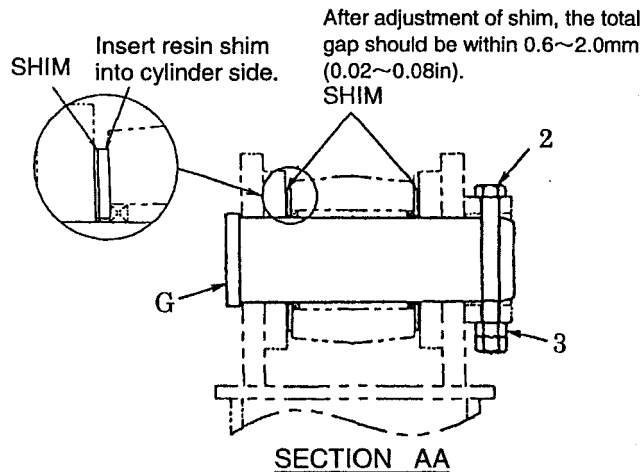


Fig. 3-4 Detail of bucket cylinder head pin (G)

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1. CAB

1.1 REMOVAL

(1) Remove floor mat

(2) Remove the following parts for air-con cover.
1) 5 bolts (1-9) for catch (24)
2) Cover (1)
3) Grille under front seat
4) Duct from duct (14) to under right duct on cab inside.

: Cross recessed screw driver
: 13mm

(3) Remove the following parts for harness and connector.
1) Antenna cable from back side of tuner
2) Harness for room lamp
3) Harness on cab front right side
4) Harness for gauge cluster

(4) Remove window washer tube

(5) Remove the following parts for cab mounting bolt
1) 5 capscrews (A1)M10
2) 4 nuts M16
3) Sems bolt (B2) M10, 2 pcs, on lower section of hand rail

: 17mm, 24mm

(6) Slinging cab
1) Remove 2 plastic plugs on front side of cab ceiling, and attach eye bolts M10, and hook wire 3 places, 2 bolts and lifting eye, on rear left side.
2) Then lift up slowly avoiding interference with surroundings.
Wire with hook ;
Length 1.5m (4ft 11in) × Dia. 8mm (0.315 in) × 3pcs.
Weight of cab ; Approx. 200kg (440 lbs)

1.2 INSTALLATION

Mount it in reverse procedure of Dismounting according to the Tightening Torque Table.

Tightening position	Tool	Tightening torque kgf·m (lbf·ft)
Lower section of hand rail Sems bolt (B2)	17	4.7 (34)
Nut M16	24	19.5 (140)
Capscrew (A1)	17	4.7 (34)

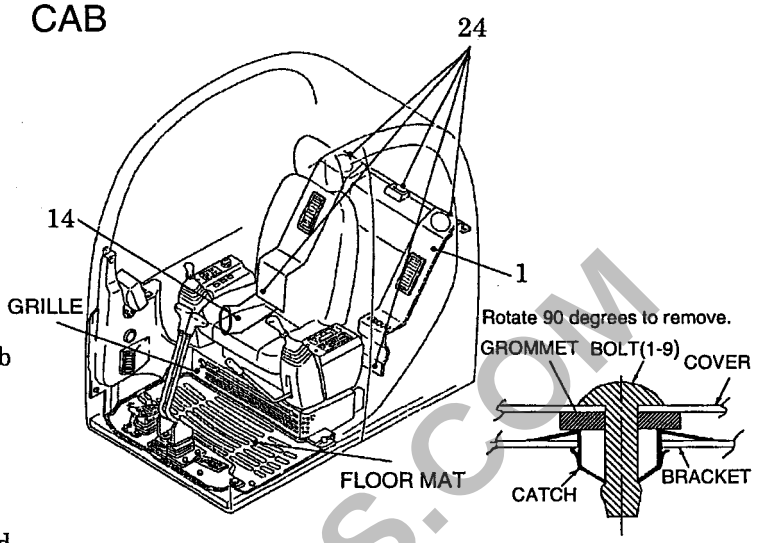


Fig. 1-1 Detaching and attaching air conditioner cover

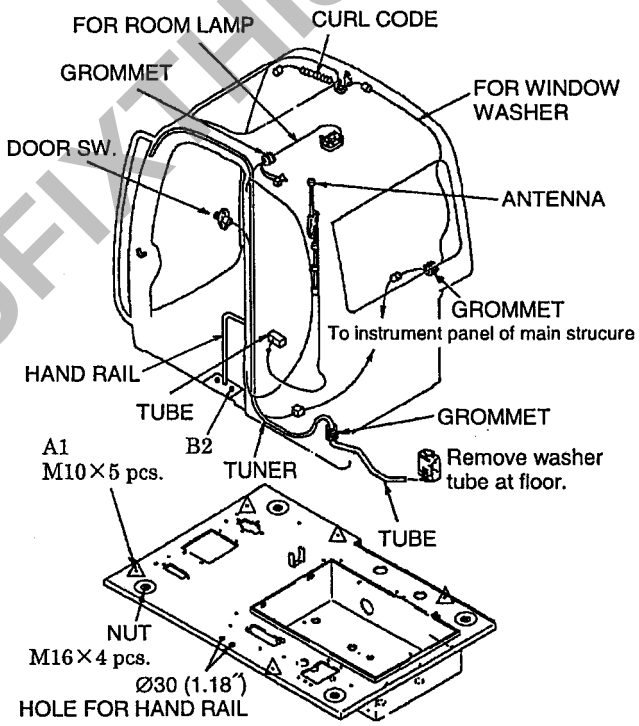


Fig. 1-2 Removing and attaching harness connector and cab mounting bolts

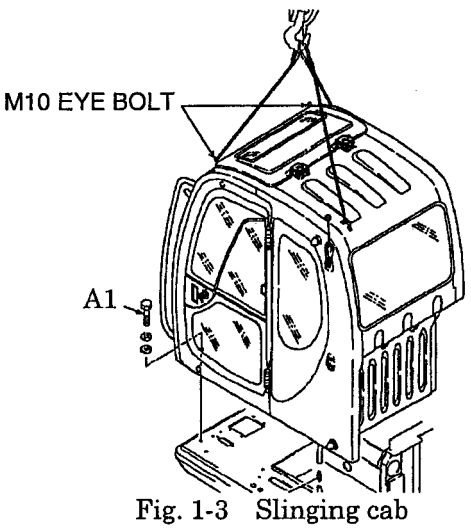


Fig. 1-3 Slinging cab

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SHOP MANUAL

SK115SR-1E
SK135SR(LC)-1E
SK135SR L-1E

TRAVEL SYSTEM

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[Part Ⅱ; Disassembling and assembling equipment]

1. TRAVEL MOTOR ····· Ⅱ-1

1A. TRAVEL MOTOR (For L type) ····· Ⅱ-1A

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1. OUTLINE

Troubleshooting provides process locating for the cause of trouble in the order that trouble occurred. This manual describes how to solve the specific phenomenon systematically as early as possible. For troubleshooting concerning the inside of equipment, refer to troubleshooting for each manual of equipment.

1.1 JUDGMENT OF ACTUAL THING AT SITE

(1) Get to the site as quickly as possible.
Verify model, serial number, situation of trouble and field, and notify person of arrival time.

(2) Verify background of trouble occurred
1) Model name and serial number
2) Kind of attachment
Check that the combination of attachment is proper or that the operating method is not unreasonable.
3) Operating time by hour-meter
4) History of trouble occurred and additional works.
5) Recurrence of past trouble, or problems on the additional works.

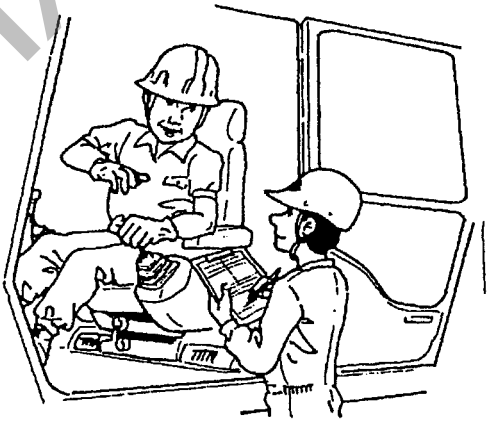
(3) How to diagnose trouble
1) Verify defective part
2) Make the condition of trouble again
3) Where defective parts can not be verified, surmise causes systematically.
4) Verify reasons for surmise
5) Report methods, procedure, and period for repairing to user.

(4) Explanation of the cause of trouble
1) Explain the cause of trouble to clients. For example, oil leak through piston is caused by flaws on the piston rod. And the method of using the machines should be explained so that the same kind of trouble does not reoccur.
2) Treatment of damaged parts
The damaged parts to be claimed and returned are evidence so they should be handled with care. Protect them from entry of water, soils, etc. into port of hydraulic unit, etc. and return them. And also use care not to flaw and damage those surfaces.



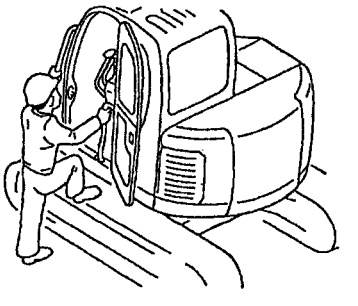
YR-B76

Attending the field to verify actual thing.



YR-B76

Verifying background of trouble occurred.



YT-B87

Confirm the symptoms of the trouble.



YR-B76

Diagnosing fail by means troubleshooting.

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1. TROUBLE DIAGNOSIS ; HYDRAULIC SYSTEM

Classification	Group No.	Trouble	E/G revolution	P1 pump	P2 pump	Pilot pump	Pilot relief valve	Travel straight spool	Travel spool	Swing spool	Boom spool	Arm spool	Bucket spool	Boom conflux spool	P2 bypass cut valve	P1 bypass cut valve	Load check valve	Lock valve	Shuttle valve	Check valve for relief	Parking brake	Bypass valve	Reduction parts	Motor	Counter balance valve	Parking brake	Counter balance check valve	Pilot valve (1-2speed select)	Boom cylinder	Arm cylinder	Bucket cylinder	Swivel joint	Pilot valve (ATT)	Pilot valve (travel)	Swing parking sol. valve	Travel 1-2speed sol. valve	Safety lock lever sol. valve	Arm variable recirculation valve	P2 bypass cut proportional valve	Travel straight proportional valve	P1 bypass cut proportional valve	Main relief valve	Bucket digging	Bucket dump	Boom raising	Boom lowering	Arm in	Arm out	Left shockless	Right shockless	Left shockless	Right shockless
			Oil pressure																																																
		Component		Pump				Control valve													Swing motor			Travel motor					Cylinder			Other valve			Proportional valve block							Relief valve										
																																															Travel		Swing	
		Device No.		1				2													3			4					5	6	7	8	9	10	11																	
Hydraulic systems – Attachment operation	(1)	No operation is possible.	○	○	○	○	○																															○					○										
Hydraulic systems – Attachment operation	(1)	Machine operates freely even though lever is in neutral.	○	○	○	○	○		○	○	○	○	○		○	○																	○	○						○	○	○											
Hydraulic systems – Attachment operation	(2)	Speed is low. – All actions	○	○	○	○	○																																			○										
Hydraulic systems – Attachment operation	(2)	Speed is low. – Bucket digging and dump	○	○	○		○						○		○		○			○											○		○						○				○	○								
Hydraulic systems – Attachment operation	(2)	Speed is low. – Boom Down	○	○	○		○				○				○		○	○											○				○						○							○						
Hydraulic systems – Attachment operation	(2)	Speed is low. – Boom Up	○	○	○		○	○			○			○	○		○	○											○				○						○	○					○							
Hydraulic systems – Attachment operation	(2)	Speed is low. – Arm in conflux	○	○	○		○	○				○				○	○	○												○			○					○		○	○						○					
Hydraulic systems – Attachment operation	(2)	Speed is low. – Arm out conflux	○	○	○		○	○				○				○	○	○												○			○							○	○							○				
Hydraulic systems – Attachment operation	(3)	Power lacks. – All motions	○	○	○	○	○																																			○										
Hydraulic systems – Attachment operation	(3)	Power lacks. – Bucket digging and dump	○	○			○	○					○				○			○											○		○						○	○			○	○								
Hydraulic systems – Attachment operation	(3)	Power lacks. – Boom Up	○	○	○		○	○			○			○	○		○	○											○				○						○	○					○							
Hydraulic systems – Attachment operation	(3)	Power lacks. – Arm in	○	○	○		○	○				○				○	○	○												○			○							○	○						○	○				
Hydraulic systems – Attachment operation	(4)	Fine operation impossible. – Bucket digging	○	○	○		○						○			○	○																○						○		○		○									
Hydraulic systems – Attachment operation	(4)	Fine operation impossible. – Boom Up&Down	○	○	○		○				○			○	○	○	○	○															○						○		○					○						
Hydraulic systems – Attachment operation	(4)	Fine operation impossible. – Swing	○	○	○		○								○	○	○				○	○	○										○						○		○				○							
Hydraulic systems – Attachment operation	(4)	Fine operation impossible. – Arm in and out	○	○	○		○					○			○	○	○	○															○						○		○						○	○				
Hydraulic systems – Travel operation	(5)	Travel 1, 2 speed change impossible					○																					○				○				○																
Hydraulic systems – Travel operation	(6)	Travel speed is low.	○	○	○		○	○	○								○			○						○	○	○	○				○		○		○				○		○							○	○		
Hydraulic systems – Travel operation	(7)	Travel power is low.	○	○	○		○	○	○								○			○						○	○	○	○				○		○		○				○		○							○	○		
Hydraulic systems – Travel operation	(8)	Machine cannot travel straight or deviates in one direction or zigzags.	○	○	○		○	○	○								○			○						○	○	○						○						○									○	○		
Hydraulic systems – Travel operation	(9)	Machine does not stop still on a slope.							○																○	○	○							○															○	○		
Hydraulic systems – Swing operation	(10)	Swing motion does not work.																																																		
Hydraulic systems – Swing operation	(11)	Swing speed is low.	○	○	○					○					○	○	○		○	○	○	○	○										○		○				○		○	○									○	○
Hydraulic systems – Swing operation	(12)	Swing power is poor.	○	○	○					○					○	○	○		○	○	○	○	○										○		○				○		○	○									○	○
Hydraulic systems – Swing operation	(12)	Swing motion drifts very large.								○											○	○	○										○		○																
Hydraulic systems – Swing operation	(13)	Swing parking is not held on a slope.								○											○	○											○		○																

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1. TROUBLE DIAGNOSIS ; ELECTRIC SYSTEM

C1 mechatro controller

Operation pressure sensor / Power supply & other signal — CN-11

System	Group No.	Trouble	Boom up pressure sensor (1·2·3)	Boom down pressure sensor (4·5·6)	Arm in pressure sensor (7·8·9)	Arm out pressure sensor (10·11·12)	Bucket digging pressure sensor (13·14·15)	Bucket dump pressure sensor (16·17·18)	Swing pressure sensor (19·20·21)	Travel right pressure sensor (25·26·27)	Travel left pressure sensor (28·29·30)	Accelerator potentio (31·32·33)	Accel motor start point indexing LS (34)
Attachment operation	(1)	No motions operate.											
Attachment operation	(1)	Machine moves freely when lever is at neutral.	○		○	○			○				
Attachment operation	(2) Speed is slow	All operate											
Attachment operation	(2) Speed is slow	Only bucket speed is slow.											
Attachment operation	(2) Speed is slow	Only boom up speed is slow.	○		○	○			○				
Attachment operation	(2) Speed is slow	Motions are slow except boom up and arm in.	○							○			
Attachment operation	(2) Speed is slow	Only arm in motion is slow.			○								
Attachment operation	(2) Speed is slow	Only arm out motion is slow.				○							
Attachment operation	(3) Power is poor	All operate											
Attachment operation	(3) Power is poor	Bucket digging											
Attachment operation	(3) Power is poor	Boom up											
Attachment operation	(3) Power is poor	Arm in											
Attachment operation	(4) Fine operation impossible.	Bucket digging			○	○							
Attachment operation	(4) Fine operation impossible.	Boom up, down			○	○							
Attachment operation	(4) Fine operation impossible.	Arm in, out	○		○	○			○				
Travel operation	(5)	Travel 1-2 speeds can not be changed											
Travel operation	(6)	Travel independent speed is low.	○	○	○	○	○	○	○				
Travel operation	(7)	Travel power is poor											
Travel operation	(8)	ATT travel combined and travel straight are impossible. (at combined operation with ATT swing)											
Travel operation	(8)	Travel deviates, zigzags. (at combined operation with ATT swing)	○	○	○	○	○	○	○	○	○		
Travel operation	(9)	Machine drifts on a downhill and does not stop still on a slope											
Swing operation	(10)	Swing motion does not work							○				
Swing operation	(11)	Swing speed is slow							○				
Swing operation	(12)	Swing power is poor							○				
Swing operation	(13)	Swing left, right	○		○	○			○				
Swing operation	(13)	Swing can not be held on a slope			○				○				
Swing operation	(13)	Swing fine operation impossible											
Option	(14)	Auto idle stop is not actuated											
Option	(14)												

Power supply & other signal — CN-12, CN-13

System	Group No.	Trouble	P1 pump pressure sensor (CN-12: 1·2·3)	P2 pump pressure sensor (4·5·6)	Option P1 side pressure sensor (7·8·9)	Alternator voltage (13)	Key SW ON (15)	Key SW GLOW (16)	Travel 1-2speed SW. (17)	Swing P/B release SW. (18)	KPSS release SW. (19)	Engine speed sensor (20·21)	Sealed grounding (22)	Offset left (CN-13: 1·2·3)	Offset right (4·5·6)
Attachment operation	(1)	No motions operate.					○								
Attachment operation	(1)	Machine moves freely when lever is at neutral.													
Attachment operation	(2) Speed is slow	All operate													
Attachment operation	(2) Speed is slow	Only bucket speed is slow.													
Attachment operation	(2) Speed is slow	Only boom up speed is slow.													
Attachment operation	(2) Speed is slow	Motions are slow except boom up and arm in.													
Attachment operation	(2) Speed is slow	Only arm in motion is slow.													
Attachment operation	(2) Speed is slow	Only arm out motion is slow.													
Attachment operation	(3) Power is poor	All operate													
Attachment operation	(3) Power is poor	Bucket digging													
Attachment operation	(3) Power is poor	Boom up													
Attachment operation	(3) Power is poor	Arm in													
Attachment operation	(4) Fine operation impossible.	Bucket digging	○	○											
Attachment operation	(4) Fine operation impossible.	Boom up, down	○	○											
Attachment operation	(4) Fine operation impossible.	Arm in, out	○	○											
Travel operation	(5)	Travel 1-2 speeds can not be changed							○						
Travel operation	(6)	Travel independent speed is low.												○	○
Travel operation	(7)	Travel power is poor													
Travel operation	(8)	ATT travel combined and travel straight are impossible. (at combined operation with ATT swing)													
Travel operation	(8)	Travel deviates, zigzags. (at combined operation with ATT swing)												○	○
Travel operation	(9)	Machine drifts on a downhill and does not stop still on a slope													
Swing operation	(10)	Swing motion does not work								○					
Swing operation	(11)	Swing speed is slow													
Swing operation	(12)	Swing power is poor													
Swing operation	(13)	Swing left, right	○	○						○					
Swing operation	(13)	Swing can not be held on a slope								○					
Swing operation	(13)	Swing fine operation impossible													
Option	(14)	Auto idle stop is not actuated													
Option	(14)														

Switch & relay — CN-14

System	Group No.	Trouble	Engine water temp high LS (1)	Engine oil pressure low LS (2)	Air filter clogging LS (3)	Double single select sw. (4)	Overload sw. (5)	(6)	Extra pressure sw. (7)	Fuel level thermister (8)	Flow control connector (11)	Wiper motor relay (13)	Washer motor relay (15)	Front working light relay (16)	Gauge cluster (25·26·27)	Sealed grounding (28)
Attachment operation	(1)	No motions operate.														
Attachment operation	(1)	Machine moves freely when lever is at neutral.														
Attachment operation	(2) Speed is slow	All operate														
Attachment operation	(2) Speed is slow	Only bucket speed is slow.														
Attachment operation	(2) Speed is slow	Only boom up speed is slow.														
Attachment operation	(2) Speed is slow	Motions are slow except boom up and arm in.														
Attachment operation	(2) Speed is slow	Only arm in motion is slow.														
Attachment operation	(2) Speed is slow	Only arm out motion is slow.														
Attachment operation	(3) Power is poor	All operate														
Attachment operation	(3) Power is poor	Bucket digging														
Attachment operation	(3) Power is poor	Boom up														
Attachment operation	(3) Power is poor	Arm in														
Attachment operation	(4) Fine operation impossible.	Bucket digging														
Attachment operation	(4) Fine operation impossible.	Boom up, down														
Attachment operation	(4) Fine operation impossible.	Arm in, out														
Travel operation	(5)	Travel 1-2 speeds can not be changed														
Travel operation	(6)	Travel independent speed is low.														
Travel operation	(7)	Travel power is poor														
Travel operation	(8)	ATT travel combined and travel straight are impossible. (at combined operation with ATT swing)														
Travel operation	(8)	Travel deviates, zigzags. (at combined operation with ATT swing)														
Travel operation	(9)	Machine drifts on a downhill and does not stop still on a slope														
Swing operation	(10)	Swing motion does not work														
Swing operation	(11)	Swing speed is slow														
Swing operation	(12)	Swing power is poor														
Swing operation	(13)	Swing left, right														
Swing operation	(13)	Swing can not be held on a slope														
Swing operation	(13)	Swing fine operation impossible														
Option	(14)	Auto idle stop is not actuated														
Option	(14)															

Governor motor & proportional & SOL — CN-15, CN-17

System	Group No.	Trouble	Accelerator motor A phase (CN-15: 1·2)	Sealed grounding (3)	P1 bypass cut proportional valve D (4·5)	P2 bypass cut proportional valve B (6·7)	Travel straight proportional valve C (8·9)	Arm variable recirculation proportional valve A (10·11)	Power supply +24V (12·13)	Battery backup (14)	Accelerator motor B phase (15·16)	P1 pump proportional valve (17·18)	P2 pump proportional valve (19·20)	Travel 1-2speed SOL (21)	Swing parking SOL (22)	Battery relay (24)	Power supply grounding (25·26)	Swing flasher relay (CN-17: 3·4)	Auto accel release SW. (8)	Swing Flasher select SW. (10)	Timer relay (11)	Auto idle stop select SW. (13)
Attachment operation	(1)	No motions operate.							○													
Attachment operation	(1)	Machine moves freely when lever is at neutral.			○	○																
Attachment operation	(2) Speed is slow	All operate					○															
Attachment operation	(2) Speed is slow	Only bucket speed is slow.				○																
Attachment operation	(2) Speed is slow	Only boom up speed is slow.			○	○																
Attachment operation	(2) Speed is slow	Motions are slow except boom up and arm in.					○															
Attachment operation	(2) Speed is slow	Only arm in motion is slow.			○	○																
Attachment operation	(2) Speed is slow	Only arm out motion is slow.			○	○																
Attachment operation	(3) Power is poor	All operate																				
Attachment operation	(3) Power is poor	Bucket digging																				
Attachment operation	(3) Power is poor	Boom up																				
Attachment operation	(3) Power is poor	Arm in																				
Attachment operation	(4) Fine operation impossible.	Bucket digging			○																	
Attachment operation	(4) Fine operation impossible.	Boom up, down			○																	
Attachment operation	(4) Fine operation impossible.	Arm in, out				○		○														
Travel operation	(5)	Travel 1-2 speeds can not be changed												○								
Travel operation	(6)	Travel independent speed is low.					○					○	○									
Travel operation	(7)	Travel power is poor																				
Travel operation	(8)	ATT travel combined and travel straight are impossible. (at combined operation with ATT swing)																				
Travel operation	(8)	Travel deviates, zigzags. (at combined operation with ATT swing)					○															
Travel operation	(9)	Machine drifts on a downhill and does not stop still on a slope																				
Swing operation	(10)	Swing motion does not work													○							
Swing operation	(11)	Swing speed is slow				○							○									
Swing operation	(12)	Swing power is poor				○																
Swing operation	(13)	Swing left, right				○									○							
Swing operation	(13)	Swing can not be held on a slope																				
Swing operation	(13)	Swing fine operation impossible													○							
Option	(14)	Auto idle stop is not actuated																				○
Option	(14)																					

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1. TROUBLE DIAGNOSIS TABLE ; ENGINE

			Service man																									Engine dealer																														
			Inspection														Visual check				Shovel side							Engine side							Fuel system				Suction / exhaust system			Lubrication system				Cooling		Main structure										
			Filters									Fluid					Gas / fluid				Electrical fittings							Electrical fittings																														
System	Group No.	Trouble \ Component	Fuel not filled up or leaking.	Oil cooler element clogged.	Fuel system trouble(Air or water entered.)	OiL filter clogged.	Air cleaner clogged.	Gauze filter clogged.	Fuel filter clogged.	V-belt slips.	Breather hose bent.	Cooling water level	Fuel is of poor quality or leaking.	Specific gravity of battery fluid	Viscosity of engine oil is not suited, engine oil is leaking, or the engine oil level not proper.	Poor quality fuel is used or heavy oil is used.	Blowby gas is much.	Gas leaks from valve and gasket.	Engine oil is oo much.	Battery fluid level	Fuse	Starter key	Battery relay	Mechatoronic controller	Mechatoro "A" adjust.	Stepping motor	Accel potentiometer	Connector and electric wiring	Safety relay	Glow relay	Glow	Starter motor	Starter relay	Alternator	Feed pump function	Check injection timing	Inspect nozzle.	Injection pump	Valve clearance	Valve spring is fatigued.	Air cleaner & muffler	Check if engine oil level goes up and down.	Check relief valve.	Oil strainer clogged.	Fuel is mixed.	Check thermostat.	Oil cooler eleent damaged.	Compression pressure low.	Control rack movement unsmooth.	Governor spring fatigued.	Crank shaft oil seal no good.	Piston liner worn.	Piston ring worn.	Valve spring fatigued.	Internal parts stuck.	Check fuel feed.	Head gasket faulty.	Flywheel gear damaged.
Engine: Starting trouble	(1)	Starter does not run.												○						○	○	○	○					○	○			○	○																									
	(2)	Starter runs but does not start.	○		○		○	○	○					○	○	○				○								○		○	○				○	○	○	○	○	○						○		○				○	○	○		○	○	○
Rotation trouble	(3)	Idling unsmooth			○			○	○							○										○										○	○	○	○							○		○	○	○			○	○		○	○	
		Medium speed hunting														○																																										
		High speed unsmooth			○				○																												○	○											○	○								
		Does not reach max revolution.							○																○	○	○										○	○												○								
		Max. revolution is too high.																							○	○																							○	○								
	(4)	Revolution does not change if work modes are changed.																						○		○																																
	(5)	Accel potentiometer does not work properly.																						○		○	○																															
Drop in output	(6)	E/G deficiency in output			○		○		○						○	○	○	○																	○	○		○	○	○	○					○		○	○				○					
		Over heat		○		○	○			○		○	○		○																												○		○	○	○									○	
	(7)	Knocking occurs after warming-up E/G														○	○	○																		○	○					○						○										
Other trouble	(8)	Exhaust gas is black					○								○				○																	○	○	○	○							○							○	○	○		○	
		Exhaust gas is white (In cold state, white smoke does not disappear after idling.)			○												○	○																		○						○						○										
	(9)	Excessive oil consumption.									○					○	○		○																							○									○	○	○					
	(10)	Excessive fuel consumption.											○		○		○	○																		○	○	○										○										
	(11)	Engine does not stop when key is turned off.																				○		○		○												○																				
	(12)	The moment the key is turned to OFF, but power does not off.																					○															Stop position																				

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STANDARD TIGHTENING TORQUE TABLE FOR FLANGED HEX HEAD BOLTS

The tightening torques in the next table apply to such areas that do not specify special tightening torques.

1. Reason for change ; It has been decided to use flanged hex head bolts in place of hex head bolts. The tightening torques for the flanged hex head bolts have been increased by about 10% as compared to conventional torques in order to get the same axial force as conventional hex head bolts, except part of special bolts (connecting rod bolts, etc.). We therefore request that this decision be made known to all personnel of your service department by referring to standard tightening torques for conventional hex head bolts and new flanged hex head bolts.

2. Time of execution ; At the latter part of Augst 1995.

3. ChangeContents ; 〔Present〕 〔NEW〕

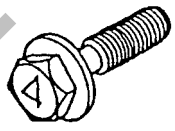
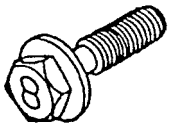
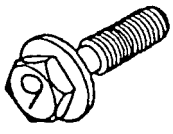


Hex head bolt　　Flangehex head bolt

4. Interchangeability ; New ⇦⇨ Old

5. Applicable engine model ; All engines

kg·m (ft·lbs)

Strength bracket / Bolt Head Display / Nominal Screw Size (Dia. × pitch)	4.8	8.8	9.8
			
M6×1.0	0.5~0.9 (3.6~6.5)	0.6~1.2 (4.6~8.7)	——
M8×1.25	1.1~2.0 (8.0~14)	1.6~2.9 (12~21)	2.1~3.4 (15~25)
M10×1.25	2.4~3.9 (17~28)	3.6~6.1 (26~44)	4.3~7.2 (31~52)
※ M10×1.5	2.3~3.8 (17~27)	3.5~5.8 (25~42)	4.1~6.8 (30~49)
M12×1.25	5.6~8.4 (41~61)	7.9~11.9 (57~86)	8.7~13.0 (63~94)
※ M12×1.75	5.2~7.8 (38~56)	7.2~10.9 (52~79)	8.1~12.2 (59~88)
M14×1.5	8.5~12.7 (61~92)	11.7~17.6 (85~127)	12.6~18.9 (91~137)
※ M14×2.0	7.9~11.8 (57~85)	11.1~16.6 (80~120)	11.8~17.7 (85~128)
M16×1.5	11.8~17.7 (85~128)	17.4~26.2 (126~190)	18.0~27.1 (130~196)
※ M16×2.0	11.2~16.7 (81~121)	16.6~24.9 (120~180)	17.2~25.8 (124~187)

※mark is used for female parts made of soft material, such as casting.

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1. LIST OF ADDITIONAL PARTS

How to utilize the list of additional modification parts

This manual describes the parts which are added and canceled on the basis of "Parts Manual" for standard machines when the machine is modified into the machines equipped with breaker.

The manual consists roughly of two sections : Breaker and Nibbler & Breaker. Each of the section is divided into five parts, 1. Upper structure, 2. Boom, 3. 2.45m (8′) arm, and 2.95m (9′ 8″) arm, 4. Connector, 5. Idler link, each being assigned a kit number. The cab guard should be ordered optionally. In the case of the arm, select a kit No. suited for the length of arm and attachment (Nibbler, Breaker) for ordering.

1.1 COMPARISON TABLE FOR KIT AND ASSY NO. BY COUNTRY

(1) BREAKER SK135SR(LC)-1E

Classification	NAME	KCME	OCEANIA, ASIA
(1) Upper	Upper structure modification kit No.	YY32T01002FP	YY32T01002FU
	• Modification of the control valve	—	YY64H00032F1
	• Install of the guard	YY21C00010F3	YY21C00006F6
	• Hydraulic tank assy	—	YY33H00006F4
	• Instrument panel assy	—	—
	• Remote control piping	YY68H00030F1	←
	• Block control piping	YT64H00036F2	←
	• Main control piping	YY06H00015F3	YY06H00013F3
	• Upper hydraulic piping	YY03H00032F1	←
	• Upper hydraulic piping	YY03H00023F2	←
	• Install of the name plate	YT22T00055F8	←
(2) Boom	Boom modification kit No.	YY32T01002FR	YY32T01002FH
	• 4.6M (15′ 1″) Boom	YY02B00157F3	YY02B00115F2
	• 4.6M (15′ 1″) Boom hydraulic piping	YY42H000085F1	YY42H00057F1
(3) Arm	2.45M (8′) Arm modification kit No.	YY32T01002FS	YY32T01002FJ
	• 2.45M (8′) Arm assy	YY12B00176F1	YY12B00123F8
	• 2.45M (8′) Arm hydraulic piping	YY43H00002F1	←
	2.95M (9′ 8″) Arm modification kit No.	YY32T01002FT	—
	• 2.95M (9′ 8″) Arm	YY12B00179F1	—
	• 2.95M (9′ 8″) Arm hydraulic piping	YY43H00059F1	—
(4) Connector	No kit No. is given because it is provided after selection		
	• Connector assy ; NPK	LP43H00004F1	←
	• Connector assy ; TOKU, KRUPP	LP43H00005F1	←
(5) Idler link	No kit No. is given because only one sort of part is provided		
	• Idler link (Right)	YY12B01006P1	←
	• Idler link (Left)	YY12B01007P1	←

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SK115SR-1E
SK135SR(LC)-1E Index of Shop Manual
SK135SRL-1E

Book Code No. / Distribution Year—Month			Index No	Title	
S5YY0104E 2002-02	S5YY0104E① 2003-12		SPECIFICATION	OUTLINE	YY01
S5YY0204E 2002-02	S5YY0204E① 2003-12			SPECIFICATION	YY02
S5YY0304E 2002-02	S5YY0304E① 2003-12			ATTACHMENT DIMENSION	YY03
S5YY1104E 2002-02	S5YY1104E① 2003-12		MAINTENANCE	TOOLS	YY11
S5YY1204E 2002-02	S5YY1204E① 2003-12			STANDARD MAINTENANCE TIME SCHEDULE	YY12
S5YY1304E 2002-02	S5YY1304E① 2003-12			MAINTENANCE STANDARD AND TEST PROCEDURE	YY13
S5YY2104E 2002-02	S5YY2104E① 2003-12		SYSTEM	MECHATRO CONTROL SYSTEM	YY21
S5YY2204E 2002-02	S5YY2204E① 2003-12			HYDRAULIC SYSTEM	YY22
S5YY2304E 2002-02	S5YY2304E① 2003-12			ELECTRICAL SYSTEM	YY23
S5YY2404E 2002-02	S5YY2404E① 2003-12			COMPONENTS SYSTEM	YY24
S5YY2504E 2002-02	S5YY2504E① 2003-12			AIR-CONDITIONER SYSTEM	YY25
——	——			——	
S5YY3104E 2002-02	S5YY3104E① 2003-12		DISASSEMBLING	DISASSEMBLING AND ASSEMBLING	YY31
S5YY3204E 2002-02	S5YY3204E① 2003-12			ATTACHMENT	YY32
S5YY3304E 2002-02	S5YY3304E① 2003-12			UPPER STRUCTURE	YY33
S5YY3404E 2002-02	S5YY3404E① 2003-12			TRAVEL SYSTEM	YY34
S5YY4104E 2002-02	S5YY4104E① 2003-12		TROUBLESHOOTING	MECHATRO CONTROL	YY41
S5YY4204E 2002-02	S5YY4204E① 2003-12			HYDRAULIC	YY42
S5YY4304E 2002-02	S5YY4304E① 2003-12			ELECTRICAL	YY43
S5YY4404E 2002-02	S5YY4404E① 2003-12			ENGINE	YY44
S5YY5104E 2002-02	S5YY5104E① 2003-12		E/G	ENGINE	YY51
S5YY6304E 2002-05	S5YY6304E① 2003-12		OPT.	MOUNTING THE BREAKER AND NIBBLER & BREAKER	YY63
YV02-01701～ YY02-03001～ YH02-01301～ LK02-01041～	YV02-01701～ YY02-03001～ YH02-01301～ LK02-01041～ YV03-02194～ YY03-04464～ YH03-02077～ LK03-01107～			APPLICABLE MACHINES	

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1.3.2 OPERATION

(1) Summary

Regulator KR36-0E01 for the inline axial piston pump K3V series is of electric flow control type that regulates the tilting angle (delivery rate) of the pump as the command current I to the solenoid proportional reducing valve is varied.

This regulator is of positive flow control type that increases the delivery flow Q as the command current I increases.

If an electric current is put in by this control according to the flow needed for the operation, the pump delivers at a flow rate that is only required by the pump, consequently holding down unwanted power consumption.

(2) Positive control.

As shown in the figure on the right, the regulator regulates the delivery rate of the pump by command current I.

1) Flow increasing action

As the command current I rises, the secondary pressure of solenoid proportional reducing valve (079) increases. This causes spool (652) to move via pilot piston (643) and stops where the hydraulic pressure pushing the spool rightwards balances with the action of pilot spring (646).

If the spool (652) moves, port Cℓ opens to the tank port. This causes the pressure of the large diameter part of servo piston (532) to go away. This causes the servo piston (532) to the left by delivery pressure P1 of the small diameter part, resulting in an increase in the tilting angle α.

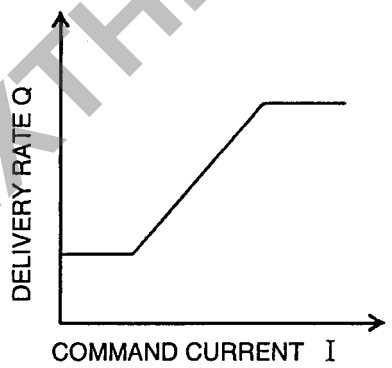


Fig.1-11 Positive flow control

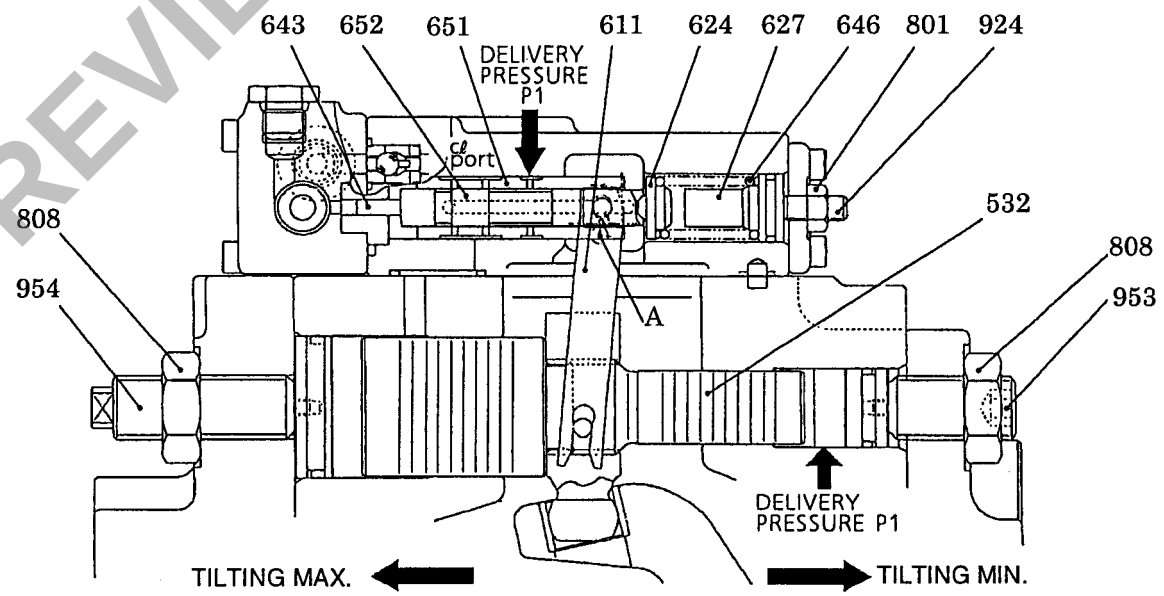


Fig. 1-12 Functions of regulator

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(2) Pump's oil flow rate is extremely low and delivery pressure is not available.

Cause	Remedy	Remark
1. Regulator is out of order	1) Repair regulator.	1) Refer to Regulator Manual.
2. Pump's internal parts are seized or broken.	2) Replace damaged parts.	2) Check filter and drain oil.
3. Attached pump is out of order.	3) Replace damaged parts.	3) Remove attached pump and check shaft joint.
4. Attached valve is out of order.	4) Check attached valve. Particularly poppet, seat and spring.	4) Refer to Manual for Attached Valve.
5. Regulator is piped incorrectly.	5) Pipe correctly.	

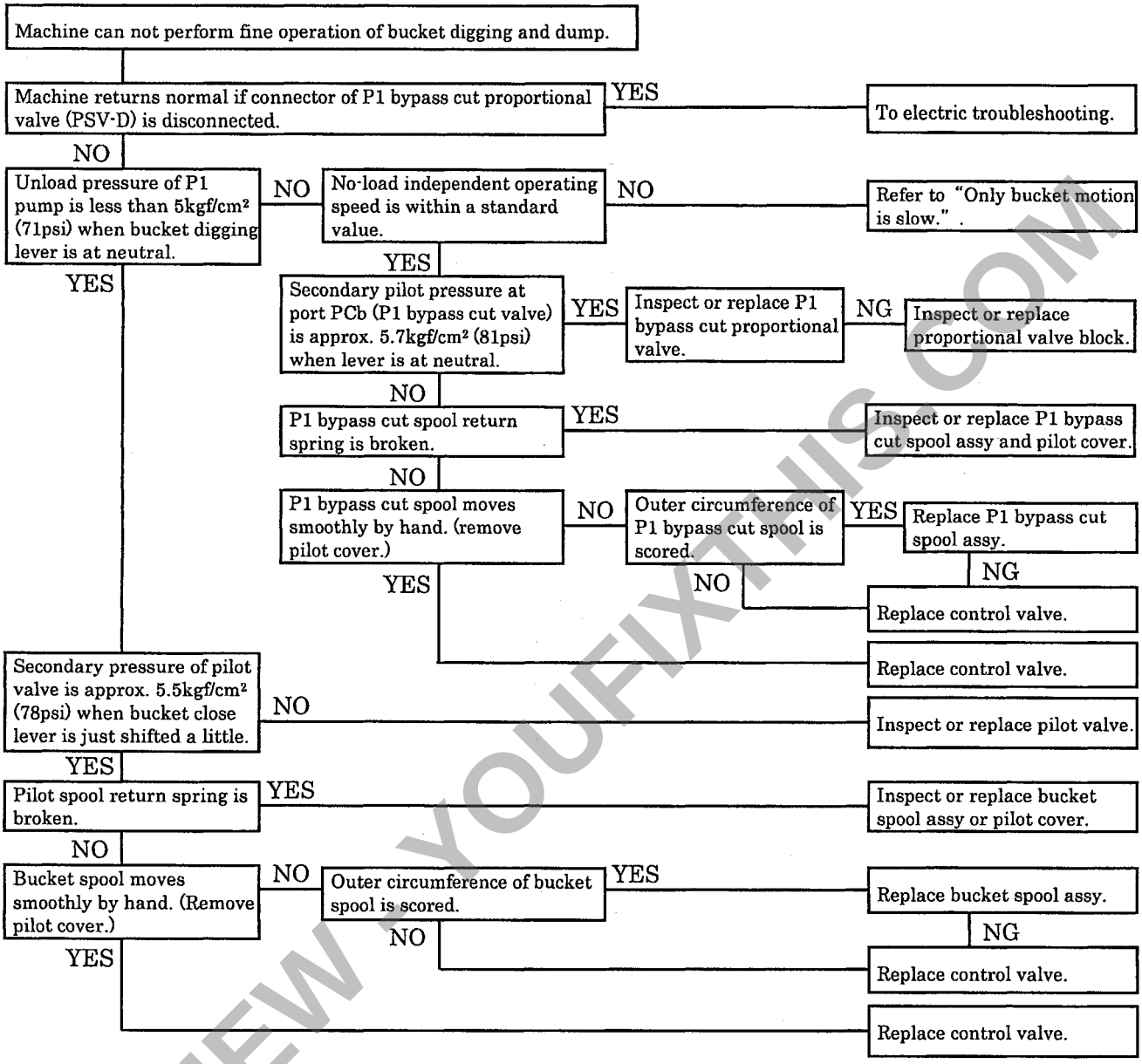
(3) Abnormal Sound and Vibration

Cause	Remedy	Remark
1. Cavitation	1) Prevent cavitation. Check that hydraulic oil is not clouded.	1-1) The boost pressure is low. 1-2) The attached pump is in trouble. 1-3) The suction pipe is inhaling air. 1-4) The suction resistance is high.
2. Caulked part of shoe is broken.	2) Replace piston shoe and shoe plate.	
3. Cylinder is cracked	3) Replace cylinder.	
4. Pump is installed improperly.	4) Correct installation.	
5. Regulator is hunting.	5) Repair regulator,	5) See Regulator Manual.
6. Relief valve in attached valve is hunting.	6) Repair attached valve.	6) See the Manual for Attached Valve.

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(4)-1



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