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Electrical System

Attachments

BE AWARE OF HEIGHT OBSTACLES

Any type of object in the vicinity of the boom could represent a potential hazard, or cause the operator to react suddenly and cause an accident. Use a spotter or signal person working near bridges, phone lines, work site scaffolds, or other obstructions.

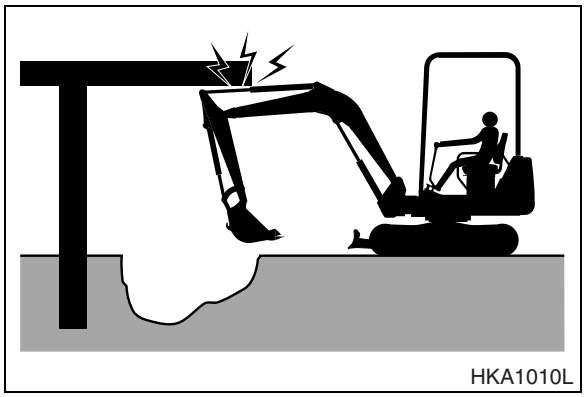

Figure 4

USE CARE ON LOOSE SUPPORT

Working heavy loads over loose, soft ground or uneven, broken terrain can cause dangerous side load conditions and possible tipover and injury. Travel without a load or balanced load may also be hazardous.

If temperatures are changing, be cautious of dark and wet patches when working or traveling over frozen ground. Stay away from ditches, overhangs and all other weak support surfaces. Halt work and install support mats or blocking if work is required in an area of poor track support.

USE SOLID SUPPORT BLOCKING

Never rely on lift jacks or other inadequate supports when work is being done. Block tracks fore and aft to prevent any movement.

OVERHANGS ARE DANGEROUS

Digging the work face under an overhang - the work area beneath a cliff or under the edge of a ditch - is dangerous. Know the height and reach limits of the excavator and plan ahead while working. Avoid creating dangerous situations by moving around the work site while making excavations. Go onto another digging area before steep overhangs are formed. Working around deep pits or along high walls or trenching may require support blocks, especially after heavy rainfalls or during spring thaws. Park the excavator away from overhangs before work shut down.

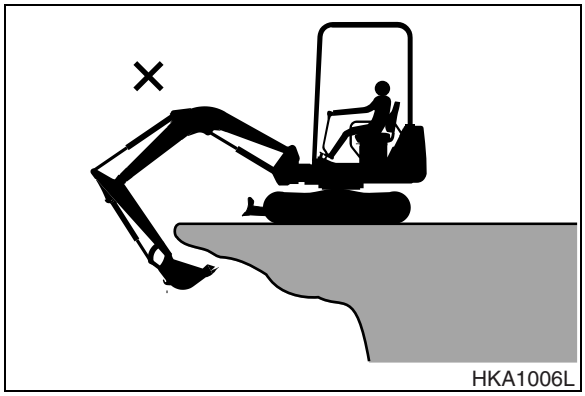

Figure 5

USE SOLID SUPPORT BLOCKING

Never rely on lift jacks or other inadequate supports when work is being done. Block tracks fore and aft to prevent any movement.

EXCAVATOR PERFORMANCE STANDARDS

Evaluation of equipment performance and operating condition can be made by running the excavator through a series of different tests, and recording results with a stop watch and tape measure.

Compare results of performance tests against the specifications and standards that follow, which are for equipment in new or renewed condition.

TEST CONDITIONS

1. All tests should be performed on a flat, level, firmly supporting ground surface.
2. All recommended, applicable maintenance and adjustment service should be completed before testing.
3. Hydraulic fluid and engine oil should be of appropriate viscosity for ambient weather conditions. Warm up hydraulic oil to standard operating temperature, between 45° - 55°C (112° - 135°F).
4. Run all tests with the engine speed control set to maximum rpm.

SWING SPEED TEST

Extend the bucket cylinder completely and retract the arm cylinder, as shown in Figure 6, to test swing speed. The lowest point of the bucket will be approximately 1 m (3.3') off the ground.

Use paint marks at the same point on the turntable and undercarriage, or select alternate measuring locations and use a stopwatch to time 3 full 360° rotations. Measure the time it takes for the turn table to swing 3 revolutions.

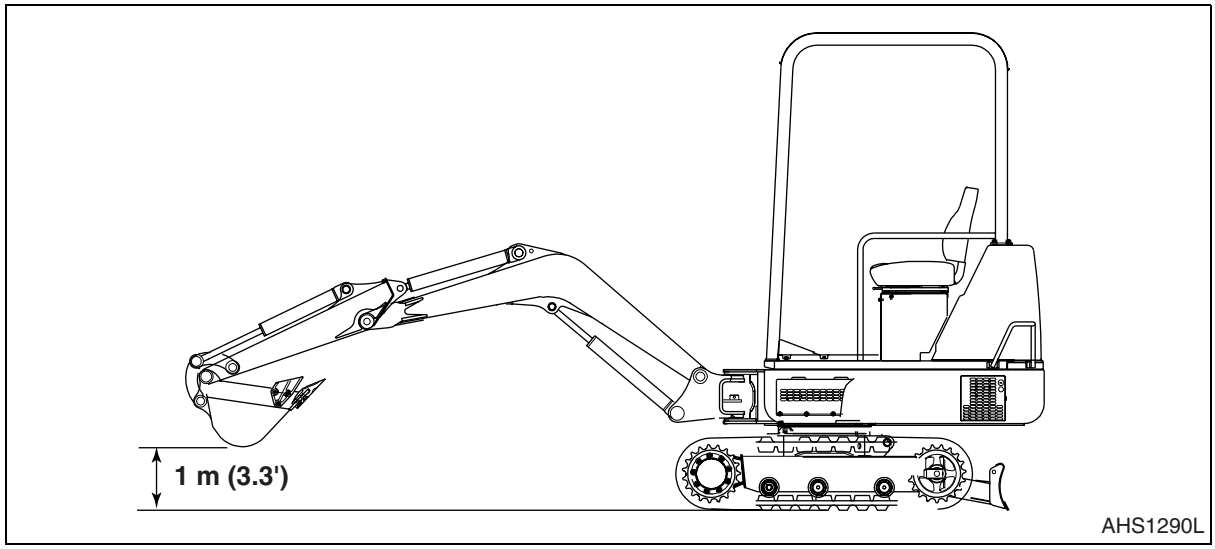

Figure 6

	S/N 30001 and Up
Swing (3 Revolutions)	16.5 ±1.0 sec.

Heat Discoloration

Heat discoloration can range from faint yellow to dark blue resulting from overload or incorrect lubrication.

Excessive heat can cause softening of races or rollers.

To check for loss of temper on races or rollers, a simple file test may be made. A file drawn over a tempered part will grab and cut metal, whereas a file drawn over a hard part will glide readily with no metal cutting.

Replace bearing if over heating damage is indicated. Check seals and other related parts for damage.

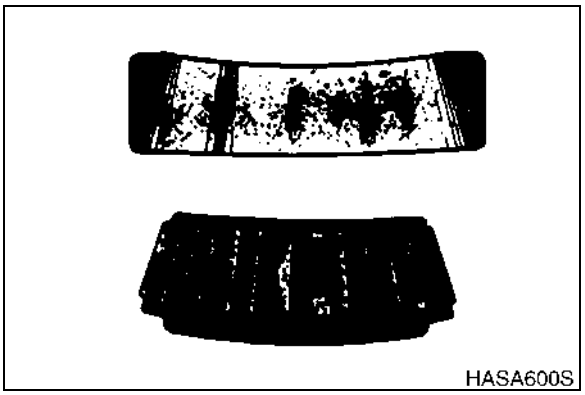

Figure 17

Stain Discoloration

Discoloration can range from light brown to black caused by incorrect lubrication or moisture.

if the stain can be removed by light polishing or if no evidence of overheating is visible, the bearing can be reused.

Check seals and other related parts for damage.

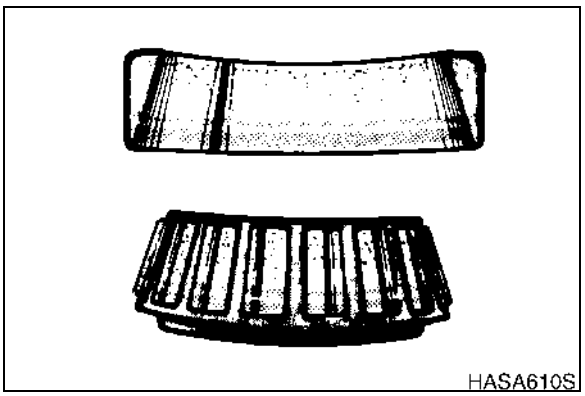

Figure 18

D. When installing nozzle, use following values of tightening torque:

NOTE: *Nozzle tightening (to cylinder head) torque: 5.0 - 6.0 kg•m (36 - 43 ft lb).*

NOTE: *Nozzle retaining nut tightening torque: 3.5 - 4.0 kg•m (25 - 29 ft lb).*

NOTE: *Nozzle union collar tightening torque: 2.5 - 3.0 kg•m (18 - 22 ft lb).*

2. Chattering test.

Operate tester handle at a speed of about 1 stroke per second.

A. Needle valve oscillation.

It is considered normal if nozzle injects fuel mist, making intermittent sounds, and oscillations of needle valve are transmitted to handle.

B. State of fuel mist injection.

The nozzle should inject mist straight in direction of its axis. A nozzle is defective if it does not inject steadily or it injects fuel in several separate stripes.

A nozzle is defective if it spills fuel accumulated on bottom of nozzle after chattering test. However, a very small drop of fuel remaining on tip of nozzle after chattering test may be regarded as normal.

3. Injection test.

Operate tester handle at a speed of 4 - 6 strokes per second.

NOTE: *A nozzle should inject fuel mist uniformly in shape of a cone.*

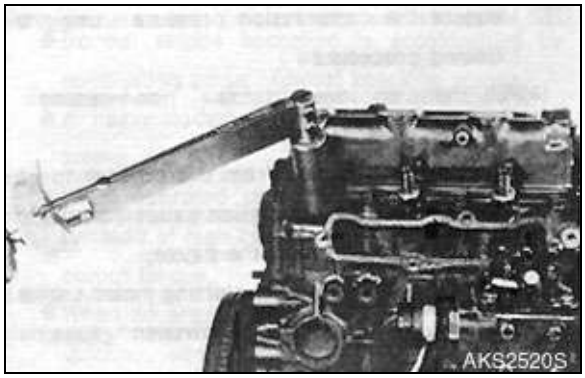

Figure 33 INSTALLING NOZZLE ASSEMBLY

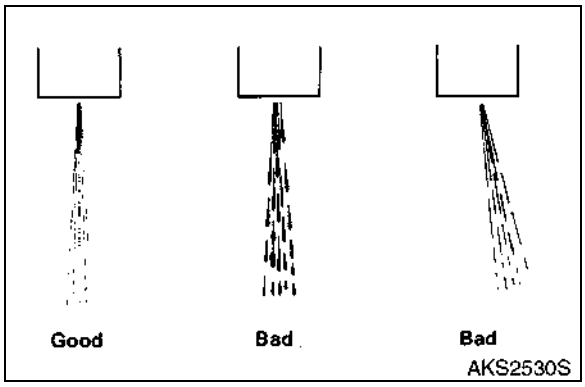

Figure 34 CHATTERING TEST

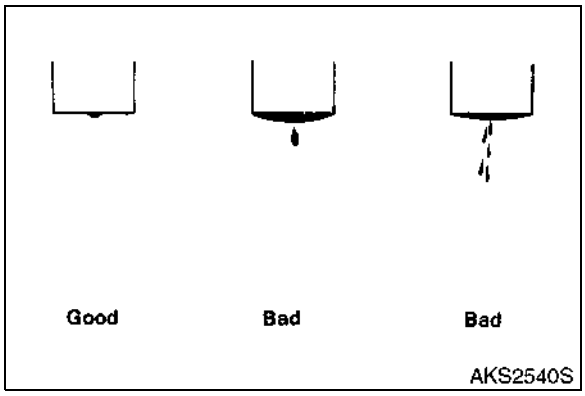

Figure 35 AFTER SPILLING

Inspection

If any parts are found defective, repair or replace them.

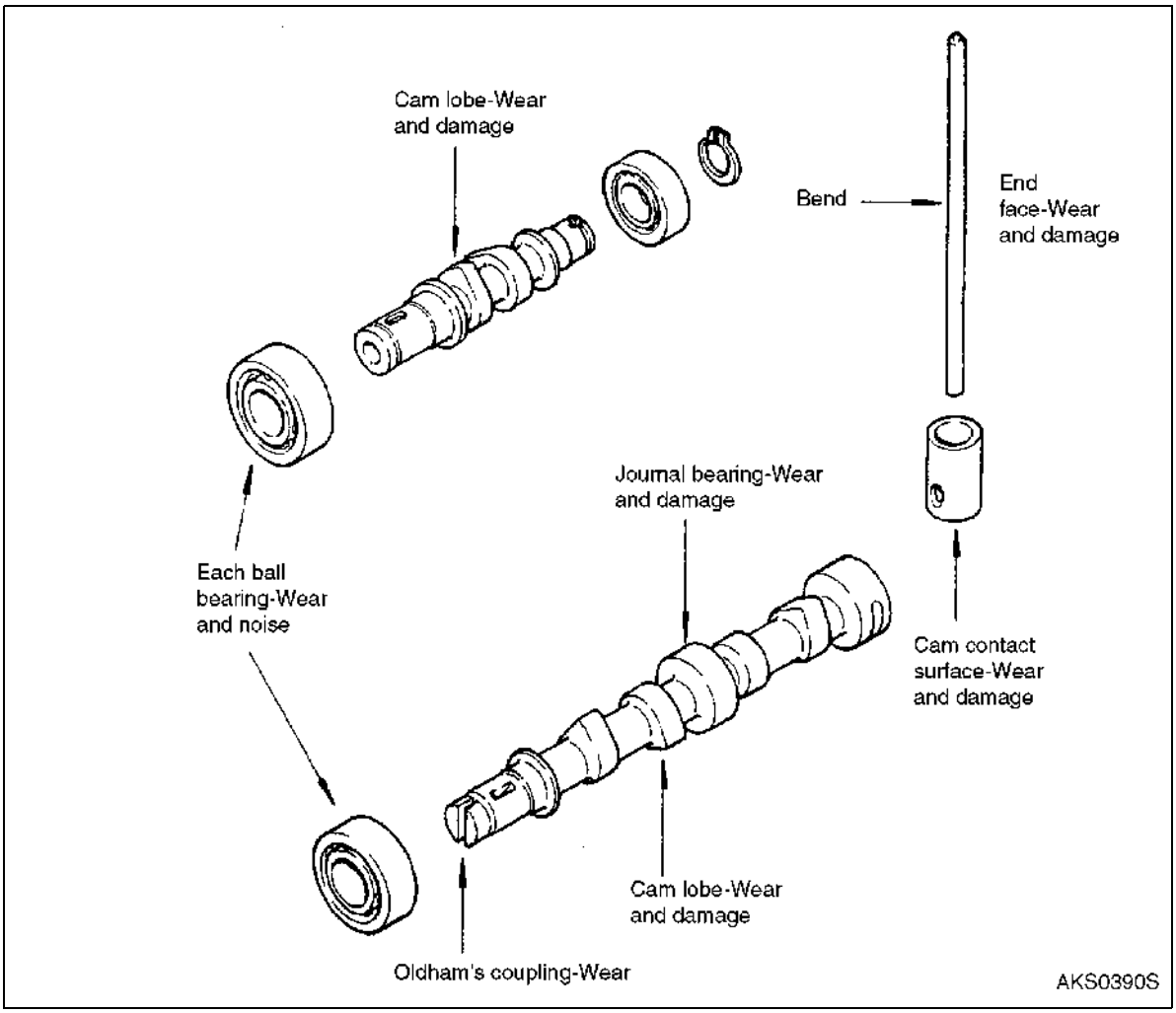

Figure 73 INSPECTION OF CAMSHAFTS

Major Diameter of Injection Pump Cam	
Standard Valve	30.0 mm (1.1811 in)
Service Limit	-0.70 mm (-0.0276 in)

Major Diameter of Valve Cam	
Standard Valve	27.370 mm (1.0776 in)
Service Limit	-1.0 mm (-0.0394 in)

E. Read voltmeter indication (regulated voltage) under the following test conditions: Ammeter indication is below 5 A; engine speed is at 1800 rpm and 2500 rpm; and lights are switched off. Regulated voltage shows a tendency to decrease as alternator temperature increases.

3. Output inspection.

   A. Disconnect grounding cable from battery.

   B. Interpose an ammeter between battery and alternator terminal "B." Ground terminal "B" through a voltmeter.

   C. Connect battery grounding cable.

   D. Start engine.

   E. Apply all load including lights.

   F. Increase engine sped until normal alternator speed is attained. Read maximum indication of ammeter at 13.5 V of voltmeter indication. Output current must conform to specification.

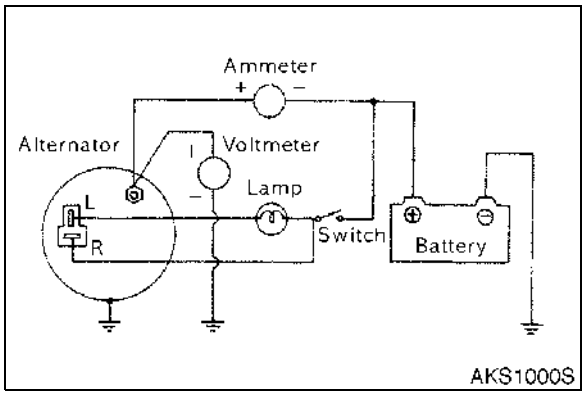

Figure 149 CHECKING FOR OUTPUT

Description		12 V X 35 A	12 V X 40 A
Alternator Output at 13.5 V	Cold	7 A @ 1300 rpm	----------
		30 A @ 2500 rpm	----------
	Hot	3 A @ 1300 rpm	----------
		23 A @ 2500 rpm	21 A @ 2500 rpm
		36 A @ 5000 rpm	37 A @ 5000 rpm

Removal

1. Disconnect battery cable.
2. Disconnect lead wire from terminal "B" on back of alternator.
3. Disconnect alternator connector.
4. Loosen alternator brace bolt and support bolt. Push alternator toward engine and remove fan belt.
5. Demount alternator.

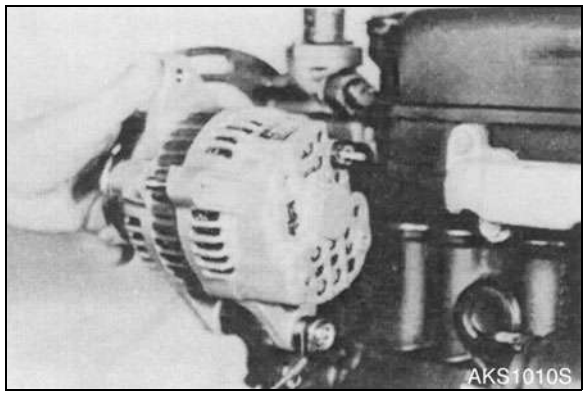

Figure 150 REMOVING ALTERNATOR

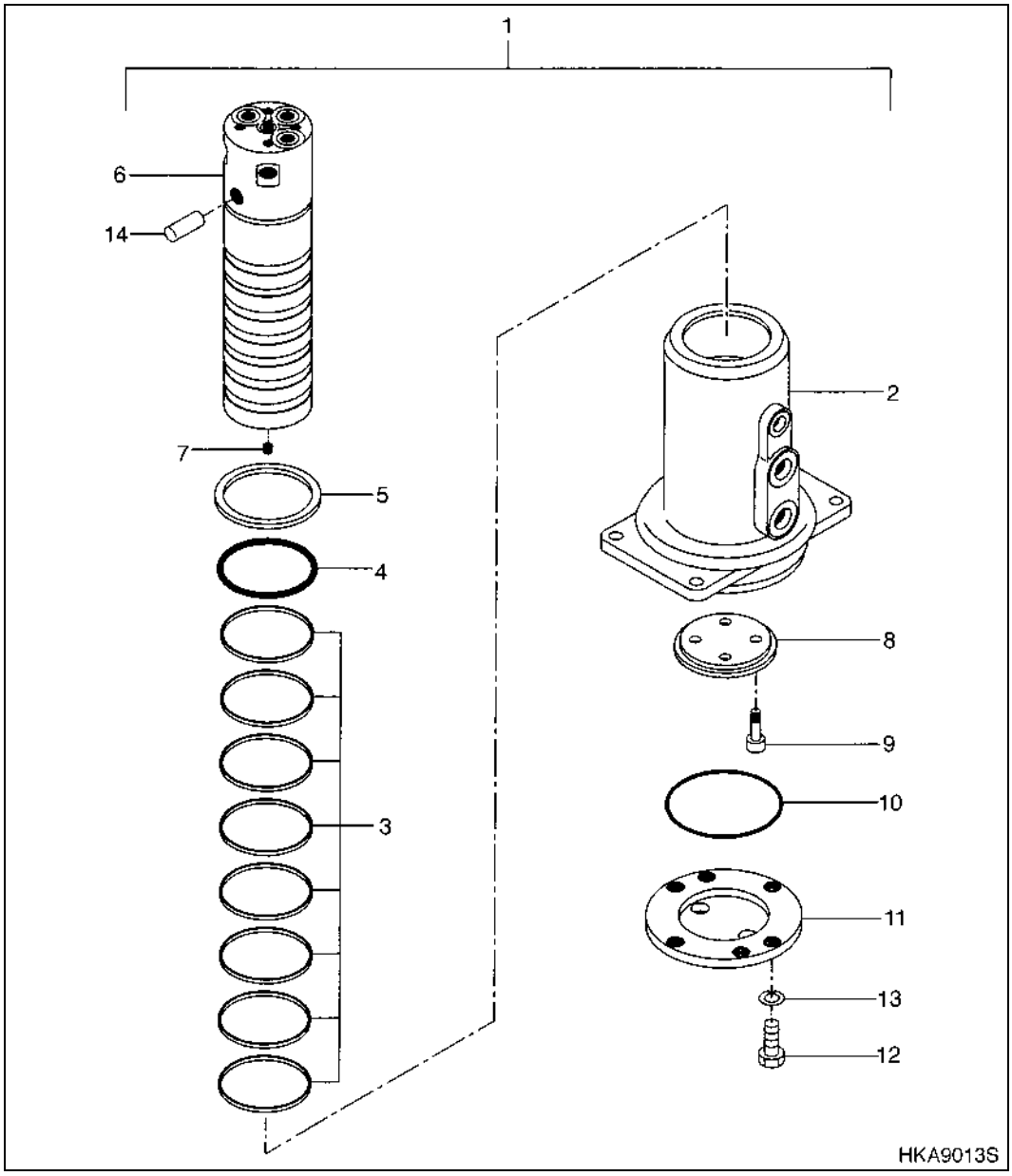

Figure 2 Solar 015 / 015 PLUS

Reference Number	Description
1	Center Joint Assembly
2	Body
3	Slipper Seal
4	O-ring
5	Dust Wiper
6	Spindle
7	Hex Head Plug

Reference Number	Description
8	Thrust Plate
9	Hex Head Bolt
10	O-ring
11	Cover
12	Hex Head Bolt
13	Spring Washer
14	Pin

8. Remove pinion gear using a plastic hammer or press.

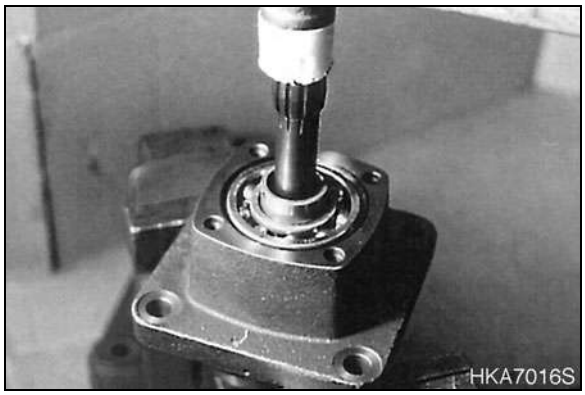

Figure 15

9. Detach X-ring from bearing housing.

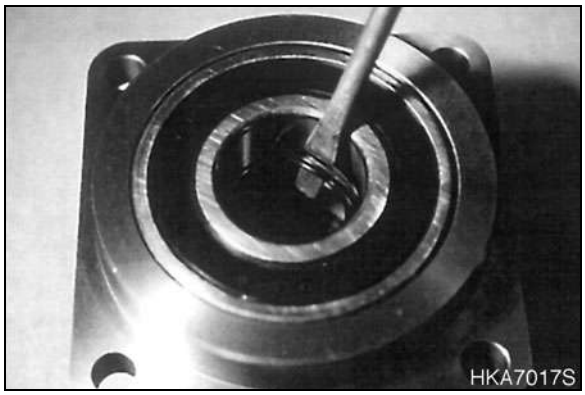

Figure 16

10. Remove ball bearing by punching the inner face seal of bearing with a lock pin punch.

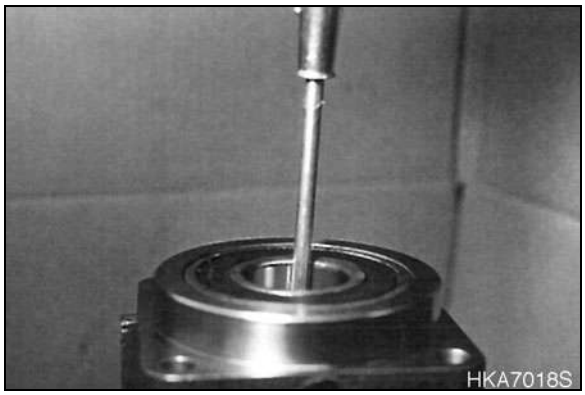

Figure 17

11. Remove ball bearing from bearing housing.

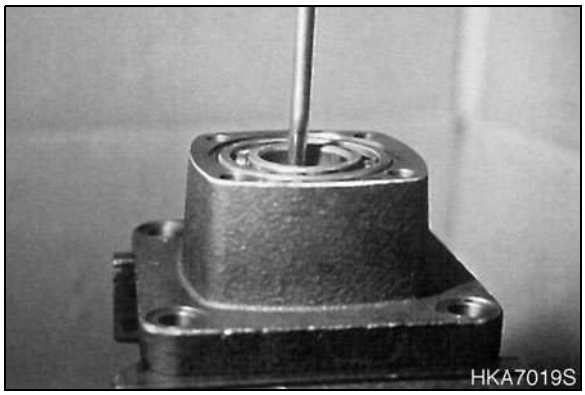

Figure 18

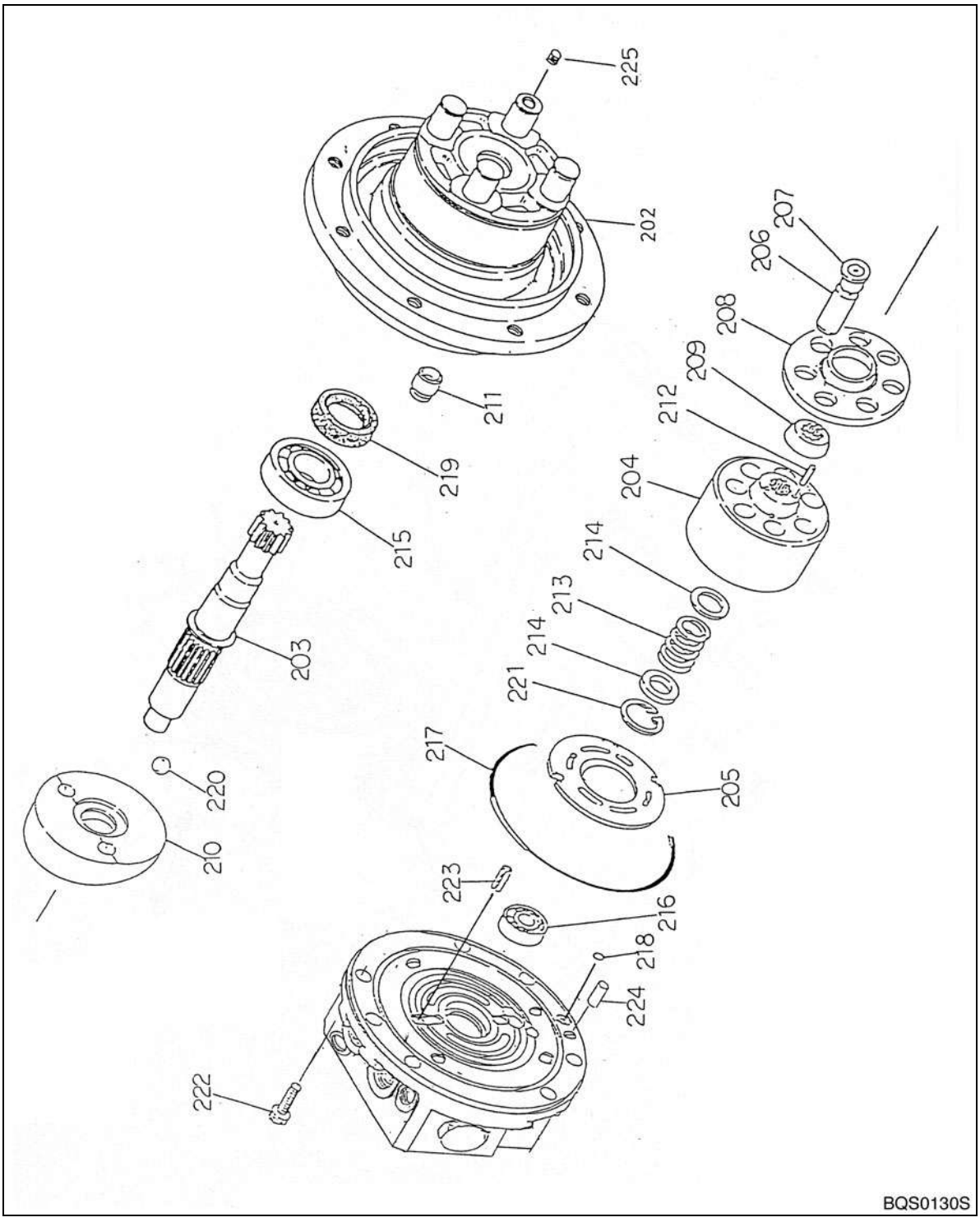
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Figure 10

GENERAL DESCRIPTION

THEORY OF OPERATION

The pilot control valve contains four push rods, a spring holder and return spring, which are in the valve casing. The valve works as a pressure reduction valve. The housing has six ports, which include input port "P," tank port "T" and four secondary pressure ports.

The electric horn button is installed in the valve handle. Gear pump pressure is used for operating control spools.

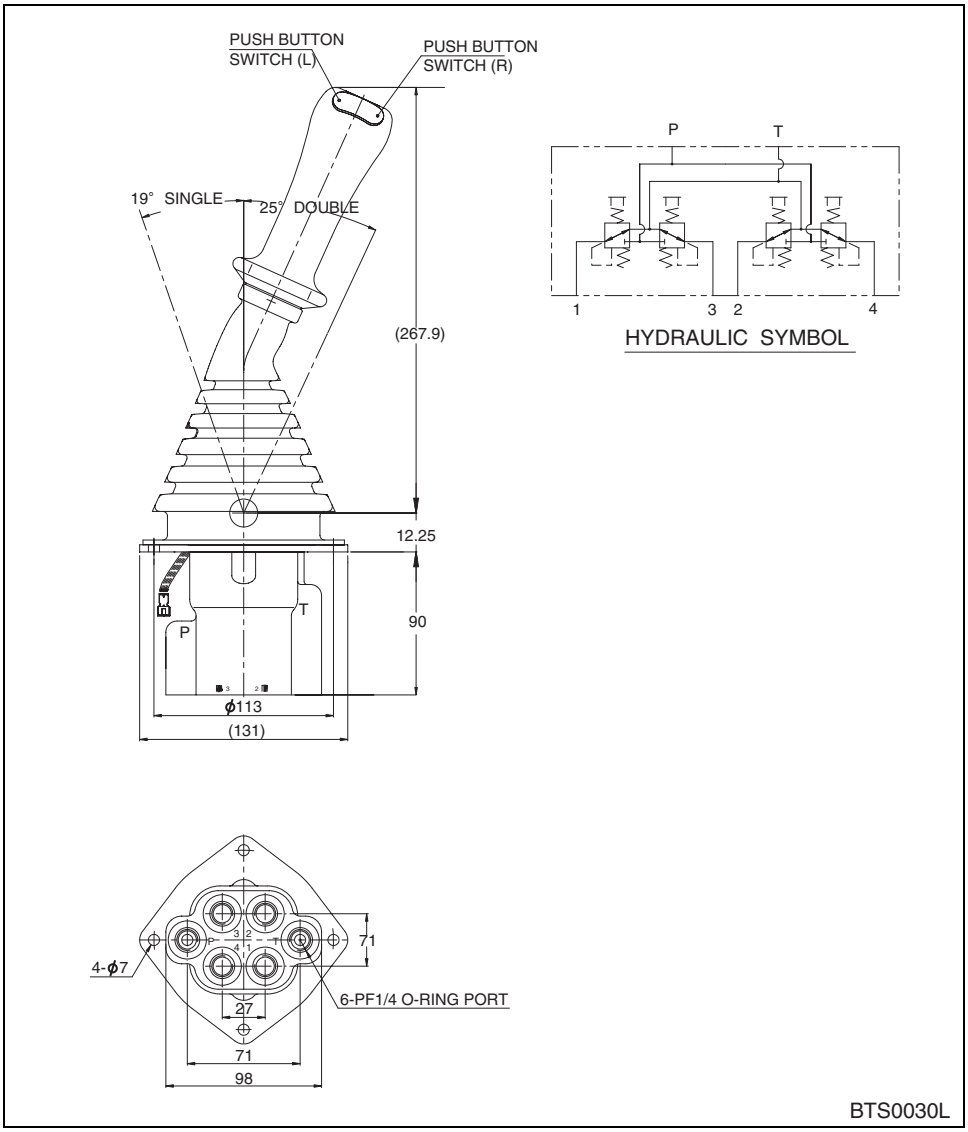

Figure 1

Maximum Primary Pressure	40 kg/cm^2 (569 psi)
Permissible Exhaust Pressure	3 kg/cm^2 (43 psi)
Rated Flow	20 liters (5.5 U.S. gal.)

2. Cover disassembly.

   Use a jig to keep cover horizontal, gently loosen hex socket screw (for attaching) of jig, and then remove cover.

   NOTE: *Be careful of control plate mounted inside.*

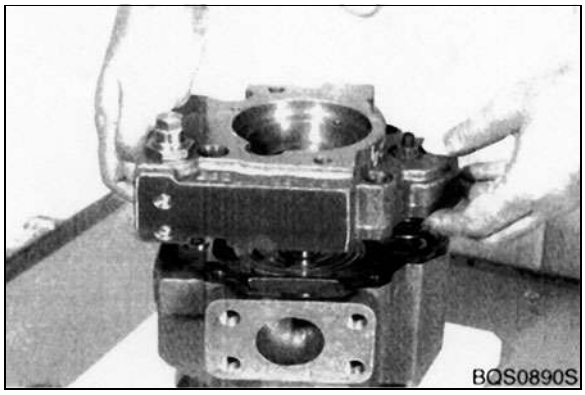

Figure 17

Hex socket screw for attaching.

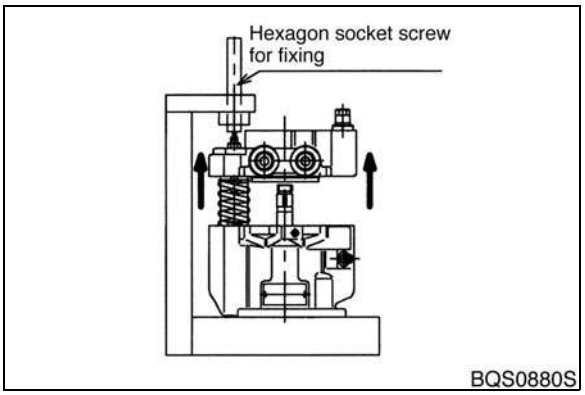

Figure 18

3. Cover removed.

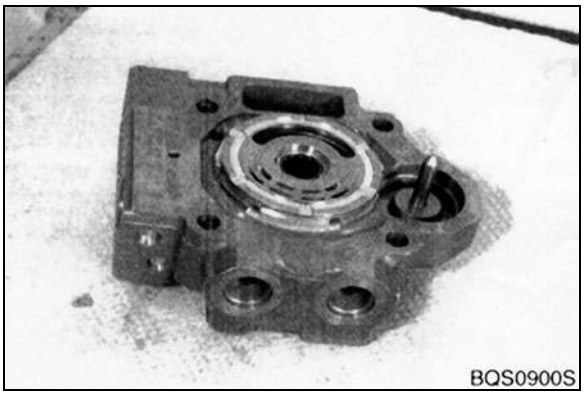

Figure 19

4. Remove packing.

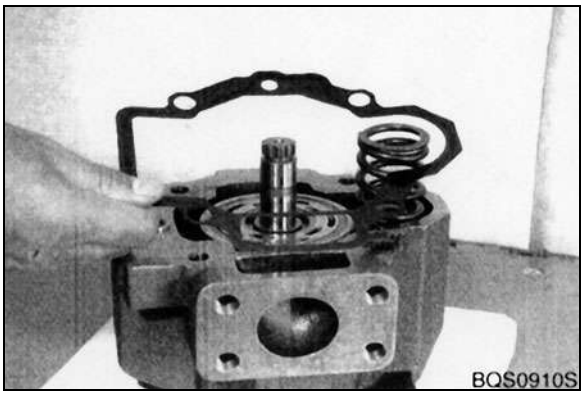

Figure 20

RELIEF VALVE REASSEMBLY

1. Position spool into cover.

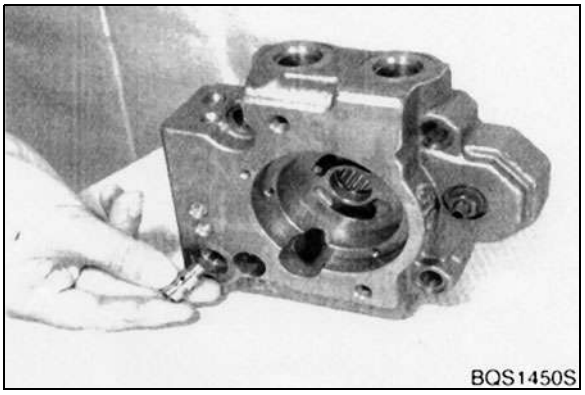

Figure 74

2. Assemble spring.

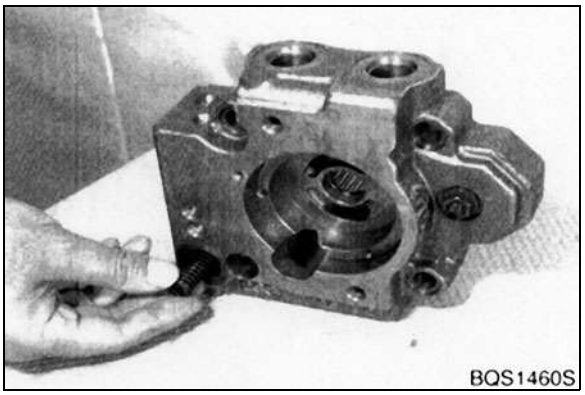

Figure 75

3. Assemble shim to adjust screw.

Figure 76

4. Assemble adjust screw.

   Spanner 14 mm

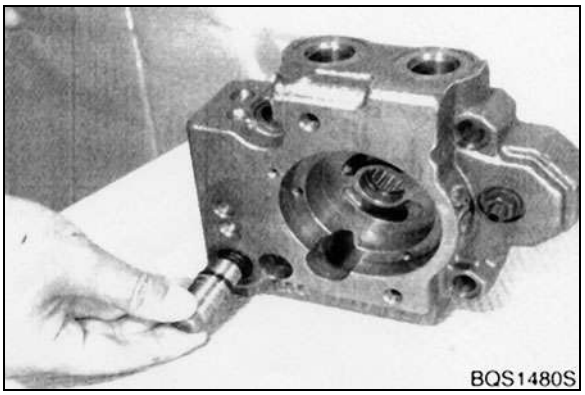

Figure 77

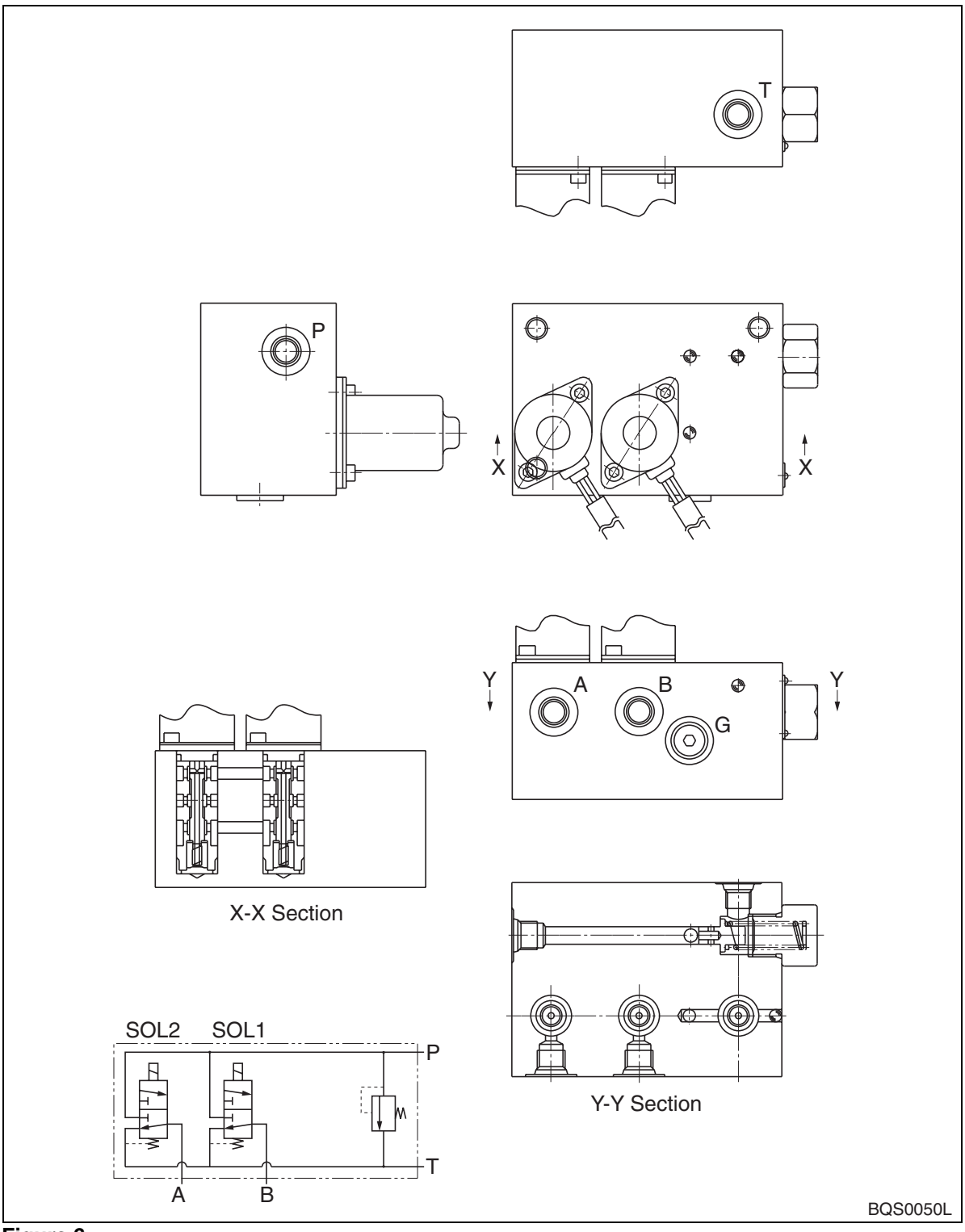

Figure 6