TABLE OF CONTENTS

Electrical System

Attachments

WORK-SITE PRECAUTIONS

ATTACHMENT PRECAUTIONS

Options kits are available through your dealer. Contact Daewoo for information on available one-way (single-acting) and two-way (double-acting) piping/valving/ auxiliary control kits. Because Daewoo cannot anticipate, identify or test all attachments that owners may wish to install on their machines, please contact Daewoo for authorization and approval of attachments, and their compatibility with options kits.

AVOID HIGH-VOLTAGE CABLES

Serious injury or death can result from contact or proximity to high-voltage electric lines. The bucket does not have to make physical contact with power lines for current to be transmitted.

Use a spotter and hand signals to stay away from power lines not clearly visible to operator.

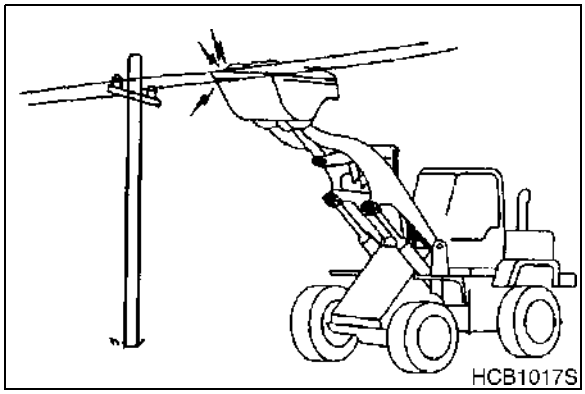

Figure 1

VOLTAGE	MINIMUM SAFE DISTANCE
6.6kV	3 m (9' - 10")
33.0kV	4 m (13' - 1")
66.0kV	5 m (16' - 5")
154.0kV	8 m (26' - 3")
275.0kV	10 m (32' - 10")

Use these minimum distances as a guideline only. Depending upon voltage in line and atmospheric conditions, strong current shocks can occur with boom or bucket as far away as 4 - 6 m (13 - 20 ft) from power line. Very high voltage and rainy weather could further decrease that safety margin.

NOTE: *Before starting any type of operation near power lines (either above ground or buried cable-type) you should always contact power utility directly and work out a safety plan with them.*

BEFORE STARTING TO DIG, CONTACT AUTHORITIES

Below ground hazards also include natural gas lines, water mains, tunnels and buried foundations. Know what's underneath work site before starting to dig.

BE AWARE OF HEIGHT OBSTACLES

Any type of object in vicinity of boom could represent a potential hazard, or cause 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.

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.

WORKING RANGE AND DIMENSIONS

Figure 3, illustrates exterior machine dimensions and working range of machine when it is equipped with a standard bucket.

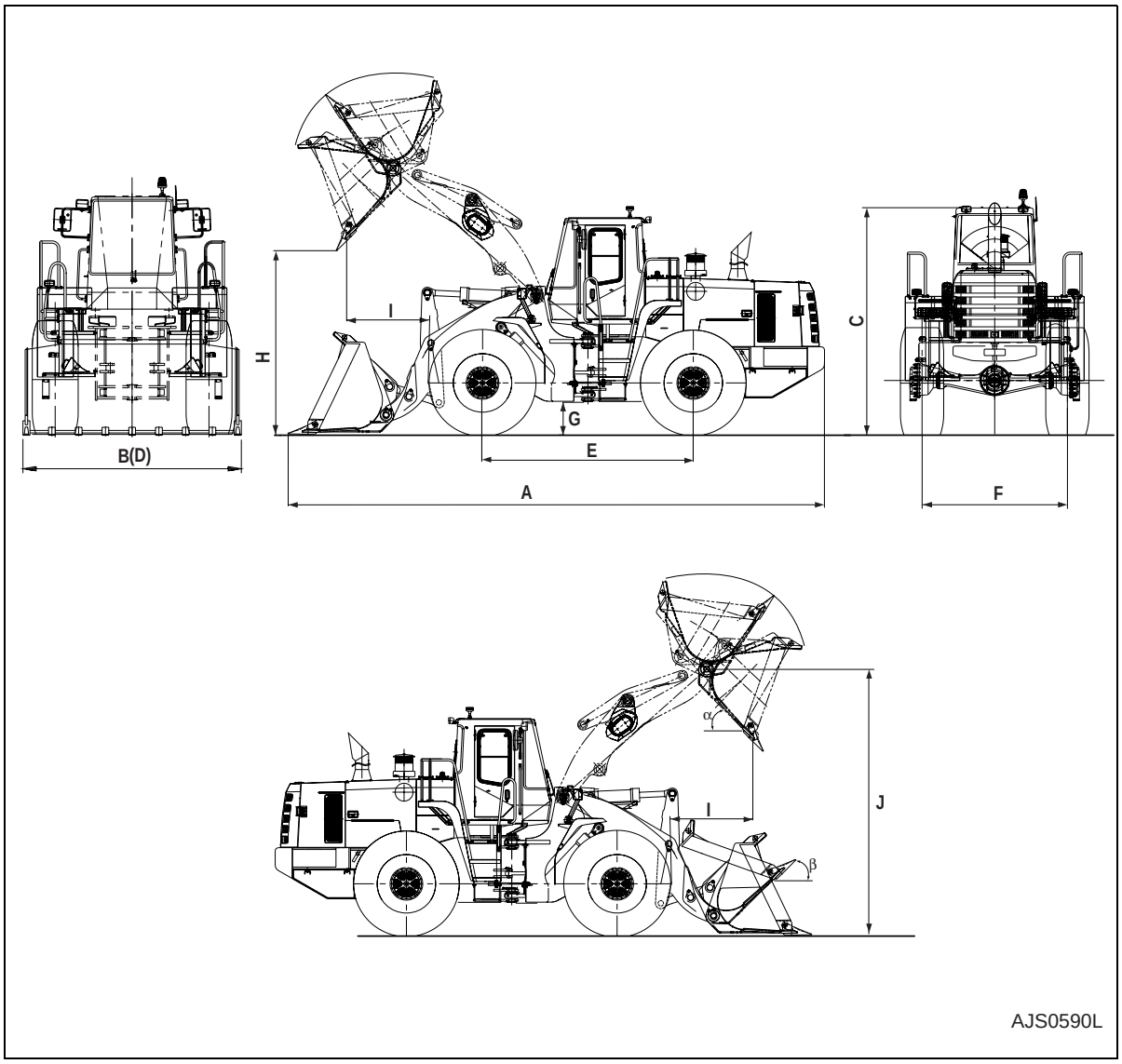

Figure 3

scratching. Curling under of any seal lip will seriously impair its efficiency. Apply a thin coat of Loctite #120 to outer diameter, of metal casing, on oil seals to assure an oil tight fit into retainer. Use extreme care not to get Loctite on lips of oil seals. If this happens, that portion of the seal will become brittle and allow leakage.

When replacing lip type seals, make sure spring loaded side is towards oil to be sealed.

5. If available, use magna-flux or similar process for checking for cracks that are not visible to the eye. Examine teeth on all gears carefully for wear, pitting, chipping, nicks, cracks or scores. Replace all gears showing cracks or spots where case hardening has worn through. Small nicks may be removed with suitable hone. Inspect shafts and quills to make certain they have not been sprung, bent, or splines twisted, and that shafts are true.

   NOTE: *Spline wear is not considered detrimental except where it affects tightness of splined parts.*

   Inspect thrust washers for distortion, scores, burs, and wear. Replace thrust washer if defective or worn.

6. Inspect bores and bearing surfaces of cast parts and machined surfaces for scratches, wear, grooves and dirt. Remove any scratches and burrs with crocus cloth. Remove foreign matter. Replace any parts that are deeply grooved or scratched which would affect their operation.

BEARING INSPECTION

The conditions of the bearing are vital to the smooth and efficient operation of the machinery. When any component containing bearings is disassembled, always carefully examine the condition of the bearings and all of its components for wear and damage.

Once the bearing is removed, clean all parts thoroughly using a suitable cleaning solution. If the bearing is excessively dirty soak the bearing assembly in a light solution and move the bearing around until all lubricants and or foreign materials are dissolved and the parts are thoroughly clean.

When drying bearings, moisture free compressed air can be used. Be careful not to direct the air in a direction which will force the bearing to dry spin while not being properly lubricated.

After the bearings have been cleaned and dried, carefully inspect all bearing rollers, cages and cups for wear, chipping or nicks. If the bearing can not be removed and is to be inspected in place, check foe roughness of rotation, scoring, pitting, cracked or chipped races. If any of these defects are found replace the whole bearing assembly. NEVER replace the bearing alone without replacing the mating cup or the cone at the same time.

After inspection lightly coat the bearing and related parts with oil and wrap in a clean lintless cloth or paper and protect them from moisture and other foreign materials until installation.

It is also important to inspect the bearing housing and/or shaft for grooved, galled or burred conditions that indicate that the bearing has been turning in its housing or on its shaft.

If available, use magna-flux or similar process for checking for cracks that are not visible to the naked eye.

The following illustrations will aid in identifying and diagnosing some of the bearing related problems.

NOTE: *The illustrations will only show tapered roller bearings, but the principles of identifying, diagnosing and remedying the defects are common to all styles and types of bearings.*

GENERAL DESCRIPTION

OUTLINE

		Front Axle
Type		Frame-Fixed, Semi-Floating
Overall Reduction Ratio		24.685
Differential type	STD.	Max. Trac (Locking Ration: 35%)
	OPT.	Super Max Trac (Limited Slip: 50%)
Max Static Load		46,900.0 kg (103,400 lbs)
Max Output Torque		17,500.0 kg•m (126,580 ft lbs)
Brake	Type	Multi Wet Disc
	Torque	4,263 kg•m at 80 Bar (30,834 ft lbs at 1,160 psi)
Parking Brake	Torque	360.0 kg•m (2,600 ft lbs)
	Release Press.	70 - 140 Bar (1,015 - 2,030 psi)
Drive Flange		8.5 C

DRIVE AXLE

The drive axle consists of the differential, final reduction gear assembly, wet type hydraulic disk brake unit, and axle shafts to which wheels are attached.

The power from the drive unit is transmitted through the drive shafts to the front and rear drive axles. The power is then transmitted to the differential where it is divided into the right and left axle shafts to the final reduction gear assembly on each shaft end, thus driving the wheels.

The wet type hydraulic disk brake unit is installed in front of the final reduction gear assembly and serves as a service brake.

Axle Mount

The front axle is bolted directly to the front frame.

The rear axle is supported by the trunnion method in which axle supports are installed across the rear axle and bolted to the rear frame. Consequently, the rear axle is cradled up and down around the center line of the differential according to the ground condition the loader travels. The trunnion-mounted drive axle helps improve operator comfort because loaders with a trunnion-mounted drive axle jolt less than those with the conventional cradle-supported drive axle, when they travel on bad ground conditions.

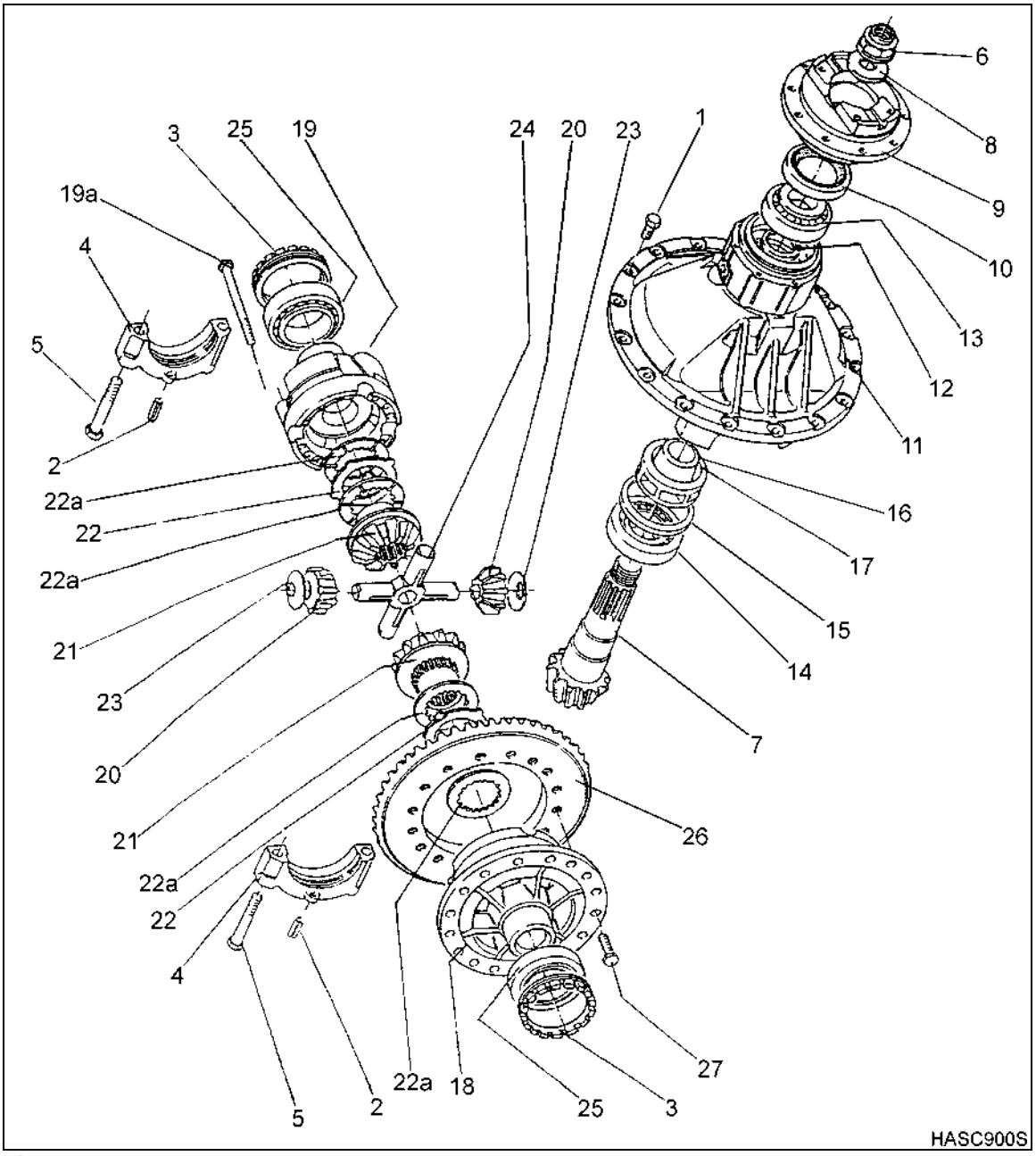

Figure 13

4. Hammer out spring pins (2) locking slotted rings (3).
5. Mark caps (4) to match parts at reassembly.
6. Remove screws (5), caps (4), and slotted rings (3).
7. Remove differential case assembly from support (11).
8. Straighten locking notches on pinion nut collar (6), position reaction tool on drive flange to unlock nut (6), release pinion nut, remove drive flange (9) from pinion shank along with washer (8).
9. Pry seal (10) from drive flange.

DISASSEMBLY

1. Unlock right and left counternuts (1) of adjustment sleeve (2).
2. Remove nuts (3) retaining hydraulic cylinder (5) to bracket (4), then undo sleeve (2) and remove cylinder (5).
3. Undo two screws (7) securing caliper to support, then remove brake caliper assembly (6).
4. Undo eight screws (8) and remove brake disc (9) from drive flange.
5. Remove split pin (10) from stem (14), unscrew spring reaction nut (11), then remove thrust washer (13) and spring (12).

   NOTE: *In case of leaks, remove stem (14) to replace seals (15) seated in cylinder body (5).*

REASSEMBLY

1. Reassembly hydraulic cylinder (5).
2. Mount brake disc (9) on drive flange and lock eight screws (8).

   NOTE: *Torque from 62 - 68 Nm (6.3 - 6.9 kg•m / 45 - 50 ft lb).*
3. Mount caliper assembly (6) to support and lock two screws (7).

   NOTE: *Torque from 185 - 205 Nm (18.9 - 20.9 kg•m / 136.3 - 151.2 ft lb).*
4. Mount hydraulic cylinder (5) on support (4) with lockwasher and two nuts (3).

   NOTE: *Torque from 43 - 48.7 Nm (4.4 - 5.0 kg•m / 31.7 - 35.9 ft lb).*
5. Connect linkage thru adjustment sleeve (2).

ADJUSTMENT

1. Apply pressure to cylinder (5) of 70 - 140 bar (1,015 - 2,030 psi), checking that stem (14) is at travel end (about 65 mm {2.56"} of spring compression.
2. Actuate sleeve (2) to adjust disc (9) to pad clearance up to 0.25 mm (0.009") reach on each side.

   NOTE: *For fine adjustment of clearance on each side of pads it is necessary to undo counternut (16) and actuate screw (17).*
3. Release pressure and check that stem (14) return travel is about 40 mm (1.58").
4. Restore pressure and check that clearance and travel remain unchanged (repeating many times).
5. Lock counternuts (1) and (16) of pad adjustment screws (17) and sleeve (2).

18. Using compressed air thru brake oil ducting, remove brake actuating piston (26) from wheel hub sleeve (27).
19. Remove and replace with new two O-rings (28) and (29) in seats on brake actuating piston.
20. Remove complete wheel hub (7).
21. Remove O-ring (8).
22. Pry off seal (30) from wheel hub (7), and remove inner race with roller cage of inner wheel bearing (31).
23. Using a proper remover, push out outer races of inner and outer wheel bearings (25) and (30) from wheel hub (7).

    NOTE: *Should sleeve (27) be damaged, it can be removed by undoing relevant screws (32). At reassembly, smear proper sealing compound on axle case joining flange, then tighten screws. Torque to 900 ± 45 N•m (91.8 ± 4.6 kg•m / 663.8 ± 30 ft lbs).*

24. Mark side gear pins (33), various components and seats (34) for identification of original position at reassembly.
25. Arrange side gear carrier (6) on wooden blocks and push out pins (33) with proper remover.
26. Pick up all needle rollers (35).

    NOTE: *It is important to keep matched needle rollers (35) and thrust washers (36) with relevant pin (33), this is consequent to predetermined assembly tolerance limits.*

27. Remove side gears (37) and relevant thrust washers (38).

    NOTE: *No gear can be removed prior to having released all of them.*

GENERAL DESCRIPTION

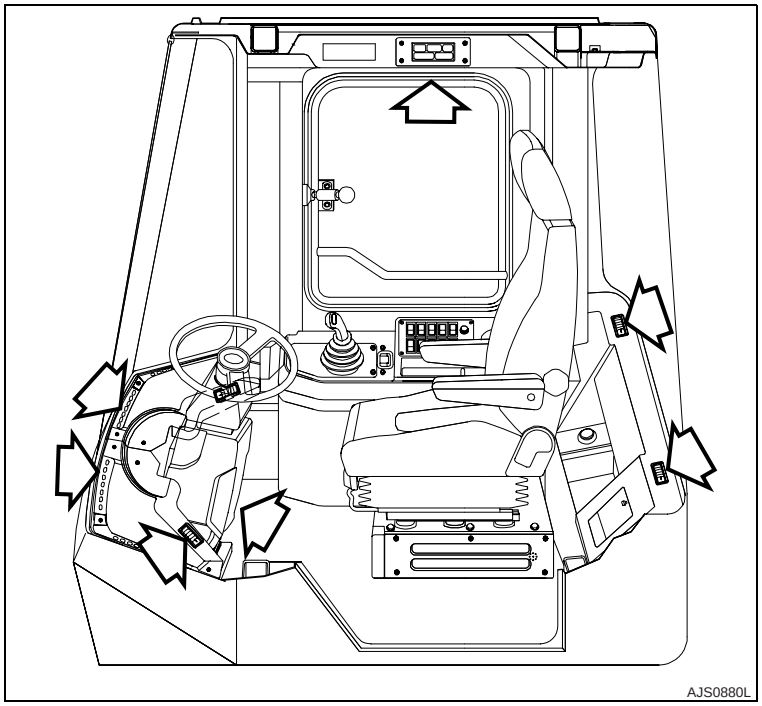

Figure 1

The heater and air-conditioner are combined into one blower unit located in the right control stand of operator's seat. If necessary, the operator can control inner temperature using the operation panel installed in the top of the right side door.

The unit is equipped with an air filtration system which filters out dirt and dust particles from air being circulated into the operator"s cab. This filter (1, Figure 2) should be cleaned out at approximately every 500 hours and replaced with a new one every 1000 hours.

NOTE: *In the event that the unit is being operated in a dusty environment, cleaning and replacement should be performed more frequently.*

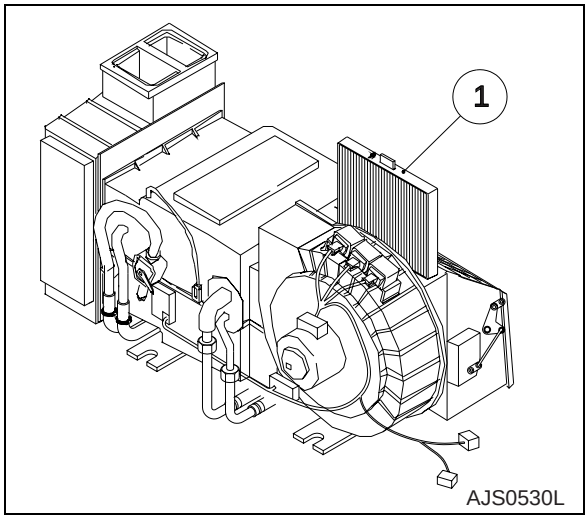

Figure 2

WARNING!

All service and inspection of the air conditioning system should be performed with the starter switch in the "O" (OFF) position.

NOTE: *Refer to appropriate operation and maintenance manual for latest service intervals.*

POWERSHIFT TRANSMISSION

The multi-speed reversing transmission in countershaft design is power shiftable by hydraulically actuated multi-disk clutches.

All gears are constantly meshing and carried on antifriction bearings.

The gear wheels, bearings and clutches are cooled and lubricated with oil.

The 4-speed reversing transmission is equipped with 6 multi-disk clutches.

At the shifting, the actual plate pack is compressed by a piston, movable in axial direction, which is pressurized by pressure oil.

A compression spring takes over the pushing back of the piston, thus the release of the plate pack. As to the layout of the transmission as well as the specifications of the closed clutches in the single speeds, see “Schedule of Measuring Points and Connection 4 WG-260” on page 8 and “Oil Circuit Diagram 4WG - 260 Forward 1st Speed” on page 11.

TRANSMISSION CONTROL

Transmission control, see “Schedule of Measuring Points and Connection 4 WG-260” on page 8, Electro-hydraulic unit on page -10 and “Oil Circuit Diagram 4WG - 260 Forward 1st Speed” on page 11.

The transmission pump, necessary for the oil supply of the converter, and for the transmission control, is sitting in the transmission on the engine-dependent input shaft.

The feed rate of the pump is Q = 105 *l*/min. at n_{Engine} = 2000 min^{-1}.

This pump is sucking the oil via the coarse filter out of the oil sump and delivers it via the ZF-Fine filter - the filters is fitted externally from the transmission - to the main pressure valve.

ZF-Fine filter

Filtration ratio according to ISO 4572 : $\beta_{30} \geq 75$ $\beta_{15} = 25$ $\beta_{10} = 5.0$

Filter surface at least : 2 x 6,700 cm^2 = 13,400 cm^2

Dust capacity according to ISO 4572 at least : 17g

The six clutches of the transmission are selected via the 6 proportional valves P1 to P6.

The proportional valve (pressure regulator unit) is composed of pressure regulator (e.g. Y6). follow-on slide and vibration damper.

The control pressure of 9.0 bar (130.54 psi) for the actuation of the follow-on slides is created by the pressure reducing valve. The pressure oil (16 - 18 bar (230 - 260 psi)) is directed via the follow-on slide to the respective clutch.

Due to the direct proportional selection with separated pressure modulation for each clutch, the pressure to the clutches, which are engaged in the gear change, will be controlled. In this way, a hydraulic intersection of the clutches to be engaged and disengaged becomes possible. This is creating spontaneous shiftings without traction force interruption.

At the shifting, the following criteria will be considered:

- Speed of engine, turbine, central gear train and output.
- Transmission temperature.
- Shifting mode (up-, down-, reverse shifting and speed engagement out of Neutral).
- Load condition (full and part load, traction, overrun inclusive consideration of load cycles during the shifting).

LIS (LOAD ISOLATION SYSTEM) - OPTION

Excessive bucket pitching is drastically reduced and good floatation is maintained for minimum operator fatigue and maximum productivity.

LIS is useful for sites where frequent cycles of loading and carry are needed or rough terrain.

When the LIS switch is "I" and the vehicle speed is above 8.0 km/h (4.97 mph), the LIS solenoids valves (14) are energized and the LIS system is "ON."

When the LIS switch is "I" and the vehicle speed is below 6.0 km/h (3.73 mph) the LIS solenoids valves (14) are de-energized and the LIS system is "OFF."

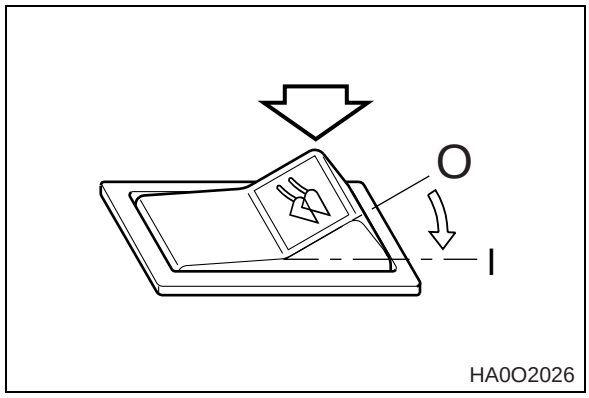

Figure 33

NOTE: *If the LIS switch is in the 'O' position, regardless of the vehicle speed the LIS solenoid valves (14) de-energized and the LIS system is not operating.*

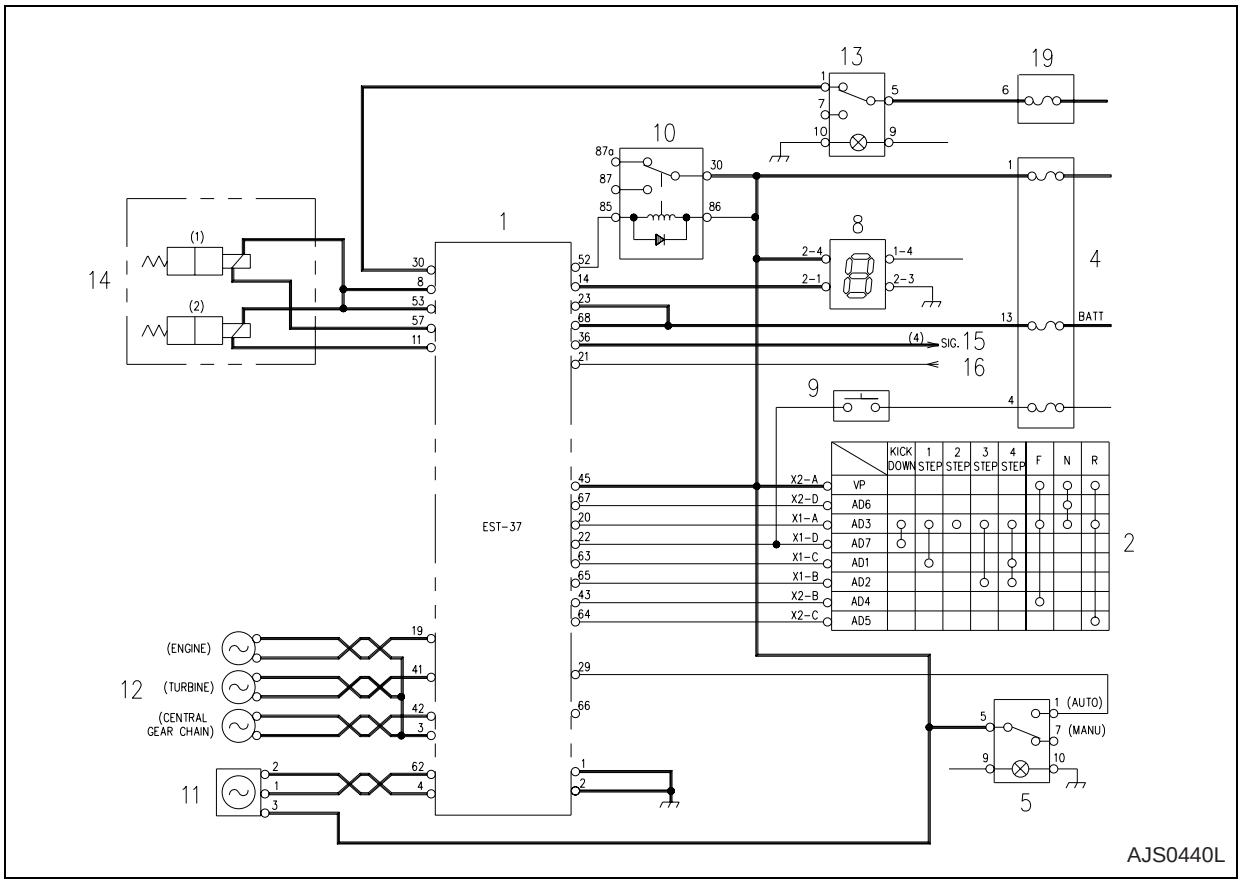

Figure 34

7. Insert heated inner bearing race until contact is obtained.

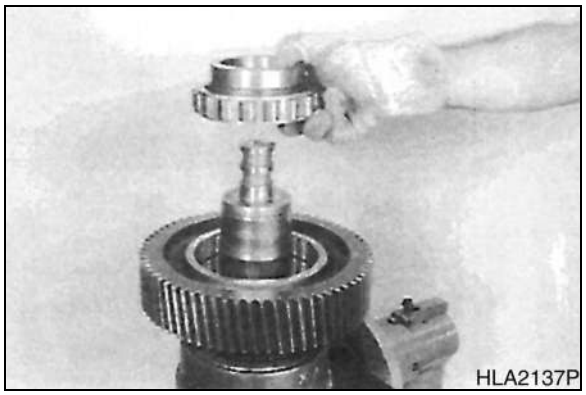

Figure 173

8. Install disk, lift spur gear slightly and install snap ring into annular groove of spur gear.

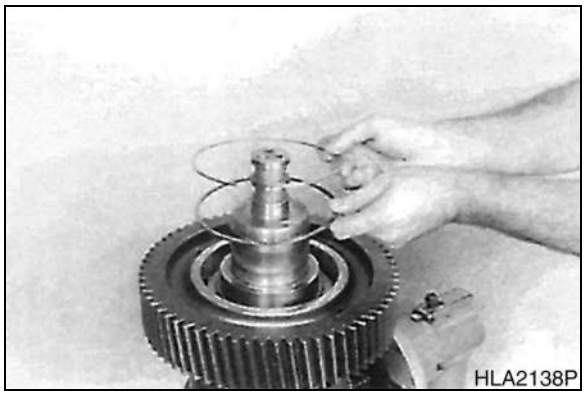

Figure 174

9. Install angle ring, with stepped face facing snap ring.

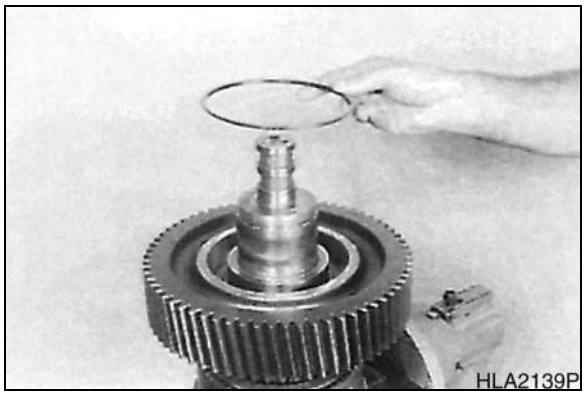

Figure 175

10. Install inner bearing race and mount flanged disk.

    NOTE: *Install flanged disk, with chamfer on inner diameter showing upward.*

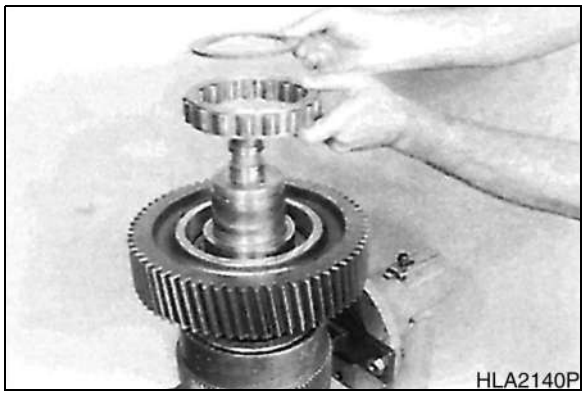

Figure 176

9. Install pre-assembled drive shaft until contact is obtained.

   NOTE: *Pay attention to overlapping of fitting key/fitting key groove.*

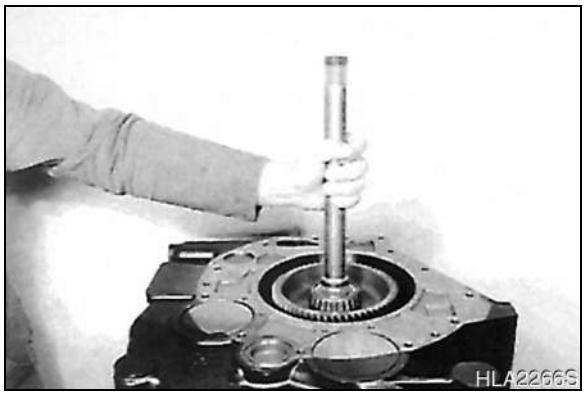

Figure 313

10. Adjust axial play of drive shaft bearing = 0.0 - 0.05 mm (0.0000 - 0.0020 in.) Figure 314 thru Figure 316).

11. Mount gasket. Mount outer bearing race, press it uniformly on and determine Dimension I from mounting face (gasket) to outer bearing race.

    NOTE: *Dimension I e.g. 129.55 mm (5.1004 in.).*

    NOTE: *Apply several measuring points and determine average.*

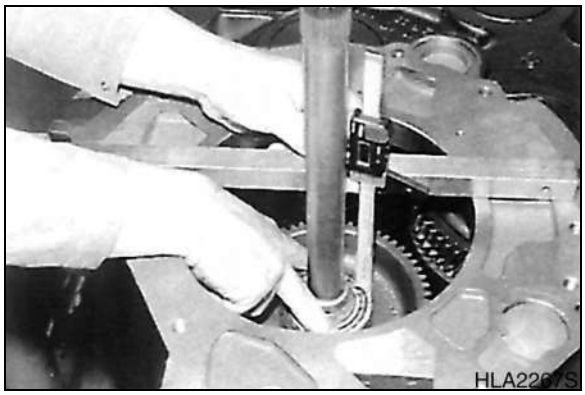

Figure 314

12. Measure Dimension II from mounting face/ converter bell to contact face/outer bearing race.

    NOTE: *Dimension II e.g. 127.43 mm (5.0169 in.).*

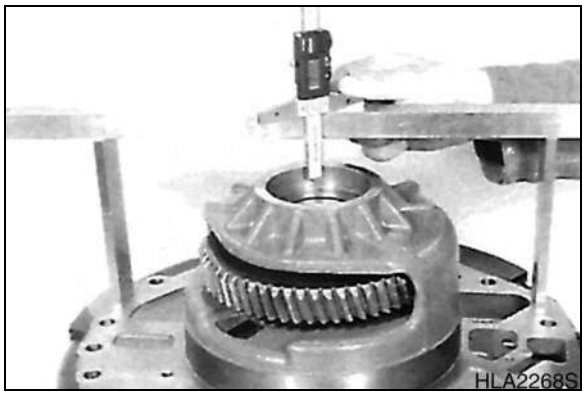

Figure 315

    NOTE: *Shims are available in 0.05 mm (0.0020 in.) graduation.*

13. Insert shim e.g. s = 2.10 mm (0.0827 in.) and position outer bearing race against shoulder.

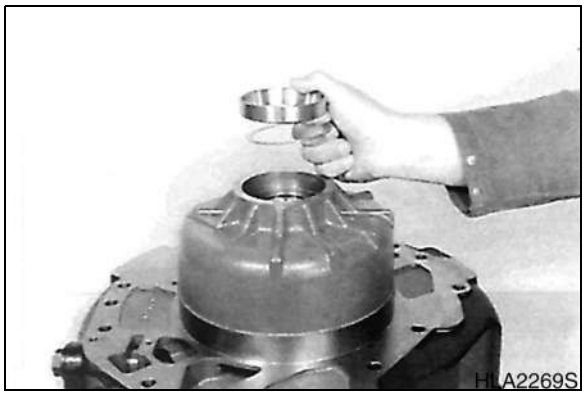

Figure 316

REASSEMBLY

NOTE: *Check cylinder head grooves for U-packing and dust seal. If edges of grooves are sharp or have burns, use an oil stone to smooth surface. See Figure 14.*

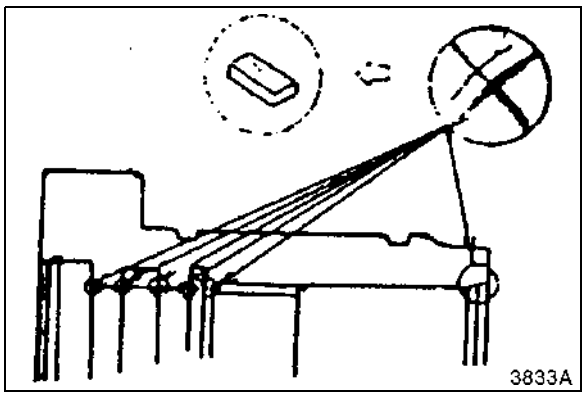

Figure 14

1. Apply grease to inner part of cylinder head and to U-packing groove. See Figure 15.

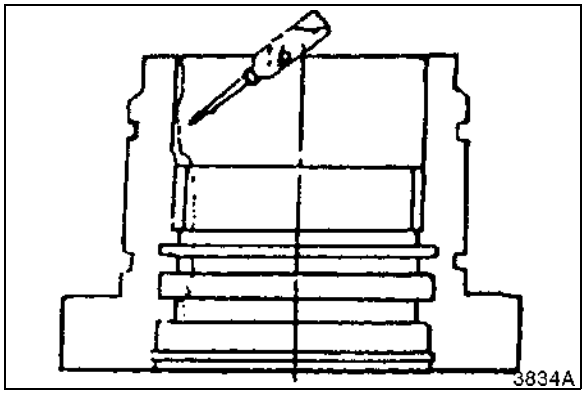

Figure 15

2. Install split backup ring into its groove by compressing ring. See Figure 16. Make sure that ends of ring do not overlap.

   NOTE: *The U-packing can be installed by hand or by using a seal installing jig. The jig should be made of copper, aluminum, or plastic. If a jig is used, be sure that jig does not have sharp edges that could damage U-packing.*

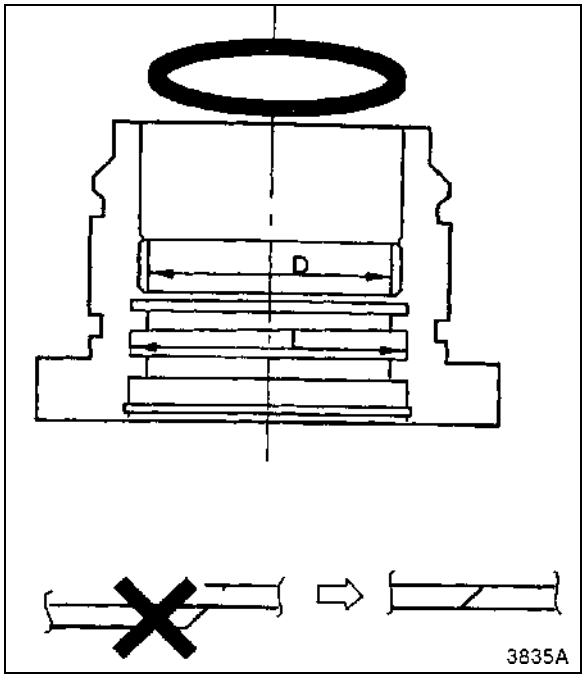

Figure 16