Mega 250-V

Shop Manual

023-00050AE

S/N 1001 thru 2000 (Tier I)

S/N 2001 thru 3000 (Tier II)

DOOSAN reserves the right to improve our products in a continuing process to provide the best possible product to the market place. These improvements can be implemented at any time with no obligation to change materials on previously sold products. It is recommended that consumers periodically contact their distributors for recent documentation on purchased equipment.

This documentation may include attachments and optional equipment that is not available in your machine's package. Please call your distributor for additional items that you may require.

Illustrations used throughout this manual are used only as a representation of the actual piece of equipment, and may vary from the actual item.

WHEEL LOADER SAFETY

⚠ CAUTION!

Follow all safety recommendations and safe shop practices outlined in the front of this manual or those contained within this section.

Always use tools and equipment that are in good working order.

Use lifting and hoisting equipment capable of safely handling load.

Remember, that ultimately safety is your own personal responsibility.

MODEL	SERIAL NUMBER RANGE
Mega 200-V (Tier I & II)	1001 and Up
Mega 250-V (Tier I)	1001 thru 2000
Mega 250-V (Tier I)	3001 thru 4000
Mega 250-V (Tier II)	2001 thru 3000
Mega 250-V (Tier II)	4001 and Up
Mega 300-V (Tier I)	1001 thru 2000
Mega 300-V (Tier II)	2001 thru 3000
Mega 300-V	3001 and Up
Mega 400-V	1001 and Up
Mega 500-V (Tier I)	1001 thru 2000
Mega 500-V (Tier II)	2001 and Up

March 2004

PRECAUTIONS WHEN HANDLING FLUIDS AT HIGH TEMPERATURE

Immediately after operations are stopped, the coolant, engine oil, and hydraulic oil are at high temperature and the radiator and hydraulic tank are still under pressure. Attempting to remove the cap, drain the oil or coolant, or replace the filters may lead to serious burns. Always wait for the temperature to go down, and follow the specified procedures when carrying out these operations.

To prevent hot coolant from spurting out, shut down engine, wait for the coolant to cool, then loosen the cap slowly to relieve the pressure.

To prevent hot oil from spurting out, shut down engine, wait for the oil to cool, then loosen the cap slowly to relieve the pressure.

Figure 5

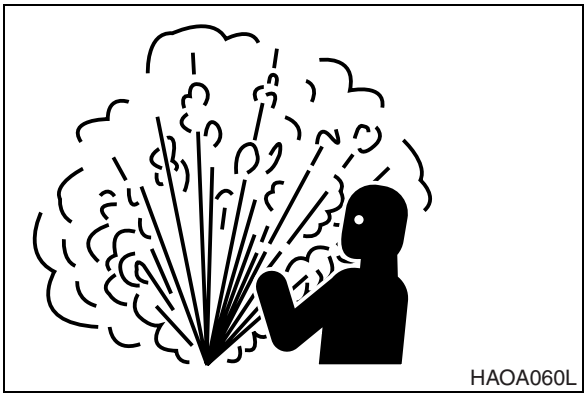

Figure 6

INJURY FROM WORK EQUIPMENT

Do not enter or put your hand, arm or any other part of your body between movable parts, such as between the work equipment and cylinders, or between the machine and work equipment.

If the control levers are operated, the clearance between the machine and the work equipment will change and this may lead to serious damage or personal injury.

If going between movable parts is necessary, always position and secure the work equipment so that it cannot move.

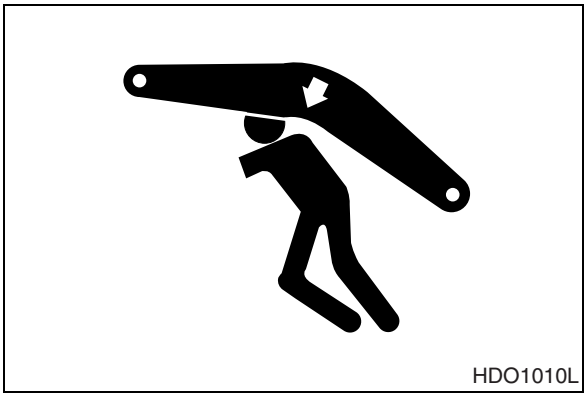

Figure 7

USE SOLID SUPPORT BLOCKING

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

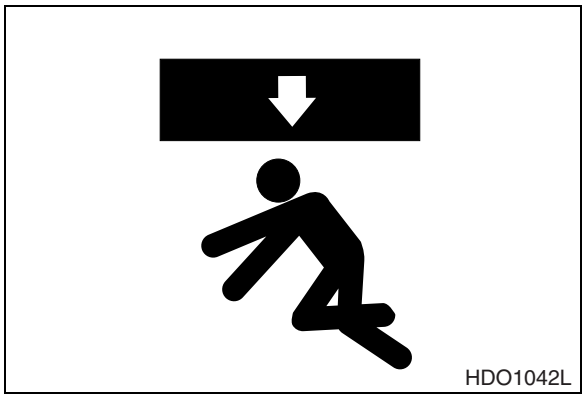

Figure 17

DIGGING BENEATH OVERHANGS

Digging beneath an overhang is dangerous. Overhang could collapse on top of operator and cause serious injury or death. Go on to another digging area before steep overhangs are formed. Know height and reach limits of wheel loader and plan ahead while working. Park wheel loader away from overhangs before work shut down.

DIGGING BENEATH WHEEL LOADER

Digging beneath wheel loader is dangerous. Earth beneath could collapse. This could cause wheel loader to tip, which could cause serious injury or death to operator. Working around deep pits, trenching or along high walls may require support blocks, especially after heavy rainfalls or during spring thaws.

STAY ALERT FOR PEOPLE MOVING THROUGH WORK AREA

When loading a truck you should always know where the driver is.

Avoid loading over the cabin of a truck even if the driver is in a safe spot. Someone else could have gone inside, for any number of reasons. Avoid working where unseen passersby might be.

Slow down work cycle and use slower travel speeds in congested or populated areas. Use a commonly understood signal so that other members of work crew can warn operator to slow or halt work in an impending hazardous situation.

Figure 18

BE AWARE OF AND CONFORM TO LOCAL REGULATIONS

Minimum levels of insurance coverage, work permits or certification, physical barriers around work site or restricted hours of operation may be mandated by governing authorities. There may also be guidelines, standards or restrictions on equipment that may be used to perform certain kinds of work. Check and follow all local requirements, which may also be related to below ground hazards and power lines.

PRECAUTIONS WITH HIGH-PRESSURE LINE, TUBES AND HOSES

When inspecting or replacing high-pressure piping or hoses, check that the pressure has been released from the circuit. Failure to release the pressure may lead to serious injury. Always do the following:

- Wear protective glasses and leather gloves.
- Fluid leaks from hydraulic hoses or pressurized components can be difficult to see but pressurized oil has enough force to pierce the skin and cause serious injury. Always use a piece of wood or cardboard to check for suspected hydraulic leaks. Never use your hands or expose your fingers.
- Do not bend high-pressure lines. Do not strike high-pressure lines. Do not install lines, tubes or hoses that are bent or damaged.
- Make sure that all clamps, guards and heat shields are installed correctly to prevent vibration, rubbing against other parts, and excessive heat during operation.
  - If any of the following conditions are found, replace the part.
  - Damage or leakage from hose end.
  - Wear, damage, cutting of covering, or exposure of strengthening wire layer.
  - Cover portion is swollen in places.
  - There is twisting or crushing at movable parts of hose.
  - Foreign material is embedded in the covering.
  - Hose end is deformed.

NOTE: *Refer to "Hose In-service Lifetime Limit (European Standard ISO 8331 and EN982 CEN)" in Operation and Maintenance Manual, for additional European regulations.*

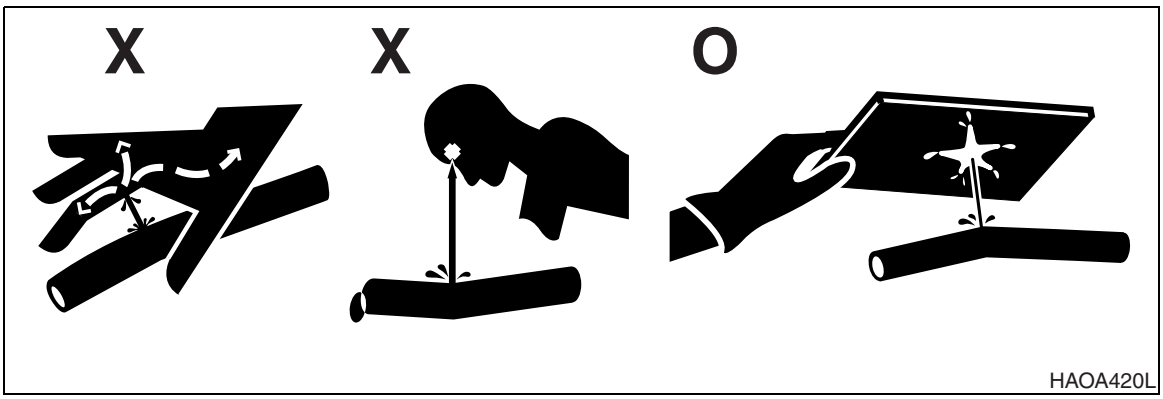

Figure 29

OBTAIN IMMEDIATE MEDICAL ATTENTION IF PRESSURIZED OIL PIERCES SKIN.

⚠ WARNING!

Failure to obtain prompt medical assistance could result in gangrene or other serious damage to tissue.

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ENGINE PERFORMANCE CURVES

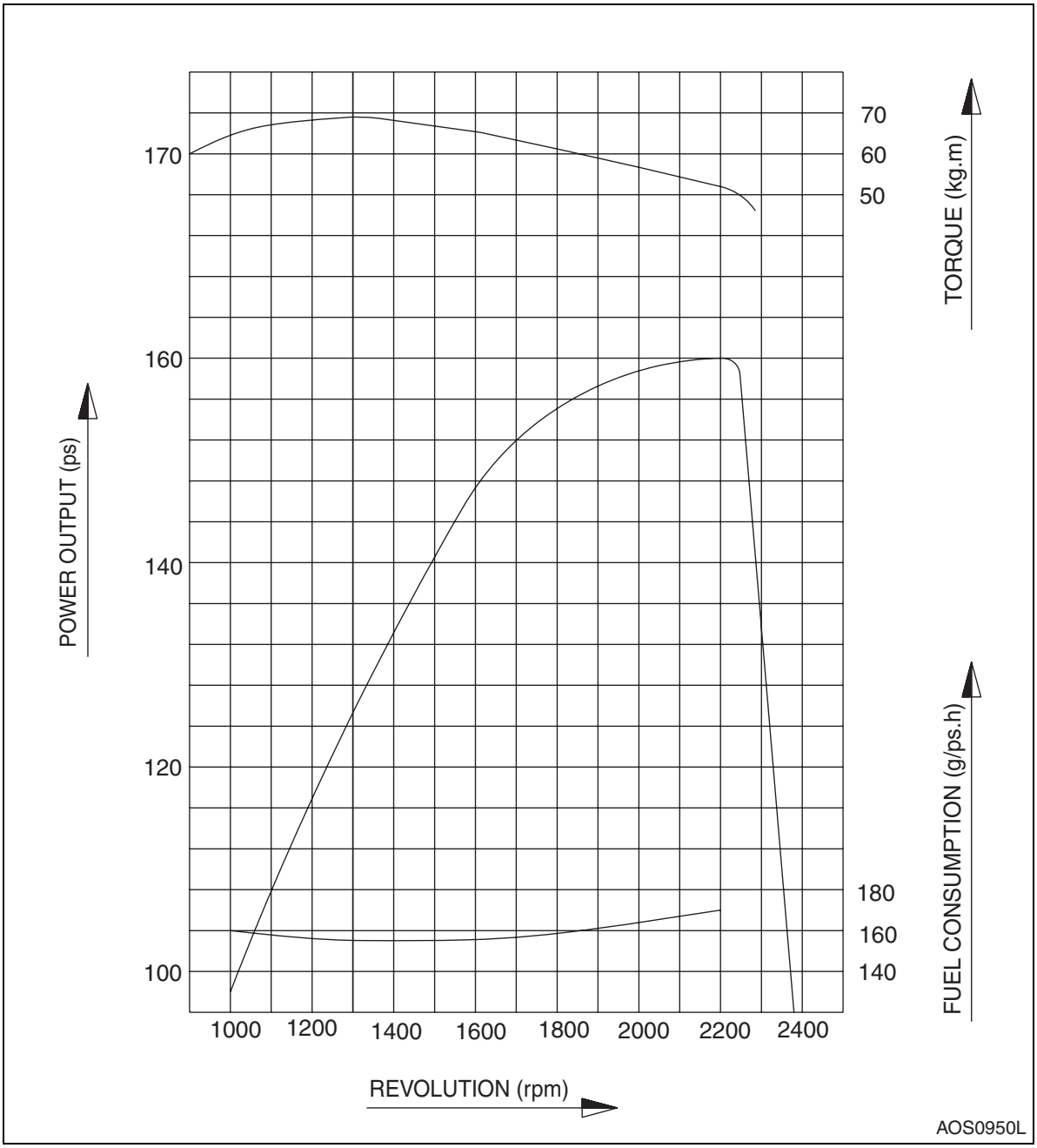

Figure 4 (S/N 1001 thru 2000)

GENERAL MAINTENANCE

Normal Bearing

Smooth even surfaces with no discoloration or marks.

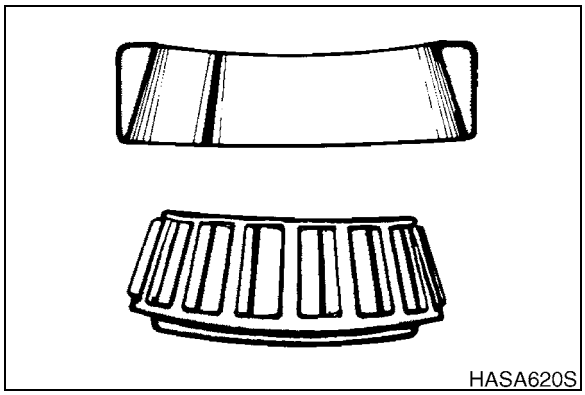

Figure 2

Bent Cage

Cage damage due to improper handling or tool usage.

Replace bearing.

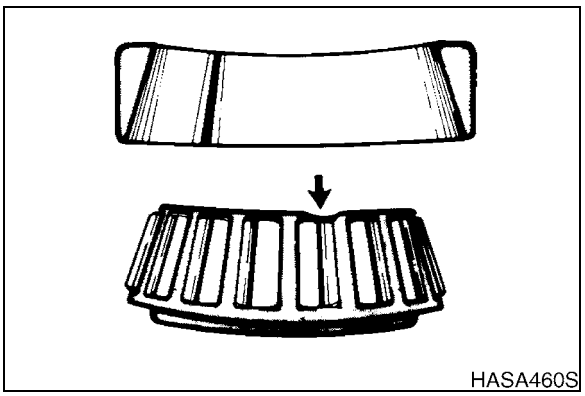

Figure 3

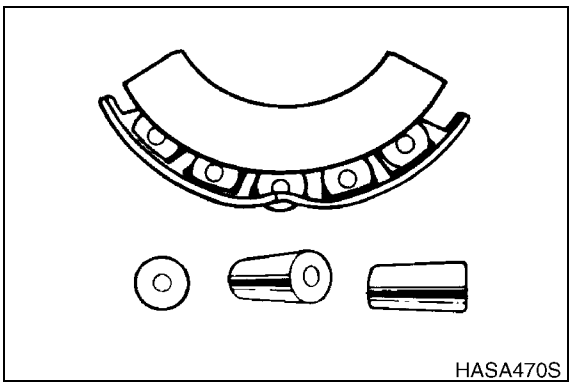

Figure 4

Galling

Metal smears on roller ends due to overheat, lubricant failure or overload.

Replace bearing - check seals and check for proper lubrication.

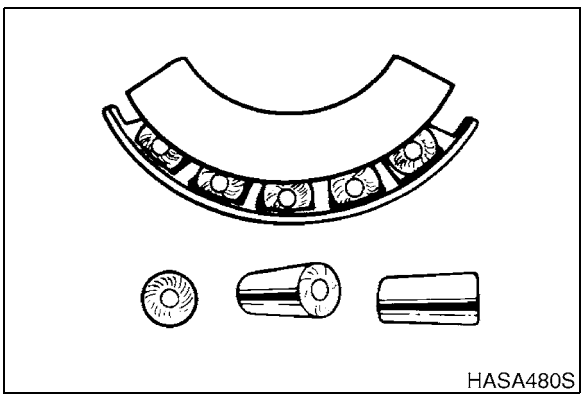

Figure 5

The following General Torque Values must be used in all cases where **SPECIAL TORQUE VALUES** are not given.

NOTE: *TORQUE VALUES LISTED THROUGHOUT THIS MANUAL ARE LUBRICATED (WET) THREADS; VALUES MUST BE INCREASED 1/3 FOR NONLUBRICATED (DRY) THREADS.*

THREAD SIZE	HEAT TREATED MATERIAL GRADE 5 AND GRADE 8			
	GRADE 5 (3 RADIAL DASHES ON HEAD)		GRADE 8 (6 RADIAL DASHES ON HEAD)	
	FOOT POUNDS (ft lb)	NEWTON METER (Nm)	FOOT POUNDS (ft lb)	NEWTON METER (Nm)
1/4" - 20	6	8	9	12
1/4" - 28	7	9	11	15
5/16" - 18	13	18	18	24
5/16" - 24	15	20	21	28
3/8" - 16	24	33	34	46
3/8" - 24	27	37	38	52
7/16" - 14	38	52	54	73
7/16" - 20	42	57	60	81
1/2" - 13	58	79	82	111
1/2" - 20	65	88	90	122
9/16" - 12	84	114	120	163
9/16" - 18	93	126	132	179
5/8" - 11	115	156	165	224
5/8" - 18	130	176	185	251
3/4" - 10	205	278	290	393
3/4" - 16	240	312	320	434
7/8" - 9	305	414	455	617
7/8" - 14	334	454	515	698
1" - 8	455	617	695	942
1" - 14	510	691	785	1064
1 1/8" - 7	610	827	990	1342
1 1/8" - 12	685	929	1110	1505
1 1/4" - 7	860	1166	1400	1898
1 1/4" - 12	955	1295	1550	2102
1 3/8" - 6	1130	1532	1830	2481
1 3/8" - 12	1290	1749	2085	2827
1 1/2" - 6	1400	2034	2430	3295
1 1/2" - 12	1690	2291	2730	3701
1 3/4" - 5	2370	3213	3810	5166
2" - 4 1/2	3550	4813	5760	7810

NOTE: *If any bolts and nuts are found loose or at values less than what the chart states, it is recommended that the loose bolt and/or nut be replaced with a new one.*

COUNTERWEIGHT

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MODEL	SERIAL NUMBER RANGE
Mega 200-V (Tier I & II)	1001 and Up
Mega 250-V (Tier I)	1001 thru 2000
Mega 250-V (Tier II)	2001 and Up
Mega 300-V (Tier I)	1001 thru 2000
Mega 300-V (Tier II)	2001 thru 3000
Mega 300-V	3001 and Up
Mega 400-V	1001 and Up

July 2004

HYDRAULIC OIL TANK

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Mega 250-V (Tier I)	3001 thru 4000
Mega 250-V (Tier II)	2001 and Up
Mega 250-V (Tier II)	4001 and Up

December 2002

CENTER JOINT (ARTICULATION JOINT)

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Mega 250-V (Tier I)	1001 thru 2000
Mega 250-V (Tier I)	3001 thru 4000
Mega 250-V (Tier II)	2001 thru 3000
Mega 250-V (Tier II)	4001 and Up

November 2002

INTRODUCTION

The efficiency and continued operation of the axles depends on constant and correct maintenance, and also on efficient repair work when there is a breakdown or malfunction. The instructions in this manual have been based on a complete overhaul of an axle. However, the mechanic must decide whether or not it is necessary to disassemble the individual components when only partial repair work is required. This manual provides a guide, which uses diagrams illustrating various phases of operations, allowing accurate work to take place. Therefore all information required for correct disassembly, relative checks, and assembly of each individual component, has been provided.

NOTE: *Throughout the phases of repair or maintenance, it is advisable to use proper equipment and tools such as: trestles, supporting benches, plastic or copper hammers, appropriate levers, extractors and specific spanners or wrenches. So that work is facilitated and working surfaces and mechanics themselves are protected. Before disassembly, it is best to thoroughly clean axles, removing any encrusted dirt or accumulated greases, then drain oil through oil drain plugs.*

IMPORTANT

All disassembled axles and components must be thoroughly cleaned with appropriate products and then restored or replaced if damage, wear, cracking, or seizing have occurred. In particular, thoroughly check the condition of all moving parts (bearings, gears, crown wheel and pinion, and shafts) and sealing parts (O-rings and oil seals), that are subject to major stress and wear. In any case, it is advisable to replace seals and O-rings every time a component is overhauled or repaired. During assembly sealing rings must be lubricated on the sealing edge. In case of crown wheel and pinion, replacement of one requires replacement of the other. During assembly proper preloading and backlash of parts must be maintained.

DISASSEMBLY OF DIFFERENTIAL UNIT

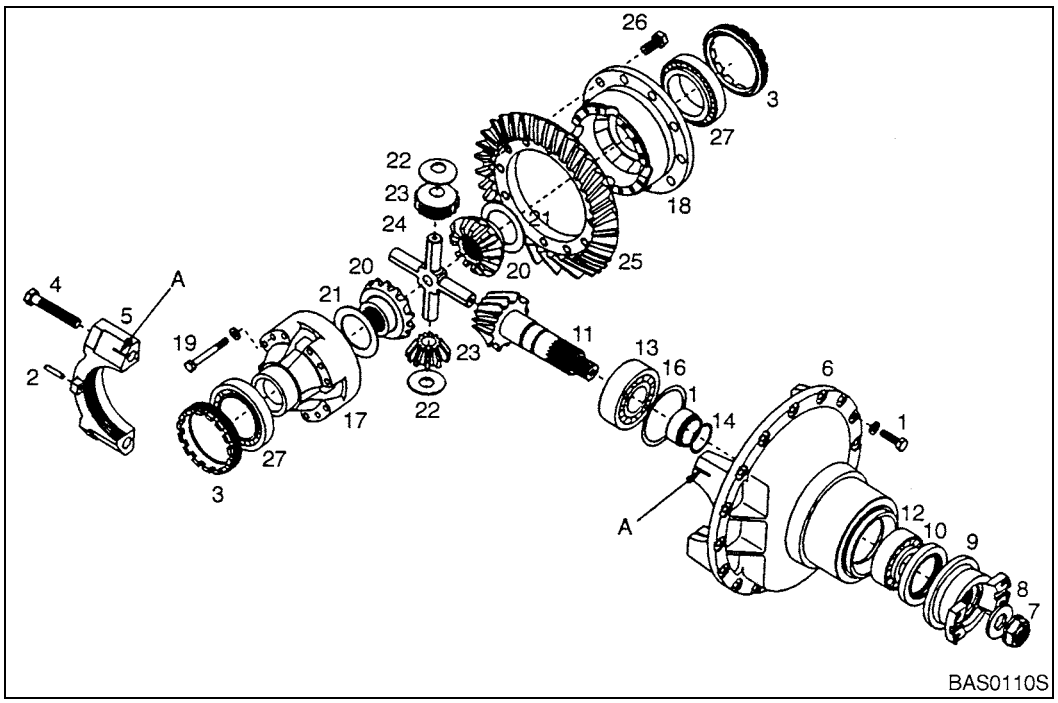


Figure 4

NOTE: *Check wear condition of components and replace as required.*

1. Match mark the differential carrier and the axle housing to aid reassembly.
2. Remove cap screws (1, Figure 4) retaining differential unit, then remove it from the axle housing.
3. Disassemble differential gear:
   A. Remove left and right spring pins (2, Figure 4).
   B. Loosen adjusting nut (3, Figure 4).

      NOTE: *Mark cap and carrier "A" to match parts at reassembly.*

   C. Remove cap screws (4, Figure 4), caps (5) and adjusting nuts (3).
   D. Lift out differential gear unit from carrier (6, Figure 4).
4. Disassemble bevel pinion:
   A. Straighten locking notches on pinion nut collar then remove pinion nut (7, Figure 4) and washer (8).
   B. Remove flange (9, Figure 4).
   C. Remove oil seal (10, Figure 4).
   D. Press bevel pinion (11, Figure 4) from carrier (6).

      NOTE: *Take care not to damage the threads.*

   E. Remove bearing cone (12, Figure 4).
   F. Remove bearing cup (12 and 13, Figure 4) from differential carrier (6).
   G. Pull out shims (16, Figure 4).

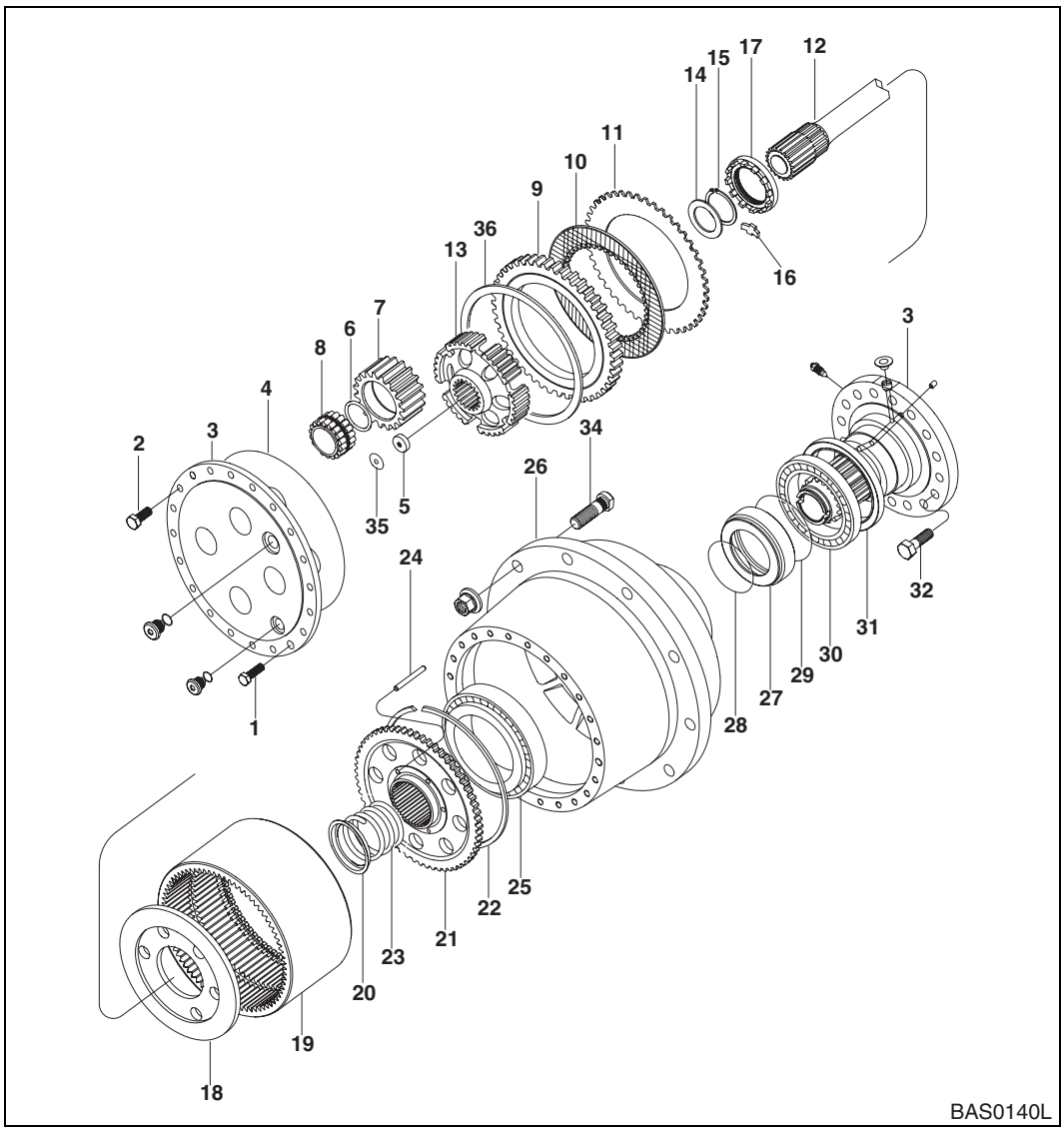


Figure 13

1. Assemble wheel hub:
   A. Install spindle (33, Figure 13) on the axle housing so that the brake bleed port is in the original upper position.

      NOTE: *Apply proper sealing compound on the housing joining face.*

   B. Tighten cap screws (32, Figure 13).

      NOTE: *Mount with Loctite #270.*

      NOTE: *Tightening torque: 28.5 - 31.5 kg•m (206 - 227 ft lb).*

   C. Press fit outer races of wheel bearings (25, Figure 13 and 27) into wheel hub (26).

      NOTE: *Make sure they rest against the seats.*

   D. Install oil seal (31, Figure 13) using a proper seal driver.

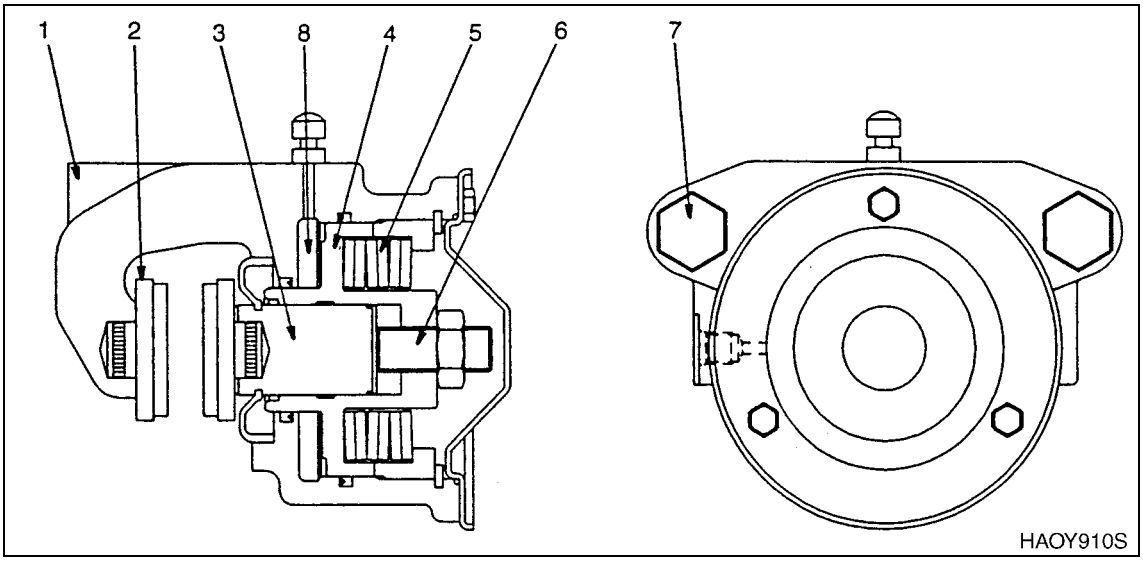


Figure 4

Reference Number	Description
1	Caliper
2	Pad
3	Push. Rod
4	Piston

Reference Number	Description
5	Disk Spring Stack
6	Adjuster Screw
7	Guide Pins
8	Oil Chamber

SPECIAL TOOLS AND MATERIALS

LUBRICANTS AND SEALANTS

Fuchs Renocal FN 745

7. Insert disk spring stack (5, Figure 17) completely into piston (6). Do not change the disk springs within the stack.

   NOTE: *The orientation of the installed disk spring stack with 5 disk springs has to be in accordance with Figure 18. The orientation of the installed spring stack with 6 disk spring has to be according to Figure 19. The installation or replacement of the disk spring stack is only allowed as a complete assembly.*

8. Grease disk spring stack.

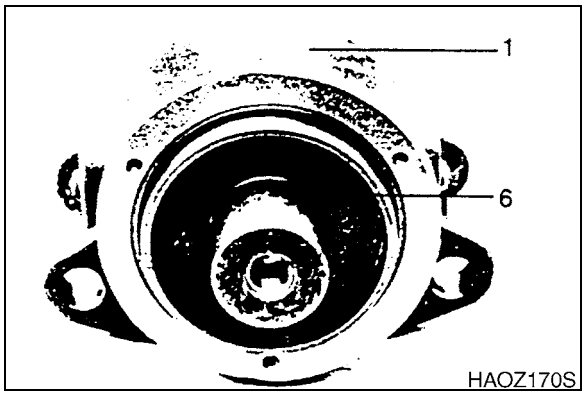


Figure 17

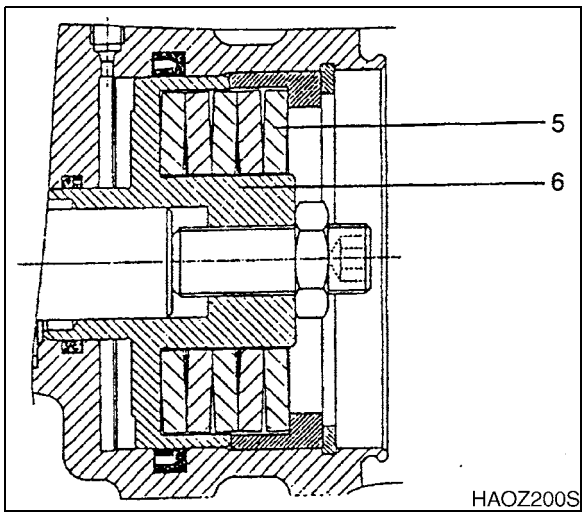


Figure 18

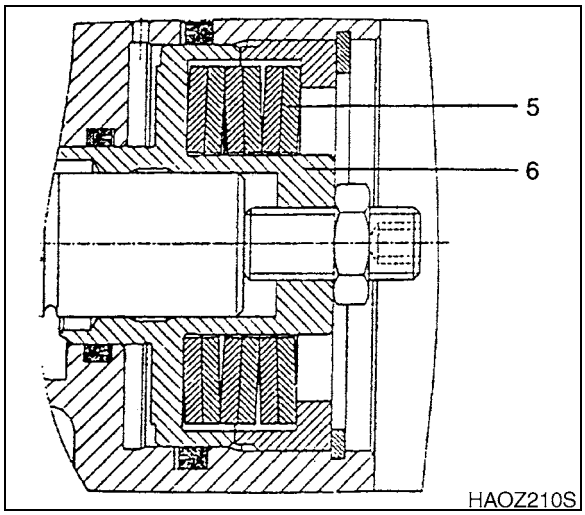
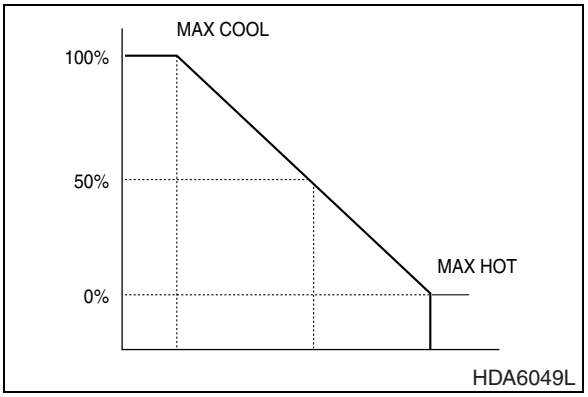
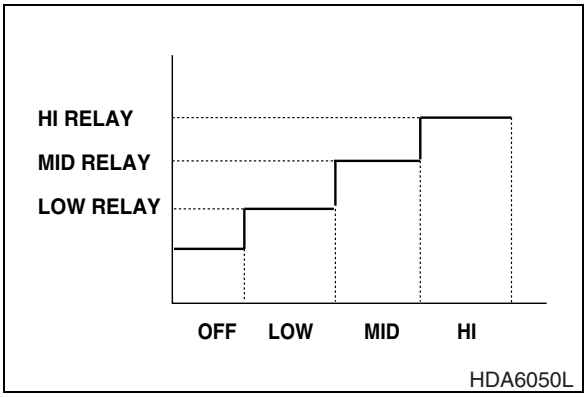
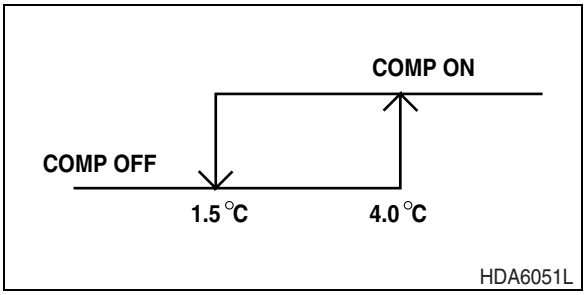


Figure 19

CONTROL SPECIFICATIONS

Control Item	Control Switch	Control Specifications
Temperature Control	"COOL" Switch "WARM" Switch	 **Figure 6** Temperature control switch consists of a 24 step variable selector. The display uses 7, Green / Red two-color LED's to display the selected temperature.
Blower Fan Speed Control	"OFF" Switch "LOW" Switch "MID" Switch "HI" Switch	 **Figure 7**
Compressor Control	Temperature Sensor	 **Figure 8**

WEIGHT OF R134A GAS USED IN MACHINES

Model	Weight of Gas
Mega 130	850 ±20 grams (30 ±0.7 oz)
Mega 160	850 ±20 grams (30 ±0.7 oz)
Mega 200-III	850 ±20 grams (30 ±0.7 oz)
Mega 200-V	850 ±20 grams (30 ±0.7 oz)
Mega 250-III	850 ±20 grams (30 ±0.7 oz)
Mega 250-V (Tier I)	850 ±20 grams (30 ±0.7 oz)
Mega 250-V (Tier II)	850 ±20 grams (30 ±0.7 oz)
Mega 300-III	950 ±20 grams (33 ±0.7 oz)
Mega 300-V (Tier I)	850 ±20 grams (30 ±0.7 oz)
Mega 300-V (Tier II)	850 ±20 grams (30 ±0.7 oz)
Mega 300-V	850 ±20 grams (30 ±0.7 oz)
Mega 400-III	950 ±20 grams (33 ±0.7 oz)
Mega 400-III PLUS	850 ±20 grams (30 ±0.7 oz)
Mega 400-V	850 ±20 grams (30 ±0.7 oz)
Mega 500-V	850 ±20 grams (30 ±0.7 oz)
Solar 130-III	950 ±20 grams (33 ±0.7 oz)
Solar 130LC-V	850 ±20 grams (30 ±0.7 oz)
Solar 130W-III	950 ±20 grams (33 ±0.7 oz)
Solar 130W-V	850 ±20 grams (30 ±0.7 oz)
Solar 140LC-V	850 ±20 grams (30 ±0.7 oz)
Solar 140W-V	850 ±20 grams (30 ±0.7 oz)
Solar 160W-V	850 ±20 grams (30 ±0.7 oz)
Solar 170LC-V	850 ±20 grams (30 ±0.7 oz)
Solar 170W-III	1100 ±20 grams (38 ±0.7 oz)
Solar 175LC-V	850 ±20 grams (30 ±0.7 oz)
Solar 180W-V	850 ±20 grams (30 ±0.7 oz)
Solar 200W-III	1100 ±20 grams (38 ±0.7 oz)
Solar 200W-V	850 ±20 grams (30 ±0.7 oz)
Solar 210W-V	850 ±20 grams (30 ±0.7 oz)
Solar 220LC-III	950 ±20 grams (33 ±0.7 oz)
Solar 220LC-V	850 ±20 grams (30 ±0.7 oz)
Solar 220LL	850 ±20 grams (30 ±0.7 oz)
Solar 225LC-V	850 ±20 grams (30 ±0.7 oz)
Solar 225NLC-V	850 ±20 grams (30 ±0.7 oz)
Solar 225LL	850 ±20 grams (30 ±0.7 oz.)
Solar 250LC-V	850 ±20 grams (30 ±0.7 oz)
Solar 255LC-V	850 ±20 grams (30 ±0.7 oz)
Solar 280LC-III	1250 ±20 grams (44 ±0.7 oz)
Solar 290LC-V	850 ±20 grams (30 ±0.7 oz)

TRANSMISSION AND TORQUE CONVERTER (ZF 4WG-190)

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MODEL	SERIAL NUMBER RANGE
Mega 250-V (Tier I)	1001 thru 2000
Mega 250-V (Tier II)	2001 and Up

November 2001

OIL CIRCUIT DIAGRAM 4WG-190

Reference Number	Positions
WT	Heat Changer
WGV	Converter Back Pressure Valve 3.50 bar (50 psi)
WSV	Converter Relief Valve 11 bar (160 psi)
HDV	System Pressure Valve 16 +2 bar (230 +30 psi)
RV-9	Pressure Reducing Valve 9 bar (130 psi)
NFS	Follow-on Slide
D	Oscillation Damper
B	Orifice
P1	Proportional Valve - Clutch K4
P2	Proportional Valve - Clutch KR
P3	Proportional Valve - Clutch K1
P4	Proportional Valve - Clutch K3
P5	Proportional Valve - Clutch KV
P6	Proportional Valve - Clutch K2
Y1 - Y6	Pressure Regulator
TEMP	Temperature Sensor

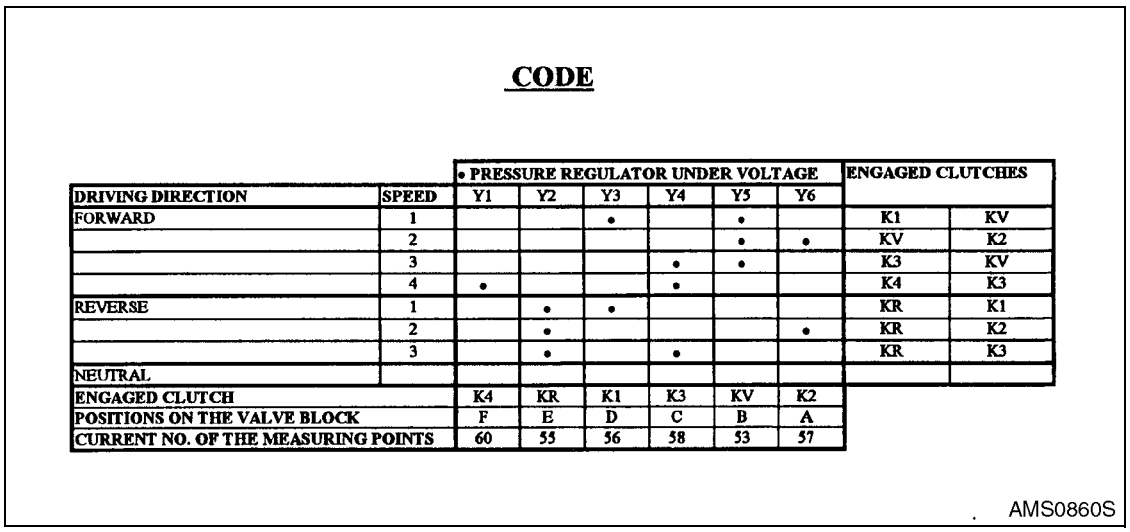


Figure 3

Forward First Gear

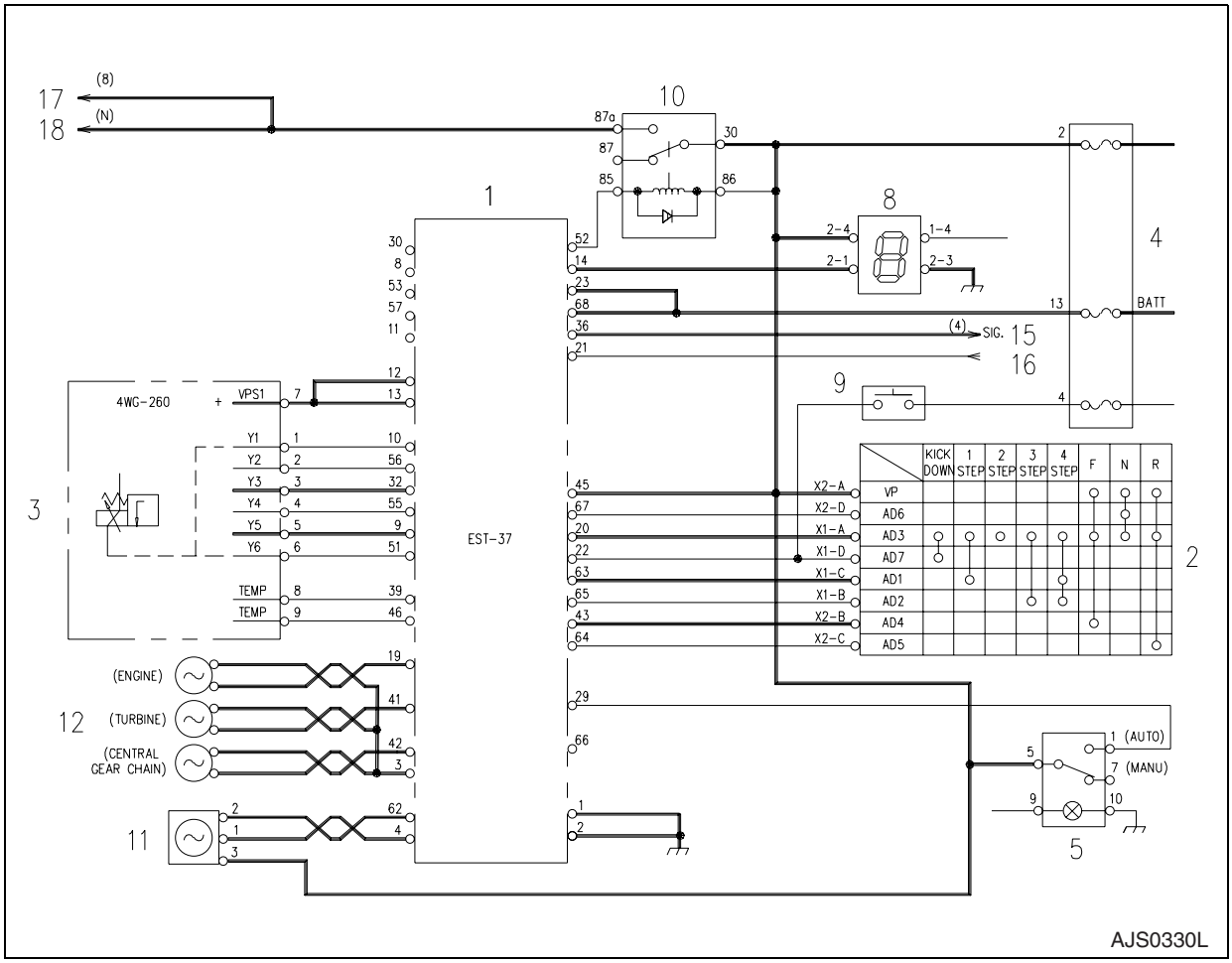


Figure 20

Transmission solenoid valves (Y3 and Y5, Figure 20) are energized when in forward first gear.

TRANSMISSION CUT OFF

When the brake pedal is depressed while transmission cutoff switch (Figure 31) is in "I" position, the transmission cutoff switch turns "ON" and current is supplied to '66' terminal of transmission controller.

All current being supplied to transmission solenoid valves (Y1 thru Y6) is cut off and the transmission is in "NEUTRAL."

NOTE: *To protect transmission, transmission cutoff switch does not function in third and fourth gears.*

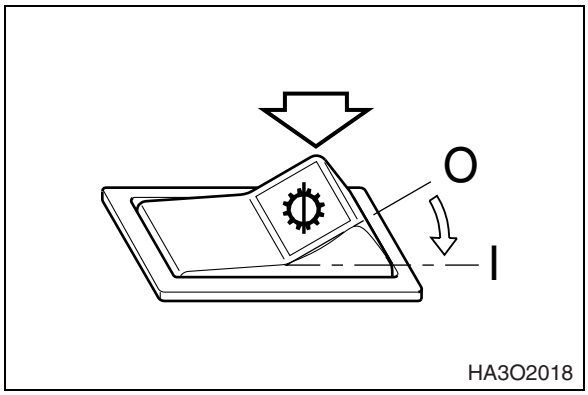


Figure 31

⚠ CAUTION!

When the machine is traveling or working in place of inclination, the transmission cutoff switch (Figure 31) must be placed in position 'O' for the purse of using engine braking and the normal braking function at the same time.

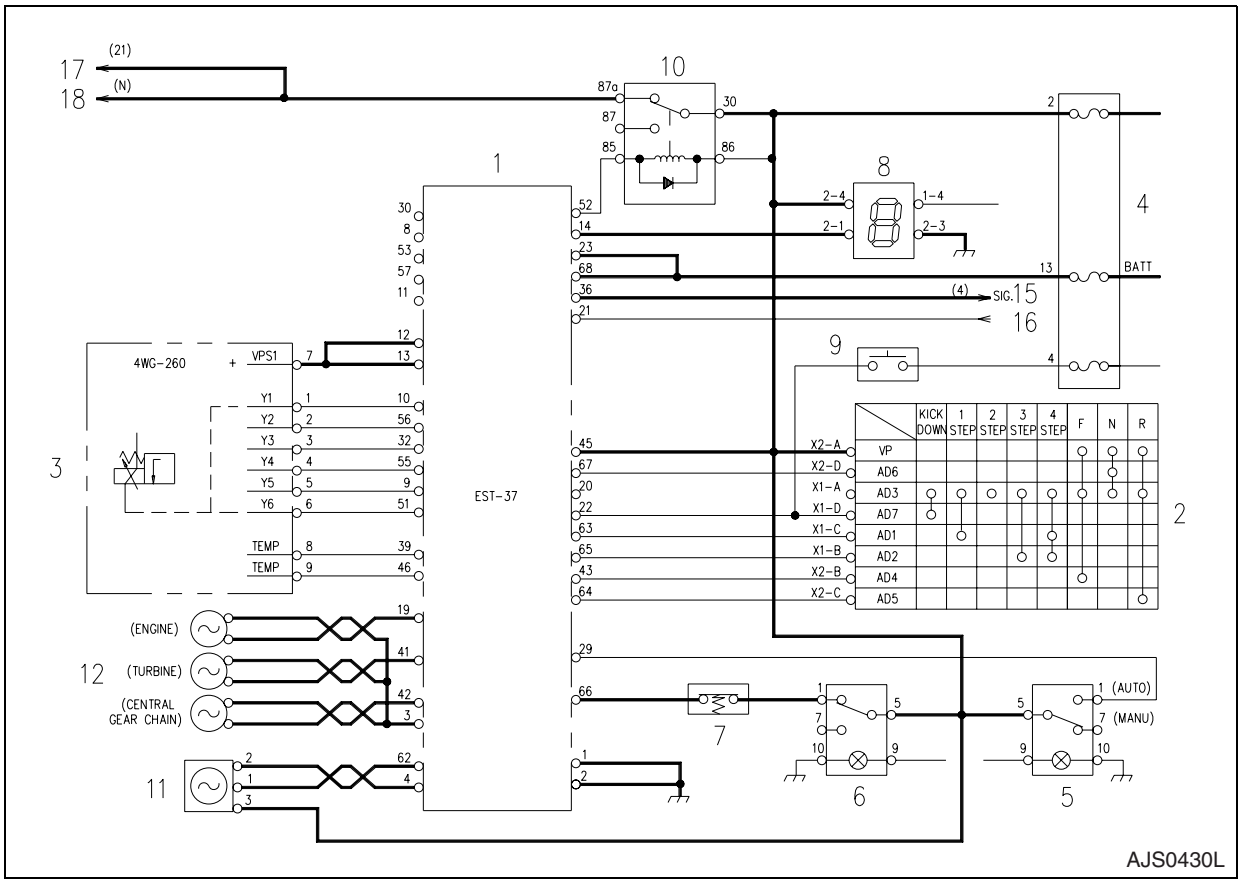


Figure 32

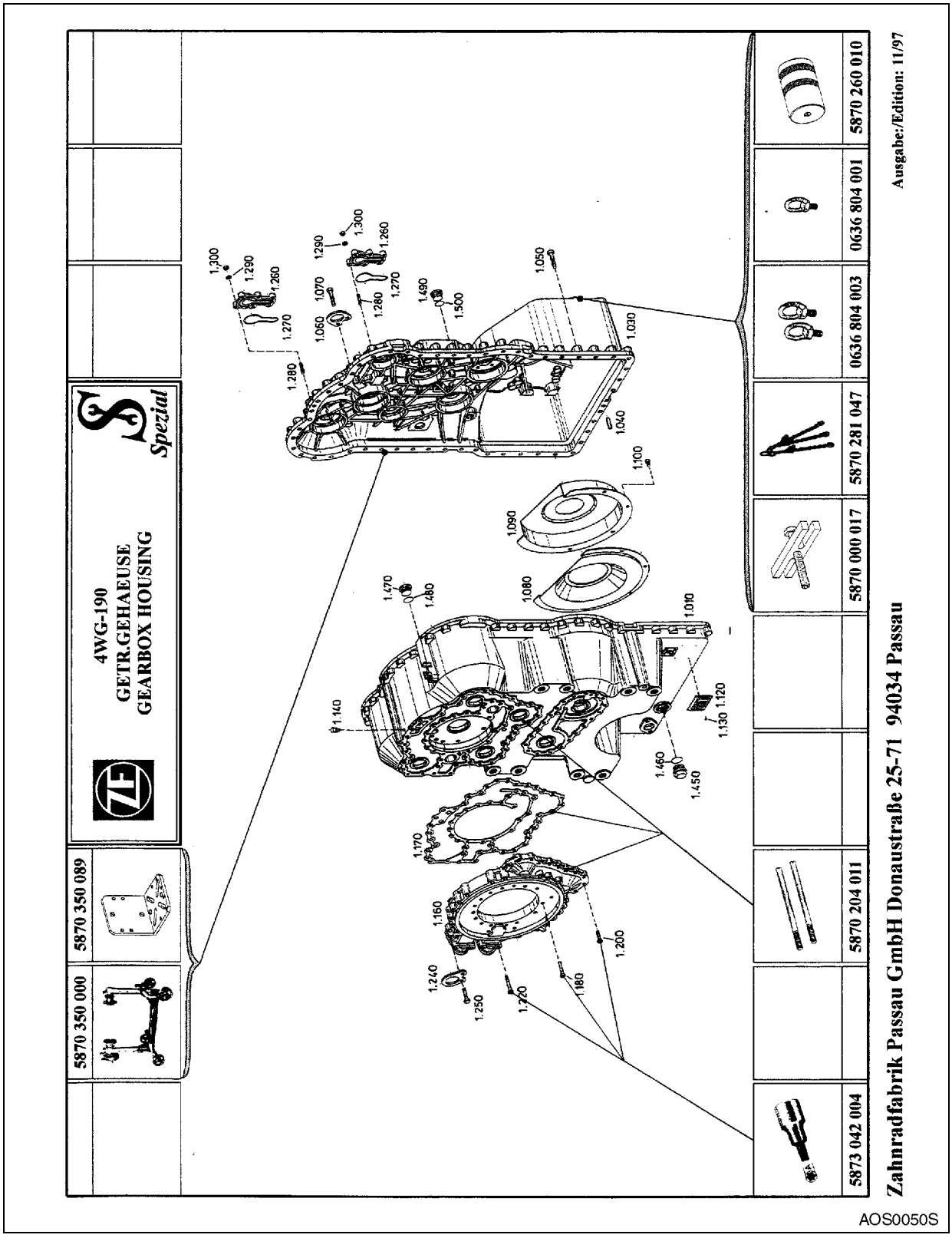

4WG-190
GETR.GEHAEUSE
GEARBOX HOUSING
Spezial
5870 350 089
5870 350 000
5873 042 004
5870 204 011
5870 000 017
5870 281 047
0636 804 003
0636 804 001
5870 260 010
Zahnradfabrik Passau GmbH Donaustraße 25-71 94034 Passau
Ausgabe:/Edition: 11/97
AOS0050S

Figure 43

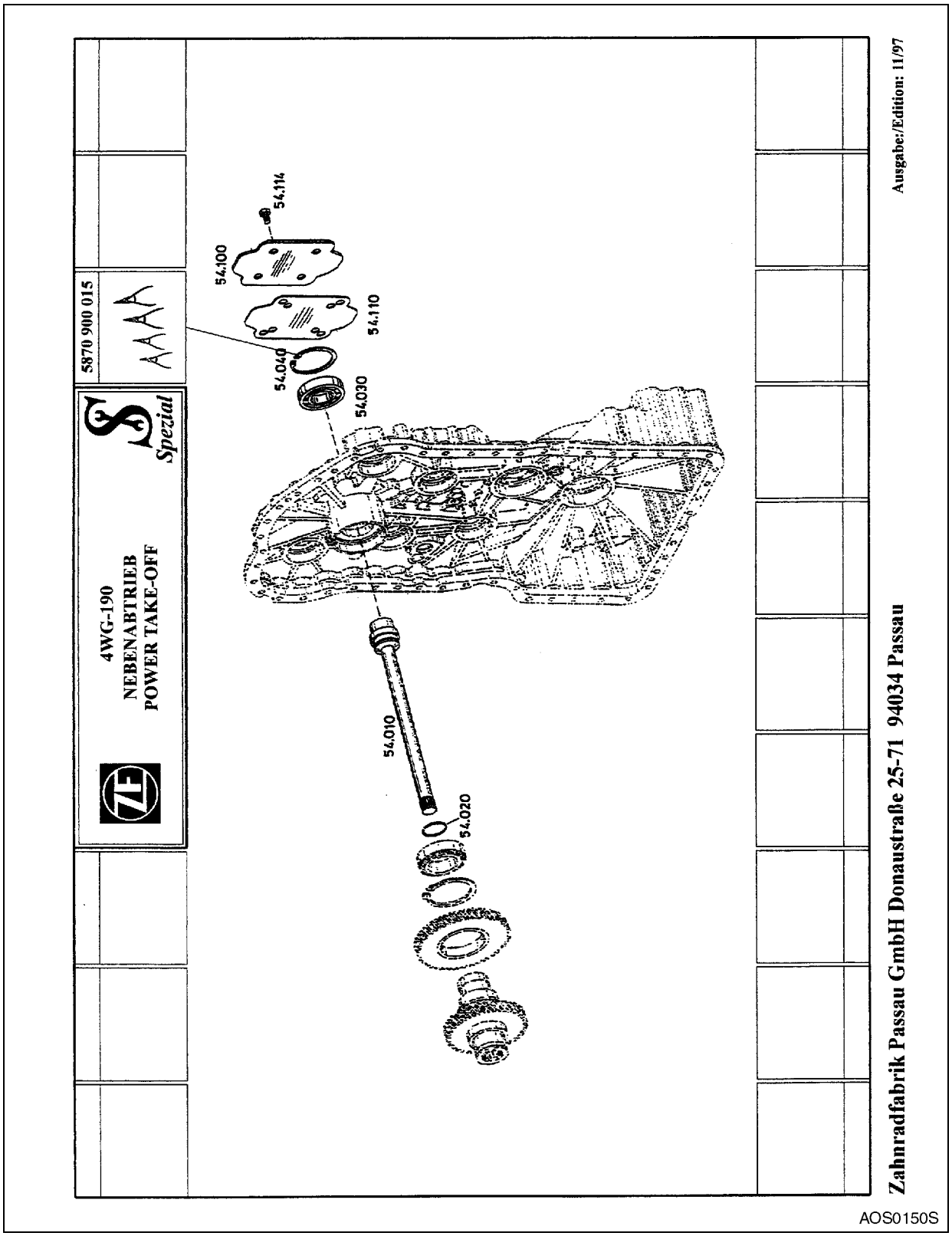

5870 900 015
4WG-190
NEBENABTRIEB
POWER TAKE-OFF
Spezial
Ausgabe:/Edition: 11/97
Zahnradfabrik Passau GmbH Donaustraße 25-71 94034 Passau
54.114
54.100
54.110
54.040
54.030
54.010
54.020
AOS0150S

Figure 53

O. Install two adjusting screws and mount gasket I.

NOTE: *Pay attention to different gaskets, see Figure 80 and Figure 83.*

(S) Adjusting screws - 5870 204 063

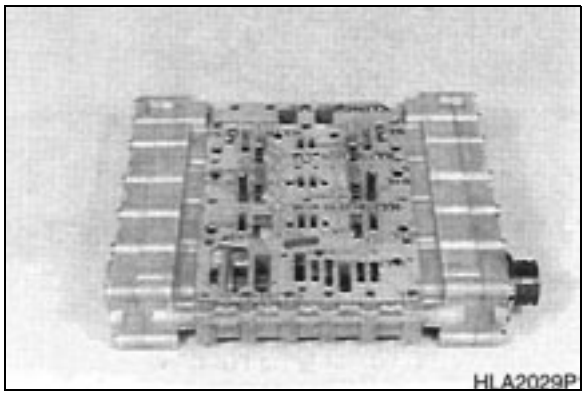


Figure 80

9. Intermediate plate-version with screens:

A. Insert screens (6x) flash -mounted into bore of intermediate plate, see Figure 81.

NOTE: *Pay attention to installation position- screens are facing up (facing duct plate).*

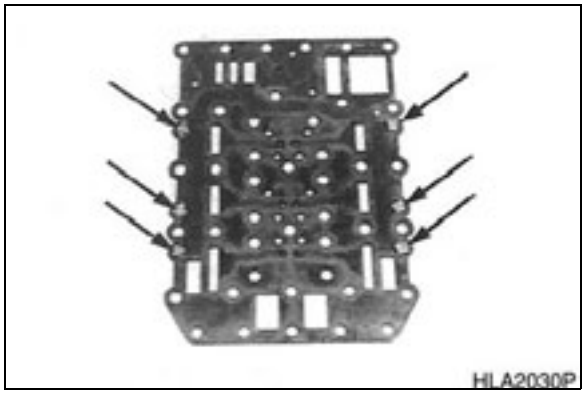


Figure 81

B. Mount intermediate plate, with screens with screens facing up.

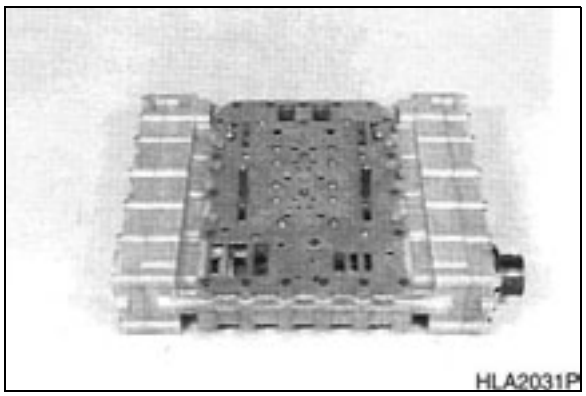


Figure 82

C. Mount gasket II.

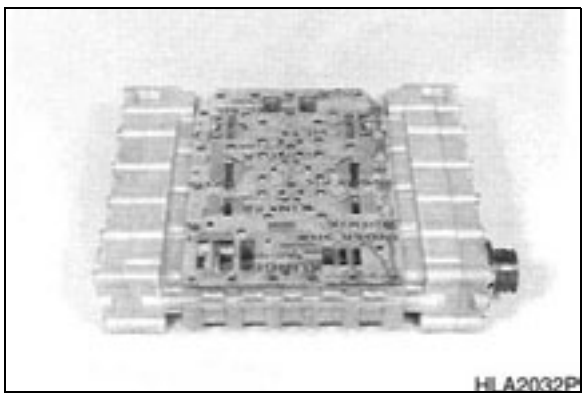


Figure 83

19. RemoveClutch-K4 a bit using pry bars and remove Clutch-K1.

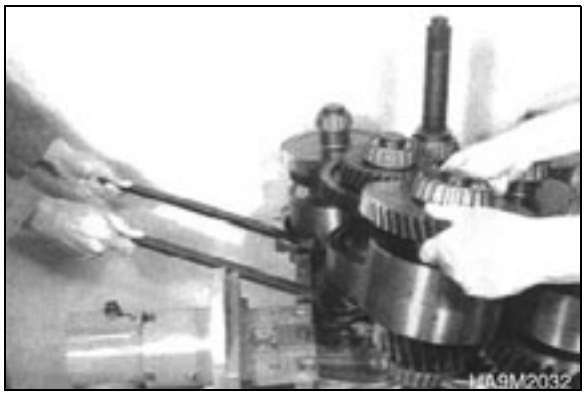


Figure 116

20. Remove Clutch-K2.

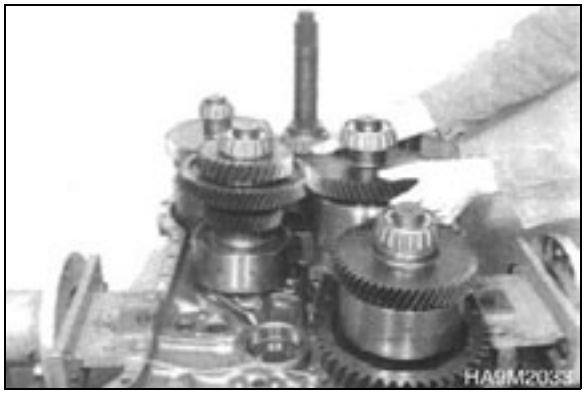


Figure 117

21. Remove Clutch-K3.

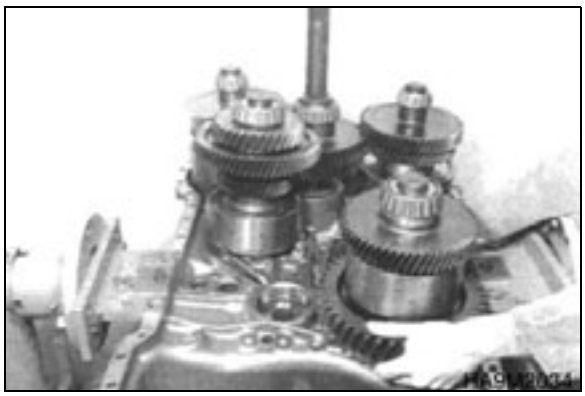


Figure 118

22. RemoveClutch - KV and KR using pry bars and remove Clutch - K4.

    (S) Pry bar - 5870 345 065

Figure 119

TRANSMISSION REASSEMBLY

INSTALL OIL TUBE

IMPORTANT
To ensure correct installation of oil tubes, the use of indicated special tool (S) is imperative.

1. Insert suction pipe (1), pressure pipes (2) and pressure pipe lubrication (3) into housing bores.
2. Fasten suction and pressure pipes using socket head screws.

   NOTE: *Torque limit (M8/8.8) 23 Nm (17 ft lb)*

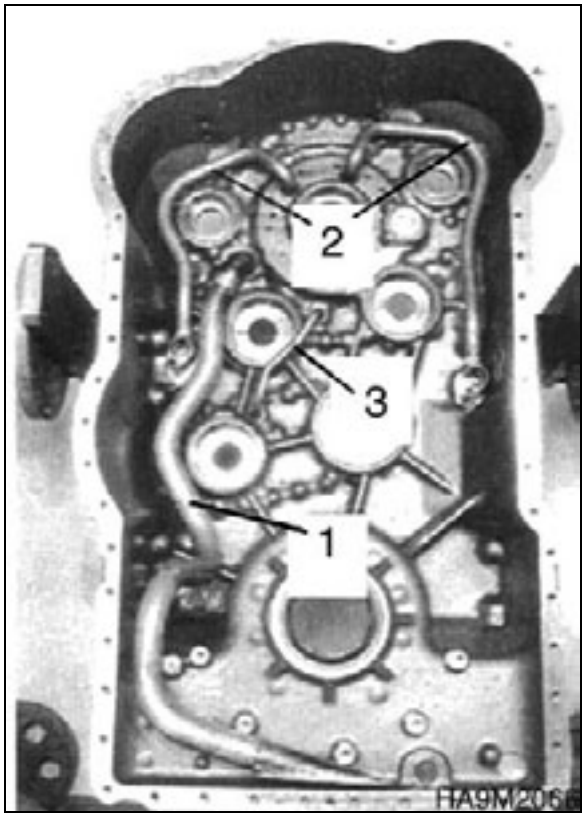


Figure 150

3. Tilt housing 180°.
4. Roll suction and pressure pipes (Arrows) into housing bores, using special tool.

IMPORTANT
The pipe end must be maximally plane with the housing face. If necessary, equalize projection of pipe.

(S) Rolling tool - 5870 600 003

(S) Rolling tool - 5870 600 005

(S) Rolling tool - 5870 600 007

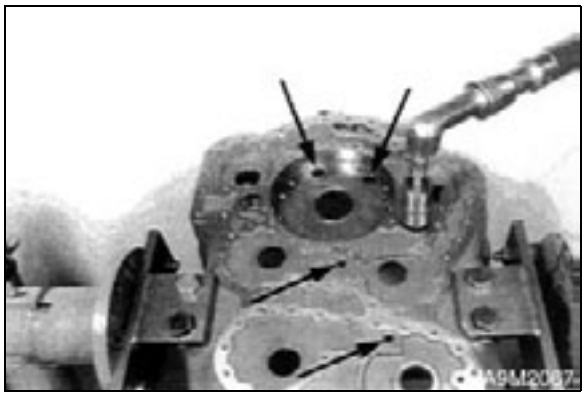


Figure 151

6. Install piston until seated.

   NOTE: *Pay attention to installation position, see Figure 181.*

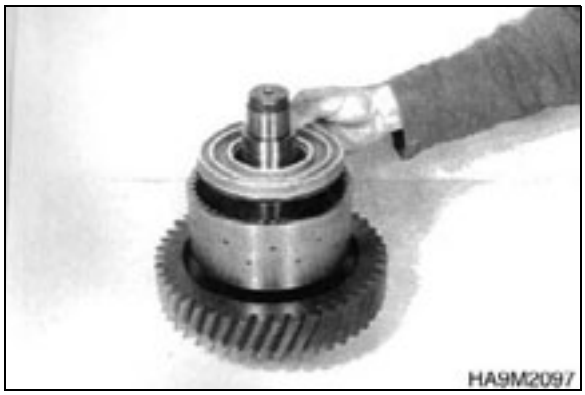


Figure 181

7. Lay on cup-spring pack and guide ring.

   NOTE: *Pay attention to stacking of cup springs, see page -92.*

Figure 182

8. Preload cup-spring pack and attach it using retaining ring.

   (S) Assembly aid - 5870 345 088

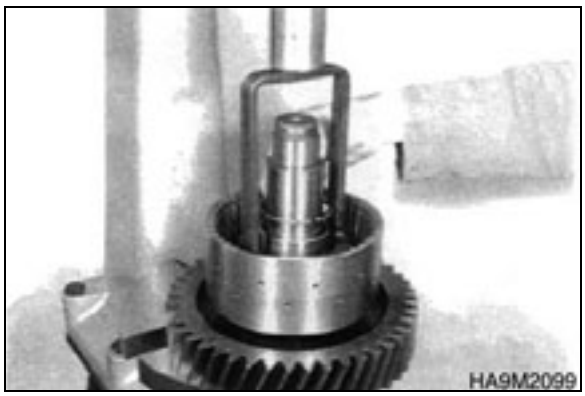


Figure 183

17. Assemble both axial washer and needle cage.

    NOTE: *Upper and lower axial washer have same thickness (55 x 78 x 1).*

Figure 210

18. Assemble both needle bearings.

Figure 211

19. Assemble idler gear.

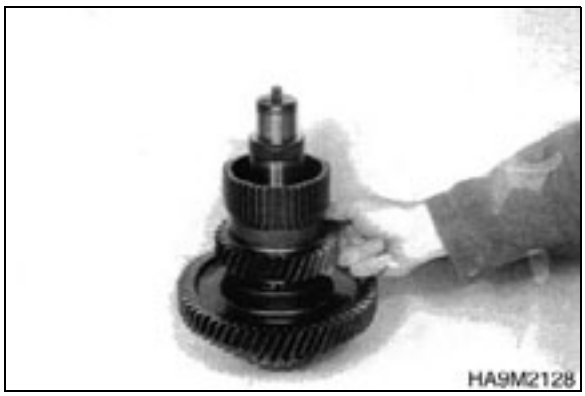


Figure 212

20. Assemble axial washer (3) (55 x 78 x 1), needle cage (2) and running disk (1) (55 x 78 x 5).

    NOTE: *Install running disk 1, with chamber facing needle cage.*

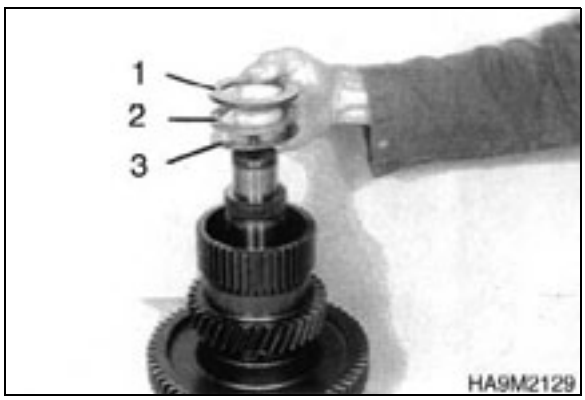


Figure 213

2. Assemble output flange.
3. Insert O-ring (Arrow) into gap of drive flange and shaft.

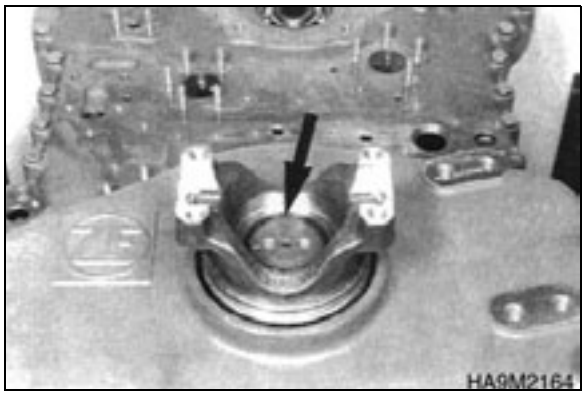


Figure 248

4. Fasten output flange using disk and hex, head screws.

   NOTE: *Torque limit (M10/8.8) 46 Nm (34 ft lb).*

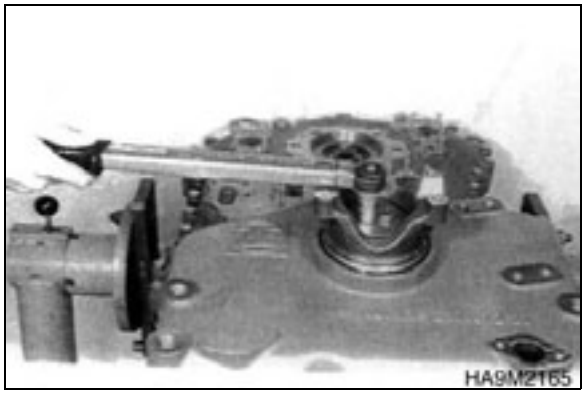


Figure 249

5. Attach hex head screws using lock plate.

   (S) Driver 5870 057 009

   (S) Handle 5870 260 002

6. Install converter-side output flange.

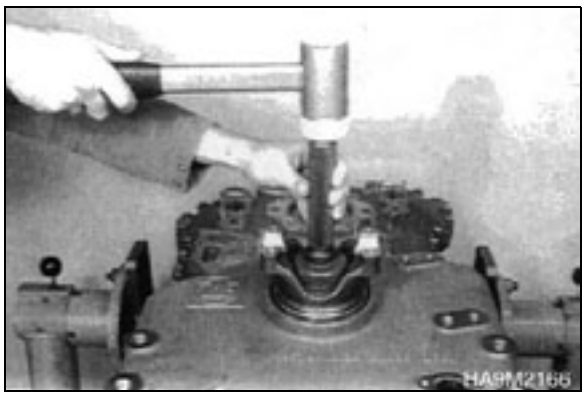


Figure 250

4. Turn counting disk radially until one tooth tip is situated centrally to inductive transmitter hole.
5. Insert measuring pin (S) until end face has got contact on tooth tip, resp. the retaining ring on screw - in face of housing.

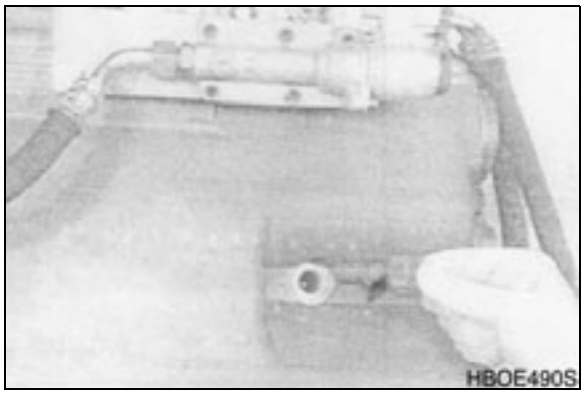


Figure 282

6. Remove measuring pin and measure Dimension I from end face/measuring pin to retaining ring.

   NOTE: *Dimension I, e.g. 30.10 mm (1.1850 in).*

7. Measure Dimension II from contact face inductive transmitter to contact face.

   NOTE: *Dimension II, e.g. 30.00 mm (1.1811 in).*

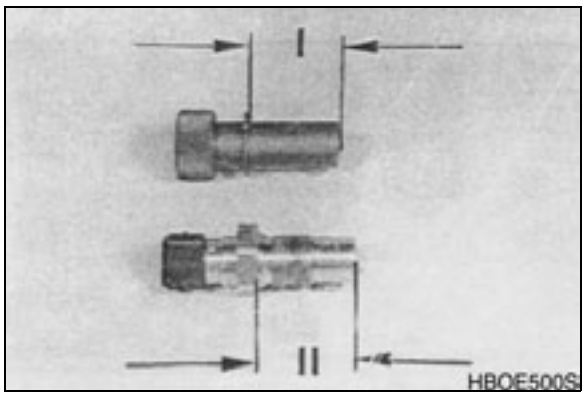


Figure 283

EXAMPLE L:

Dimension I	30.10 mm (1.1850 in)
Required Gap (0.03 - 0.08 mm (0.0012 - 0.0031 in)) e.g	- 0.60 mm (0.0236 in)
Gives Installation Dimension	= 29.50 mm (1.1614 in)

EXAMPLE L:

Dimension II	30.00 mm (1.1811 in)
Installation Dimension	- 29.50 mm (1.1614 in)
Difference = Shim	= 0.50 mm (0.0197 in)

Symbol	Meaning	Remarks
WE	Warning high engine speed.	Changes between actual gear/direction while driving, in neutral only displayed if no fault is detected (spanner).
PN	Direction F or R selected while parking brake engaged.	Transmission in neutral until parking brake is released. **CAUTION**: Vehicle starts to move after release of parking brake.
F or R flashing	Direction F or R selected while turbine speed is to high. **CAUTION:** Gear will engage if turbine speed drops.	----------
EE flashing	No communication with display.	Checked wiring from TCU to display.

Fault Code (hex)	Meaning of the Fault Code (Possible reason for fault detection.)	Reaction of the TCU	Possible Steps to Repair	Remarks
3C	Logical error at output speed input. TCU measures a output speed over a threshold and at the next moment the measured speed is zero. • Cable / connector is defective and has bad contact. • Speed sensor has an internal defect. • Sensor gap is incorrect.	Special mode for gear selection. Op-Mode: substitute clutch control. If a failure is existing at turbine speed. TCU shifts to neutral. Op-Mode: limp home.	Check cable from TCU to sensor. Check connectors. Check speed sensor. Check sensor gap.	This fault is reset after power up of TCU.
3E	Output speed zero doesn't fit to other speed signals. If transmission is not neutral and the shifting has finished. TCU measures output speed zero and turbine speed or internal speed not equal to zero. • Speed sensor has an internal defect. • Sensor gap is incorrect.	Special mode for gear selection. Op-Mode: substitute clutch control. If a failure is existing at turbine speed. TCU shifts to neutral. Op-Mode: limp home.	Check sensor signal of output speed sensor. Check sensor gap of output speed sensor. Check cable from TCU to sensor.	This fault is reset after power up of TCU.
71	S.C. to battery voltage at clutch K1. The measured resistance value of valve is out of limit, voltage at K1 valve is too high. • Cable / connector is defective and has contact to battery voltage. • Cable / connector is defective and has contact to another regulator output of TCU. • Regulator has an internal defect.	TCU shifts to neutral. Op-Mode: limp home. If failure at another clutch is pending. TCU shifts to neutral. Op-Mode: TCU shut down.	Check cable from TCU to gearbox. Check connectors from TCU to gearbox. Check regulator resistance. [1)] Check internal wire harness of gearbox.	[1)] See “Measurement of Resistance at Actuator/sensors and Cable” on page 35.

* Only Mega 400-III PLUS
** Only Series "V"
Gray shaded boxes are error codes for other applications. They are only given for general reference purposes.

Fault Code (hex)	Meaning of the Fault Code (Possible reason for fault detection.)	Reaction of the TCU	Possible Steps to Repair	Remarks
B4	Slippage at clutch K4. TCU calculates a differential speed at closed clutch K4. If this calculated value is out of range, TCU interprets this as slipping clutch. • Low-pressure at clutch K4. • Low main pressure. • Wrong signal at internal speed sensor. • Wrong signal at turbine speed sensor. • Sensor gap is incorrect. • Clutch is defective.	TCU shifts to neutral. Op-Mode: limp home. If failure at another clutch is pending. TCU shifts to neutral. Op-Mode: TCU shut down.	Check pressure at clutch K4. Check main pressure in system. Check sensor gap at internal speed sensor. Check sensor gap at turbine speed sensor. Check signal at internal speed sensor. Check signal at turbine speed sensor. Replace clutch.	----------
B5	Slippage at clutch KV. TCU calculates a differential speed at closed clutch KV. If this calculated value is out of range, TCU interprets this as slipping clutch. • Low-pressure at clutch KV. • Low main pressure. • Wrong signal at internal speed sensor. • Wrong signal at turbine speed sensor. • Sensor gap is incorrect. • Clutch is defective.	TCU shifts to neutral. Op-Mode: limp home. If failure at another clutch is pending. TCU shifts to neutral. Op-Mode: TCU shut down.	Check pressure at clutch KV. Check main pressure in system. Check sensor gap at internal speed sensor. Check sensor gap at turbine speed sensor. Check signal at internal speed sensor. Check signal at turbine speed sensor. Replace clutch.	----------

* Only Mega 400-III PLUS
** Only Series "V"
Gray shaded boxes are error codes for other applications. They are only given for general reference purposes.

HYDRAULICS

Problem	Possible Cause	Remedy
Oil leaking between cylinder head (16) and piston rod (18). (Index nos. refer to Figure 1).	Foreign material in U-ring (3, Figure 1)	Remove foreign material.
	Scratches in U-ring (3, Figure 1).	Replace U-ring (3).
	Damage to U-ring (3, Figure 1).	Replace U-ring (3).
	Foreign material in dust seal (2, Figure 1).	Remove foreign material.
	Scratches in dust seal (2, Figure 1).	Replace dust seal (2).
	Damage to dust seal (2, Figure 1).	Replace dust seal (2).
	Foreign material in seal O-ring (4, Figure 1).	Remove foreign material.
	Scratches in seal O-ring (4, Figure 1).	Replace O-ring (4).
	Damage to seal O-ring (4, Figure 1).	Replace O-ring (4).
	Scratch on sealing surface of piston rod (18, Figure 1).	If scratches are not deep, hone with an oil stone and lubricate. If scratches are deep, replace piston rod (18).
	Deep scratches on inner surface of bushing (15, Figure 1).	Replace bushing.
Oil leaking between cylinder head (16) and cylinder tube (13).	Damage to O-rings (14, Figure 1).	Replace O-rings (14).
Oil leaking from welded area of cylinder tube (13).	Damage to welded area.	Replace cylinder tube (13).
Cylinder drops from pull of gravity.	Light scratches on sealing surface of cylinder tube (13, Figure 1).	Hone out scratches with oil stone.
	Deep scratches on sealing surface of cylinder tube (13, Figure 1).	Replace cylinder tube (13).
	Deep scratches on sealing surface of piston O-rings (10, Figure 1).	Replace O-rings (10).
	Foreign material in U-ring (3, Figure 1).	Remove foreign material.
	Scratches in U-ring (3, Figure 1).	Replace U-ring (3).
	Damage to U-ring (3, Figure 1).	Replace U-ring (3).
	Nylon wear rings (7, Figure 1) twisted.	Replace nylon wear rings (7).
	Nylon wear rings (7, Figure 1) scratched.	Replace nylon wear rings (7).
	Nylon wear rings (7, Figure 1) have other damage.	Replace nylon wear rings (7).

14. Insert one end of slipper seal, (1, Figure 28) into its groove. Use your hand to slide other end of slipper seal into groove.

WARNING!

Before piston is inserted into cylinder tube, make sure that slipper seal is no longer expanded. If seal is still expanded, it could catch on threaded portion of cylinder tube. An expanded seal could also jam inside cylinder tube.

15. Install two backup rings, (1, Figure 29). One ring fits on either side of slipper seal (2).

Reference Number	Description
1	Backup Ring
2	Slipper Seal

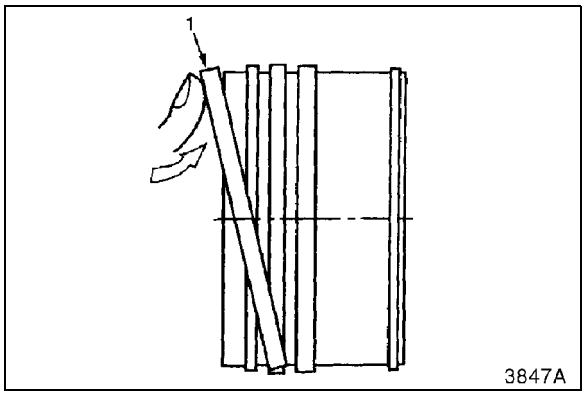


Figure 28

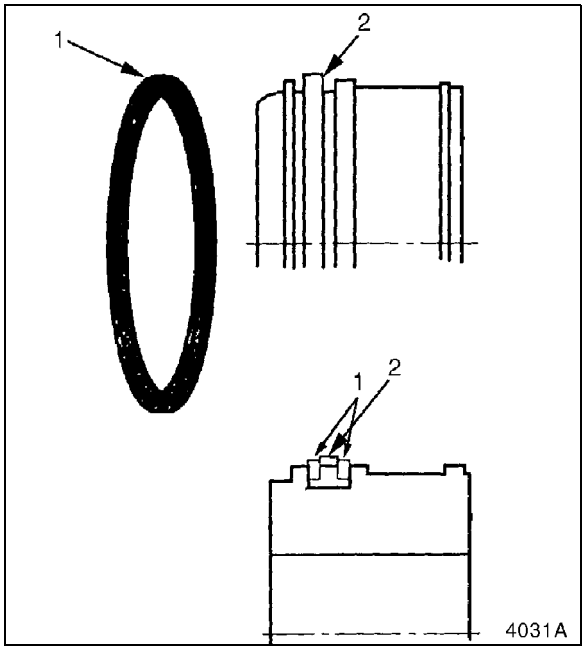


Figure 29

On the fan drive motor, at engine speed of 1,650 rpm and above 1,650 rpm, the relief valve on the fan drive pump opens to dump excess flow back to hydraulic tank and thus the fan motor speed will constantly be 1,400 rpm. At low idle engine speed (between 970 and 1,650 rpm), the fan speed will be approximately between 830 and 1,400 rpm.

Fan speed can be changed by adjusting the relief valve on the fan drive pump.

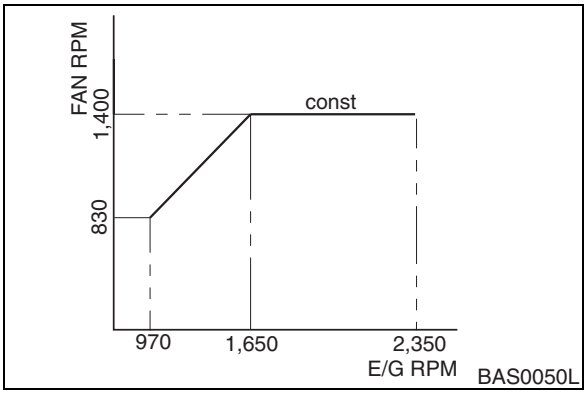


Figure 4

4. Place E-seals, flat side outward, into grooves in both bearing blocks. Follow by carefully placing backup ring, flat side outward, in groove made by E-seal and groove in bearing block. (Note: In the W900 series pump, in center of backup ring and E-seal there is a notch, make sure that these notches line up so backup ring will set flush with E-seal). The backup ring in the W1500 pump is symmetrical.
5. Place mounting flange, with shaft seal side down, on a clean flat surface.
6. Apply a light coating of petroleum jelly to exposed face of front bearing block.
7. Insert drive end of drive shaft through bearing block with seal side down, and open side of E-seal pointing to intake side of pump.
8. Install seal sleeve over drive shaft and carefully slide drive shaft through shaft seal. Remove seal sleeve from shaft.
9. Install idler gear shaft in remaining position in bearing block. Apply a light coat of clean oil to face of drive and idler gears.

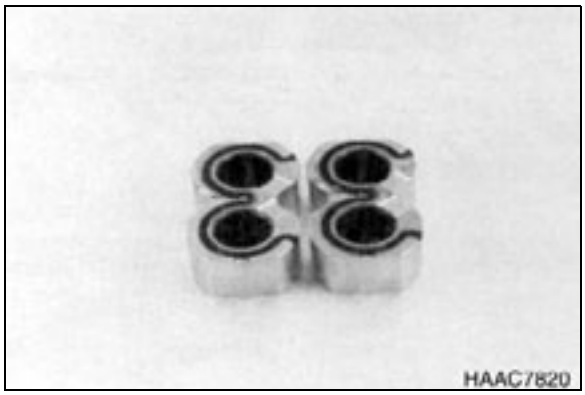


Figure 23

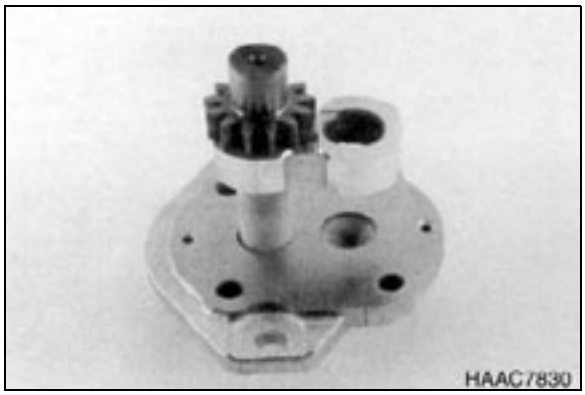


Figure 24

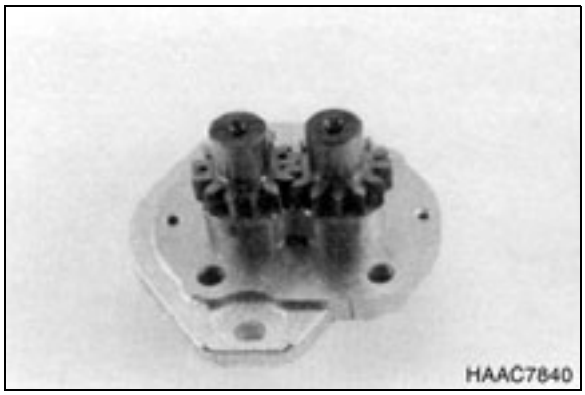


Figure 25

DIMENSIONS

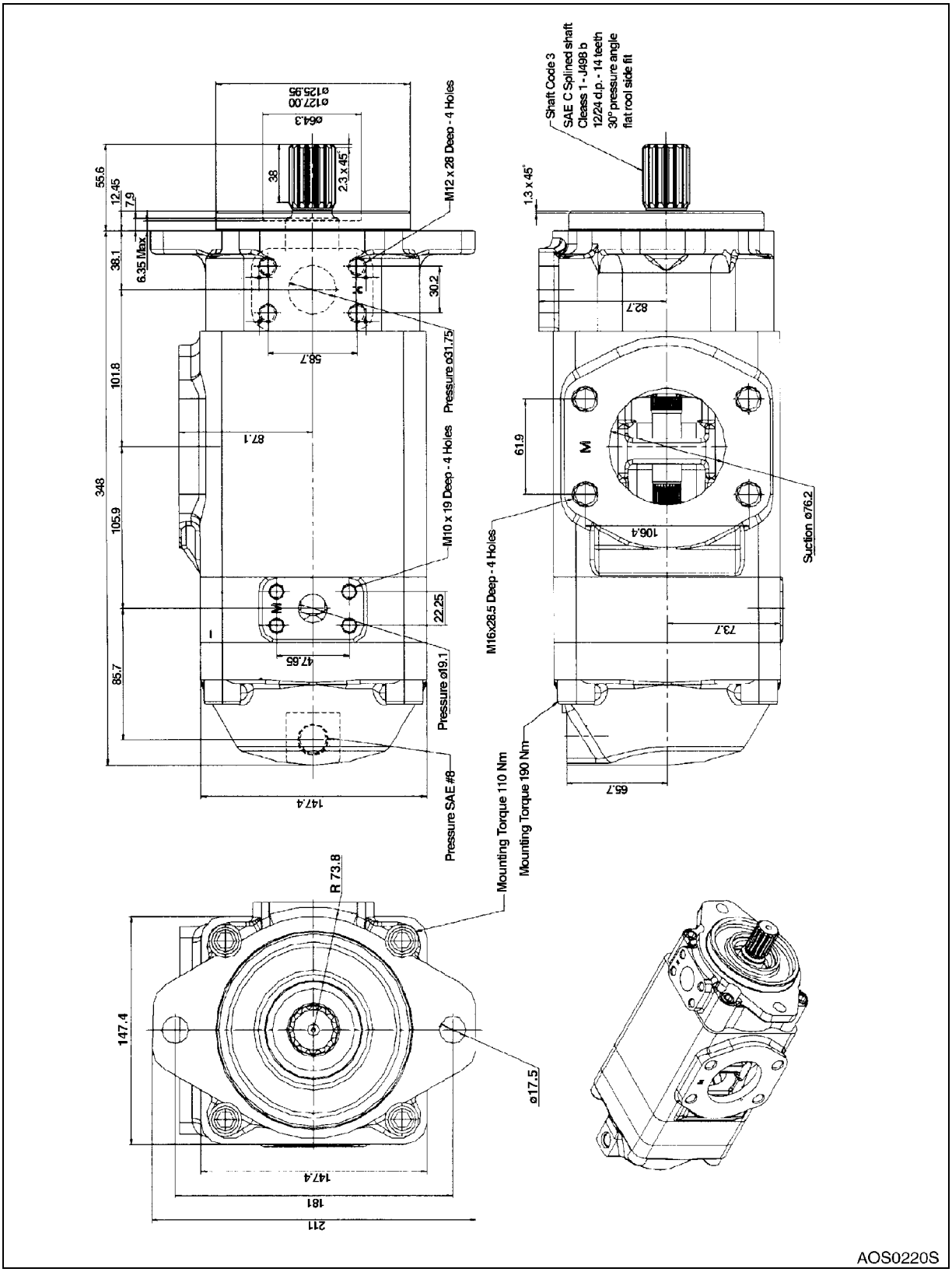


Figure 4

19. Use screws (38) to ensure end cap (1) goes down straight and does not tilt.

    NOTE: *Tighten screws (38) to 190 Nm (140 ft lb).*

Figure 32

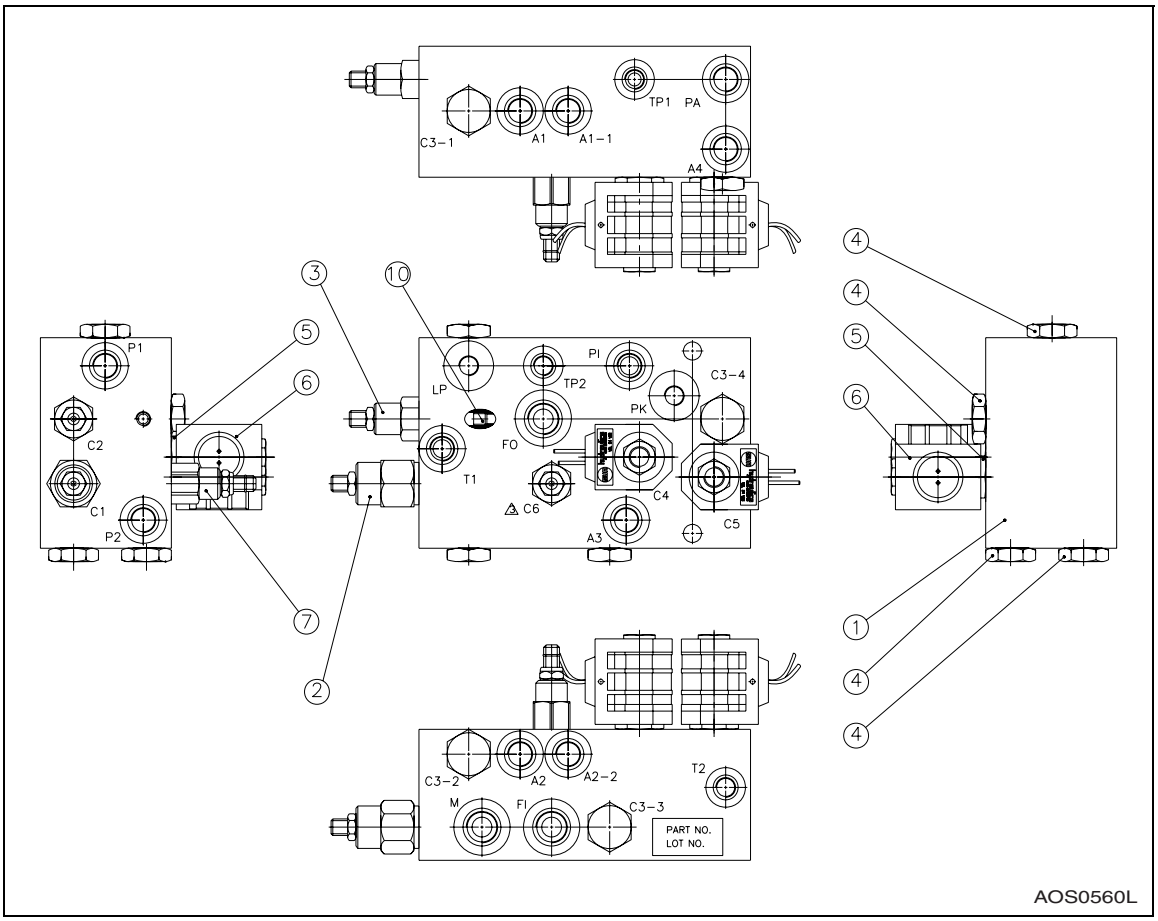


Figure 7 BRAKE & FAN MOTOR SUPPLY VALVE
(S/N 1001 thru 2000 (Europe Low Noise Kit))
(S/N 2001 and Up)

Reference Number	Description
1	Body (200*127*79)
2	Sequence (C1)
3	Reducing (C2)
4	Check (C3-1, C3-2, C3-3, C3-4)
5	Solenoid (C4, C5)

Reference Number	Description
6	Coil (C4, C5)
7	Relief (C6)
8	Plug
9	Plug
10	Orifice (∅4.0-M8*1.25)

OPERATION (PORT RELIEF VALVE)

In the Inoperative State

The pressure oil at the cylinder port (HP) flows through the hole in the piston poppet (1) to act from the opposite sides of the check valve poppet (2) and relief valve poppet (3). Owing to the difference in area on which the hydraulic pressure acts, both poppets close to seat the same time.

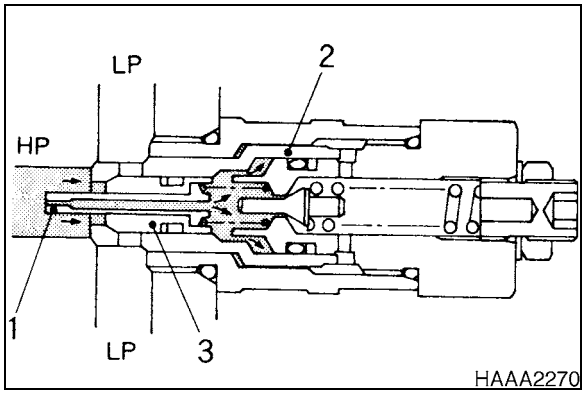


Figure 8 IN INOPERATIVE STATE

Operation (A)

When the pressure at the cylinder port (HP) rises and exceeds the relief pressure setting, the pilot poppet (4) opens. The pressure oil flows from the pilot poppet into the low-pressure oil passage (LP), passing between the check valve poppet (2) and the housing (5).

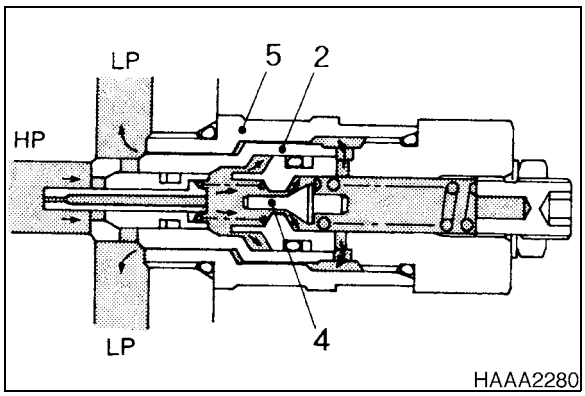


Figure 9 OPERATION (A)

Operation (B)

As the pilot poppet (4) opens, the pressure at the back of the piston poppet (1) lowers to move the piston poppet (1). As a result, the hole in the piston poppet (1) is closed so that the pressure at the back of the relief valve poppet (3) drops further.

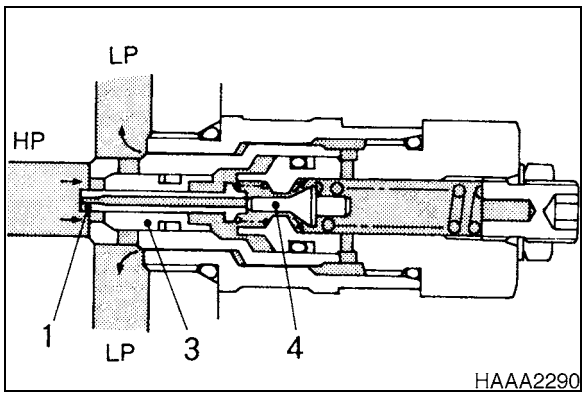


Figure 10 OPERATION (B)

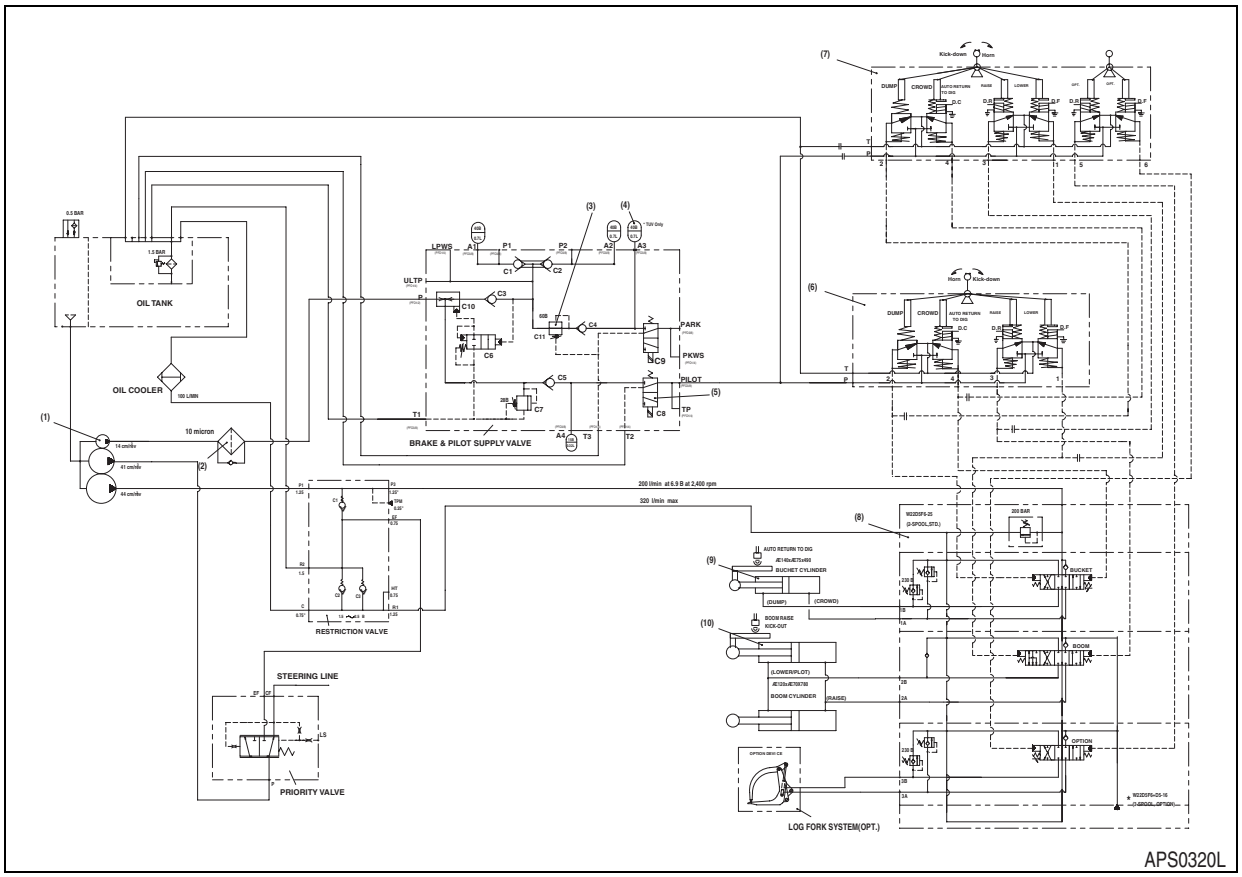


Figure 3

Reference Number	Description
1	Pilot Pump
2	Brake and Pilot Filer
3	Pressure Reducing Valve
4	Accumulator: Pilot
5	Pilot Cutoff Valve

Reference Number	Description
6	Pilot Valve (Mono, STD.)
7	Pilot Valve (Two-lever, OPT.)
8	Main Control Valve
9	Bucket Cylinder
10	Boom Cylinder

REASSEMBLY

NOTE: *The relief valve pressure can be changed by changing springs. The following table displays the characteristics of the three springs available. See Figure 13.*

Pressure in Bars	Wire Diameter (A)	Coil Diameter (B)	Spring Height (C)
4 bar (58 psi)	2.5 mm (0.0984")	12.5 mm (0.4921")	50.0 mm (1.9685")
7 bar (100 psi)	3.0 mm (0.1181")	12.5 mm (0.4921")	50.0 mm (1.9685")
10 bar (145psi)	3.2 mm (0.1260")	12.5 mm (0.4921")	50.0 mm (1.9685")

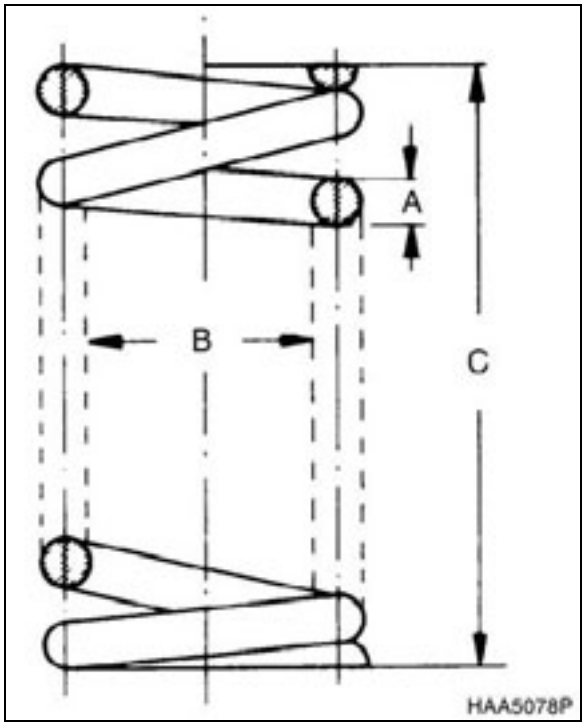


Figure 13

1. Figure 14, shows PP plug and spool.

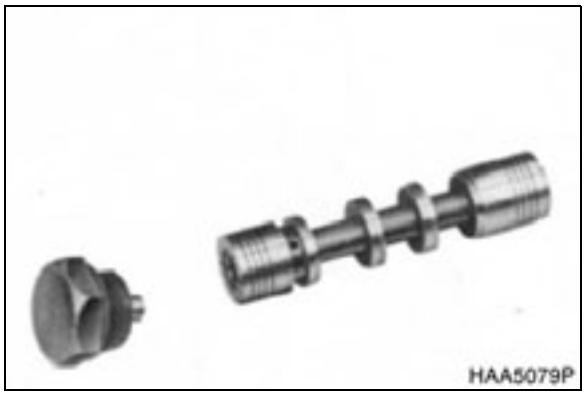


Figure 14

CUSHION VALVE OPERATION

Function

The cushion valve absorbs any excessive peak pressure that my be generated during initial movement of the steering wheel or during a change in steering direction. The cushion valve also prevents excessive high-pressure and shock that can result from steering load inertia.

Working Principle

If a high-pressure oil is fed back to the port R, it pushes the spring (3) and opens the poppet (2). This operation directs the high-pressure oil to port L through the center hole in spool (12) and the check valve poppet in port L part. At the same time, oil reaches the pressure room of the plug through orifice (8). This operation closes the passage from port R to port L. This releases the pressure and prevents machine shock by intercepting oil. If a low-pressure oil flows, the cushion operation is not necessary. It is due to the speed of closing spool (12) is faster than the speed of opening poppet (2), therefore, the cushion valve does not work.

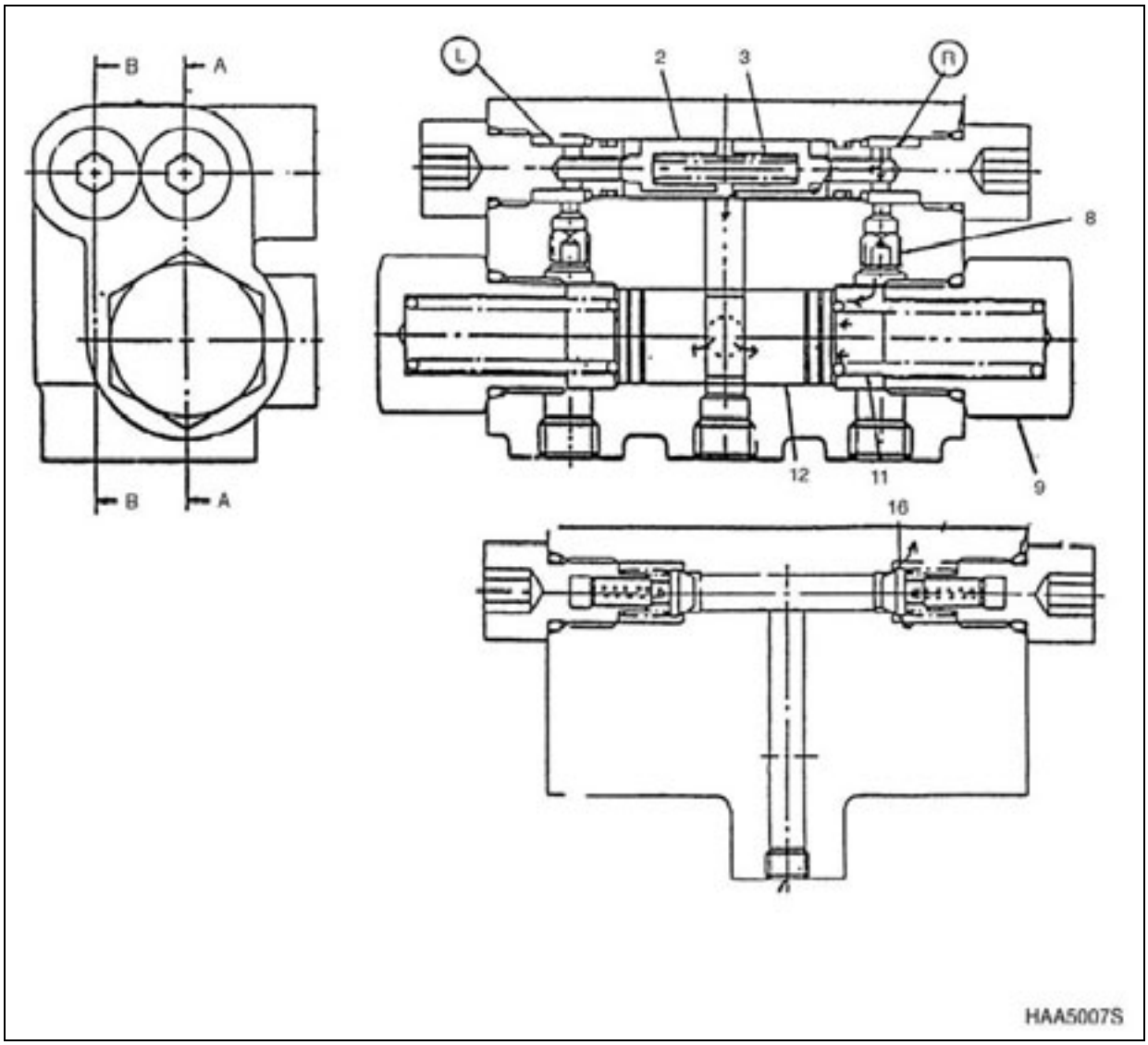


Figure 5

17. Push neutral position springs out of groove in spool. See Figure 26.

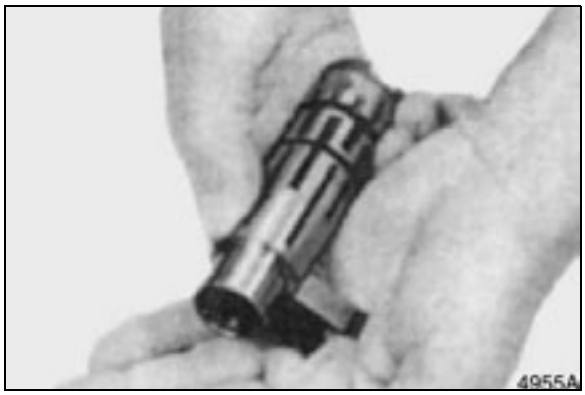


Figure 26

18. Remove dust seal from housing. See Figure 27. Remove O-ring and backup ring from inside housing.

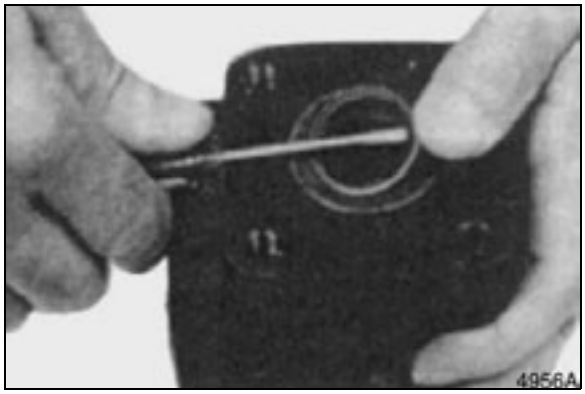


Figure 27

19. Figure 28, shows all parts removed from steering unit. Clean all parts before assembly. Use only new O-rings and seals.

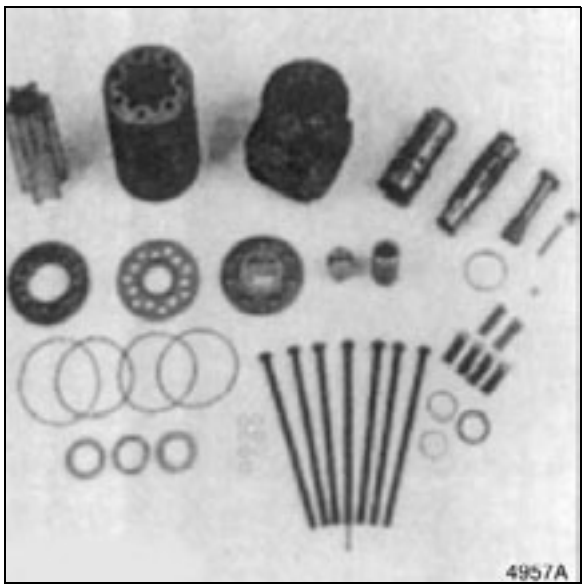


Figure 28

CLEANING AND INSPECTION

For general cleaning and inspection procedures, refer to "General Maintenance Procedures" section.

26. Use a screwdriver to install OSPL 800 and 1000 spacers (If equipped.). See Figure 57.

    NOTE: *Refer to parts manual for our unit to determine if these parts are installed.*

Figure 57

27. Install end cover. See Figure 58.

Figure 58

28. Install a washer and roll pin into hole shown in Figure 59.

Figure 59

29. Install six remaining bolts and tighten them. See Figure 60. Cross tighten bolts and roll pin to 48 Nm (35 ft lb).

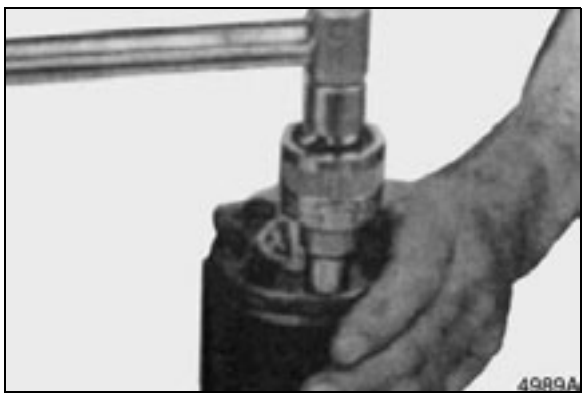
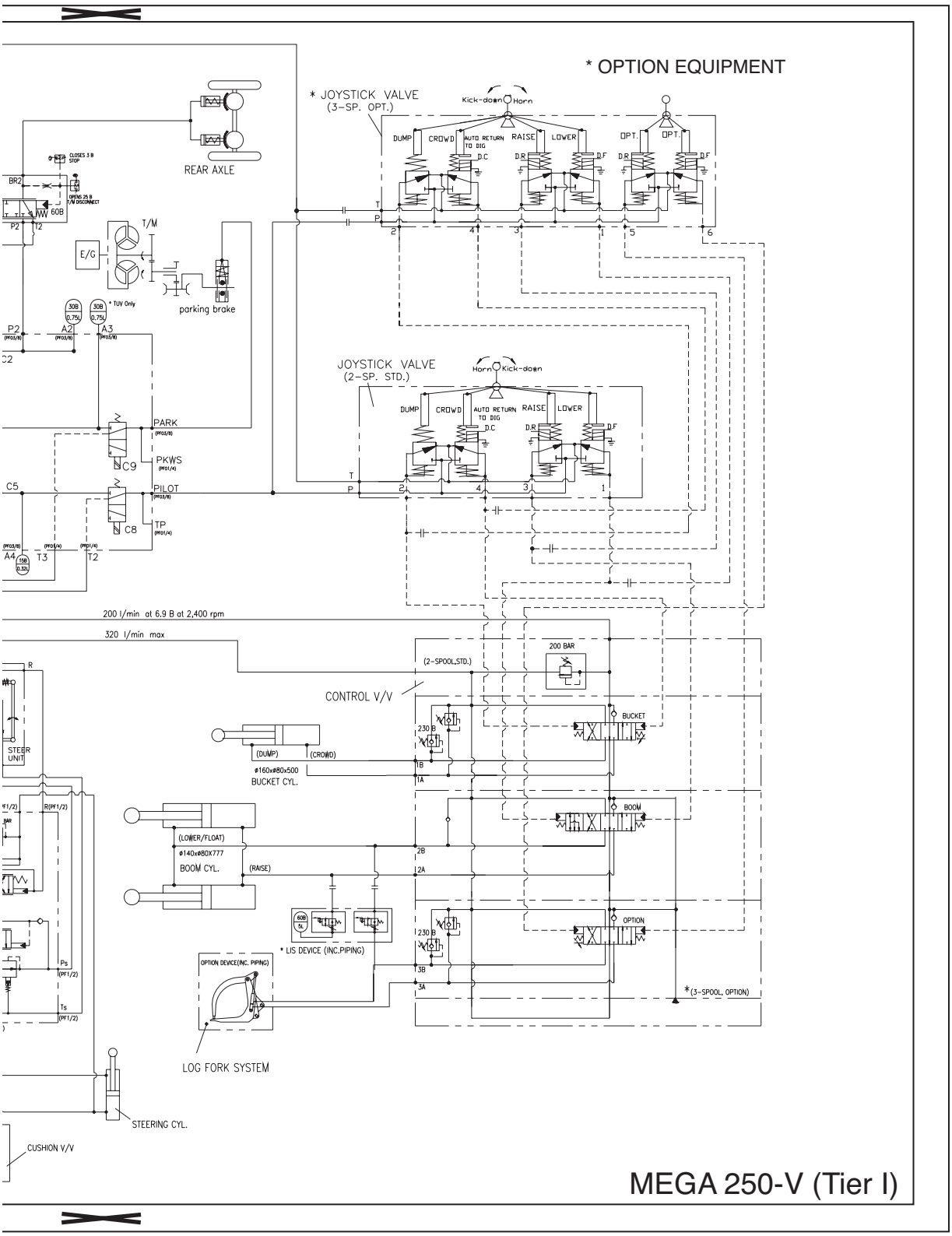


Figure 60

SPECIFICATIONS

Item		Specification
Maximum Rated Pressure		210 Bar
Rated Flow Ports to R1, R3, C		200 l/min
Rated Flow Ports to R2		400 l/min
Setting Pressure	C1	160 - 165 Bar
	C3	2 ±0.2 Bar Cracking Pressure
	C4, 5, 6	0.7 ±0.1 Cracking Pressure
Port Size	R1, R2	1-1/2" SAE Flange Port (M12, 1.75)
	P1, P3	1-1/4" SAE Flange Port (M12, 1.75)
	HT, C, EF	3/4" PF O-ring
	TPM, TPS	1/4" PF O-ring
	R3	1/4" PF O-ring (Supplied Plugged)



MEGA 250-V (Tier I)

BSS0220L

OVERVIEW

The electrical system for this equipment is DC 24 volts. The rated voltage for all electric components is 24 volts with the exception of the stereo and air-conditioning control actuator. The system contains two 12 volt batteries connected in series and a three phase AC generator with a rectifier. The electric wiring used in the system is easily identifiable by the insulator color. The color symbols used in the electrical system are listed in the following chart.

Electric Wire Color

Symbol	Color
W	White
G	Green
Or	Orange
B	Black
L	Blue
Lg	Light green

Symbol	Color
R	Red
Gr	Gray
P	Pink
Y	Yellow
Br	Brown
V	Violet

NOTE: *RW: Red wire with White stripe*

R - Base Color, W - Stripe Color

NOTE: *0.85G: Nominal sectional area of wire core less insulator = 0.85 mm^2 (0.03 in^2).*

MONITORING SYSTEM

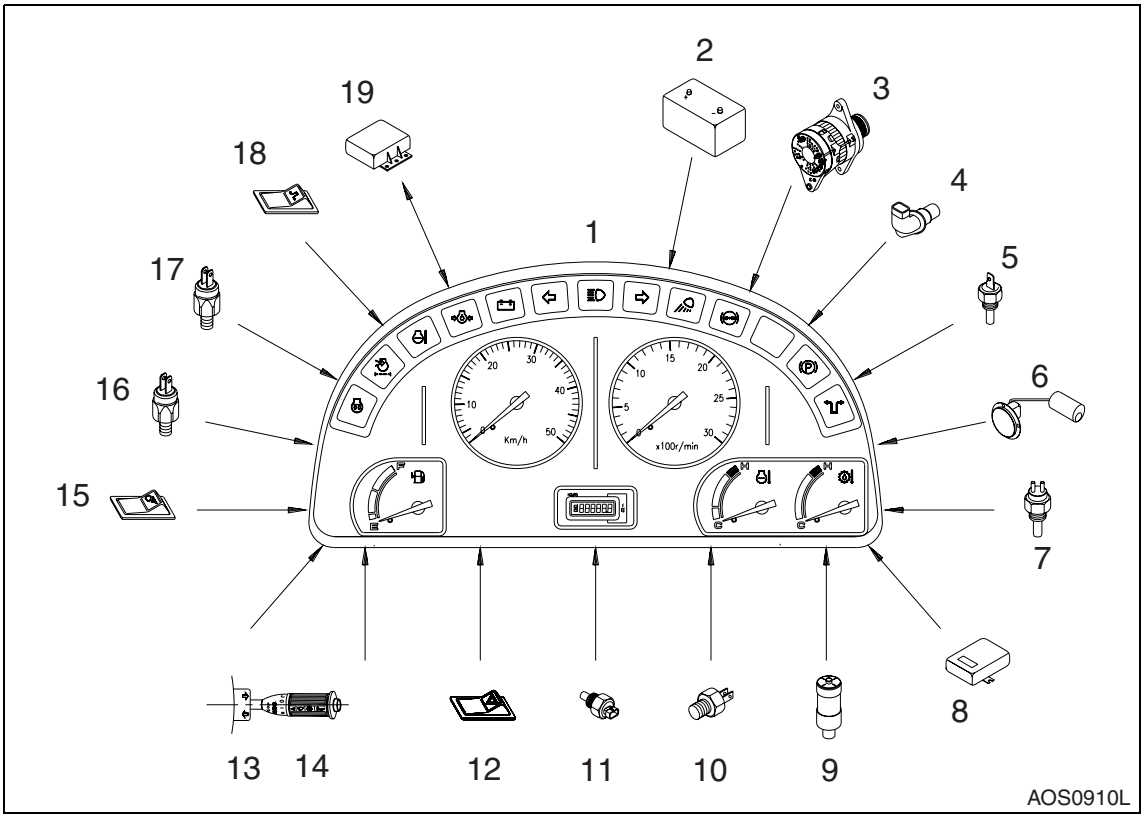


Figure 14

Reference Number	Description
1	Instrument Panel
2	Battery
3	Alternator
4	Speed Sensor
5	Coolant Temperature Sensor
6	Fuel Sensor
7	Transmission Oil Temperature Sensor
8	Preheat Controller
9	Air Cleaner Indicator

Reference Number	Description
10	Engine Coolant Temperature Switch
11	Engine Oil Pressure Switch
12	Hazard Warning Light Switch
13	Turn Signal Light Switch
14	High Beam Switch
15	Working Light Switch
16	Brake Oil Pressure Switch
17	Parking Brake Pressure Switch
18	Emergency Steering Switch
19	Control Unit

The monitoring system displays various data and warning signals onto the instrument panel by processing information gathered from various sensors throughout the equipment.

Symbol	Description	Input Terminal	Operation	Remarks
	Parking Brake	CN2-12	Light turns "ON" when the parking brake switch is applied and parking brake pressure is above 65 kg/ cm^2 (925 psi). (24V is inputted to the input terminal)	Under any conditions, will be turned "ON" before engine start up.
	Emergency Steering	CN2-13	Light turns "ON" when the vehicle speed is above 5 km/h and the steering pressure is below 10 kg/ cm^2 (140 psi). (When the test switch is applied)	This is option parts.

Initial Operation

Item	Input (Terminal)	Output (Operation and initial setting mode)
Initial Operation	CN 1-1	• All warning lights are turned "ON" and turned "OFF" after 2 seconds. (Except for turn signal indicator, high beam indicator, working light indicator and transmission cutoff indicator and emergency steering indicator. • Warning buzzer is activated and turned "OFF" after 2 seconds. • Monitoring system displays present conditions.

RETURN TO DIG

After dumping, if the work lever (joystick) is in the "CROWD" position, the work lever (joystick) will be locked and the bucket will be crowded. When the bucket is matched to setting position, the lever is returned to the "NEUTRAL" position and bucket crowding will be stopped. After this operation, if the boom is lowered the bucket is in parallel with ground.

With the return to dig proximity switch (10) and the bucket positioner are matched, the contact points "30" and "87" of the return to dig relay (4) is closed due to the current flowing from fuse box (1), to the coil of the return to dig relay (4) and to the "0" and "-" terminal of the return to dig proximity switch (10). In this state, if the work lever (joystick) is in the "CROWD" position, the lever is locked and the bucket positioner is approaching out of the return to dig proximity switch (10). That is, bucket is crowded. If the bucket positioner is out of the return to dig proximity switch (10), the float magnetic (9) is de-energized. As a result the lever is returned to "NEUTRAL" position and bucket is set to the selected digging angle.

Proximity Switch

- Operating Distance: 10±1 mm
- Operation Indicator light

  : Light turns "ON" when the object is detected.

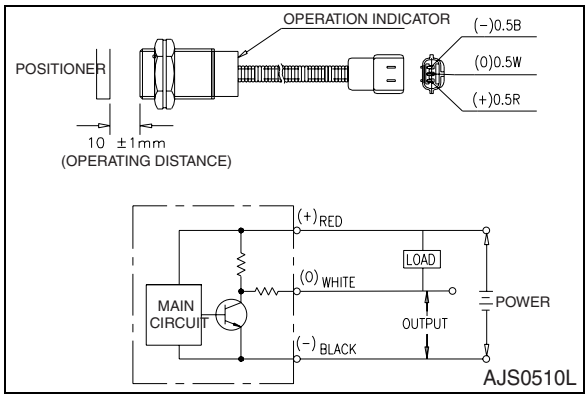


Figure 32