Starting Motor Keeps Running

Defective solenoid.
Defective start switch.
Short in wiring.

Noise Produced At Engine Cranking

Armature interfering with stationary components.
Starting motor drive gear worn.

Charging Circuit

Low Charging System Voltage

High resistance in circuit connections.
Defective wiring.
Low amperage output of alternator.
Defective regulator.
Defective battery.

Low Charging System Output

Slipping drive belt.
Excessively worn or sticking brushes.
Dirty or out-of-round slip rings.
Grounded, shorted, or open field circuit.
Defective alternator.
Defective regulator.

High Charging System Voltage

High resistance at regulator connections.
Defective regulator.

Noisy Alternator

Defective drive belt.
Worn or defective bearings.
Loose mounting or drive belt.
Pulley not aligned.
Diodes shorted or open.

Gauges

Voltmeter Shows Low Voltage (Engine Running)

Alternator inoperative.
Faulty voltage regulator.
Short circuits.
Alternator drive belt loose or broken.
Defective voltmeter.

Voltmeter Fluctuates

Shorted or loose connections.
Alternator defective.
Alternator drive belt loose.
Low idling speed.

If A Gauge Does Not Register

Lack of current to the gauge.
Poor ground connection.
Connecting wire grounded to unit.
A defective sending unit or gauge.

If A Gauge Consistently Registers Too High

Poor connection between gauge and connecting wire.
Broken connecting wire.
Poor ground at sending unit.
Failure of gauge or sender, usually the sender.

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Adjusting Neutral Start Switches

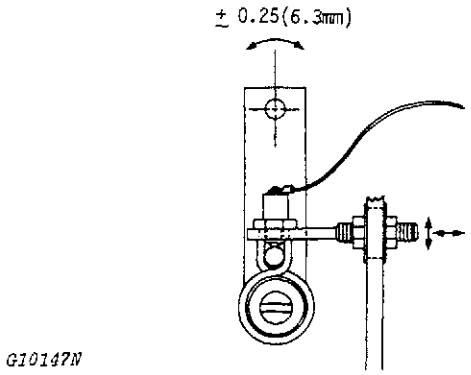


Fig. 6-Adjusting Neutral Start Switches

Block the machine up so the wheels clear the floor.

Raise the lift arm and engage the lift arm lock pins.

Remove the side screens, seat support assembly and right hand cover plate.

Disconnect the T-bar control links from the left hand and right hand hydrostatic lever weldments. (This will allow you to adjust the pumps to a good neutral position without any outside function of the external control links).

Check the mounting hardware on the lever and make sure it is tight. (This consists of the 1/4-20NC bolt and nut and the 5/16-inch set screw in the bottom of each lever).

Start the unit and check for a neutral setting of the hydrostatic pumps; when the pumps are in their neutral setting the wheels will remain stationary. (When adjusting the pumps to their neutral position the neutral start switches should be adjusted down so that engine starting problems are eliminated during this phase.)

The adjustment of the lever control to neutral is accomplished by turning the nuts that position the switch holder weldment either in or out as required to position the switch holder weldment and the lever control to a neutral position. (To make sure you have a true neutral setting you should stroke each pump forward and release the lever weldment. When the control moves to the neutral position the wheels should not turn. Repeat this process moving the lever to reverse, again the wheels should not turn.)

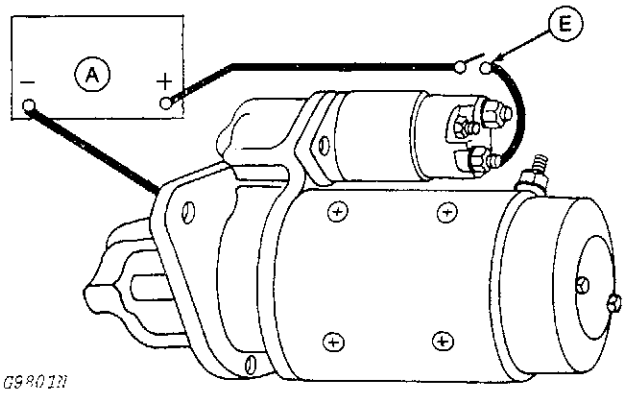
The neutral start position of the switch is set by adjusting the switch holder weldment up or down as required. This weldment can be moved by loosening the outside nut slightly and moving the weldment up or down as required.

The switch should be adjusted so the machine will start with the lever in the neutral position ± 0.25 inch (6.3 mm), but such that the machine will not start when the control lever is stroked to forward or reverse.

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Solenoid Return Test

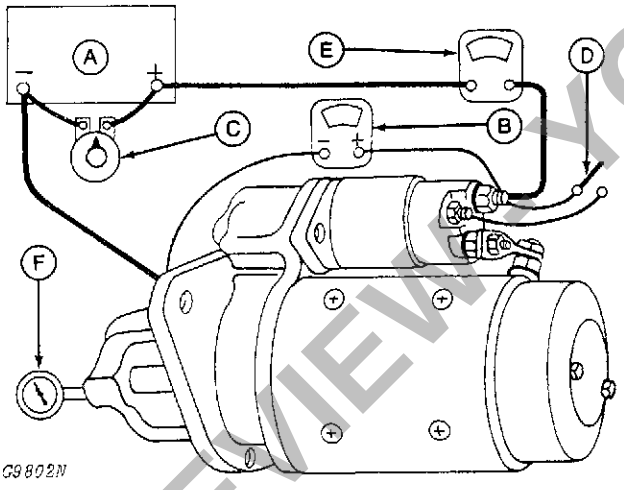


A—12 Volt Battery E—Switch

Fig. 3-Return Test

Make connections shown in Fig. 3. Close the switch and pull the drive out until the pinion contacts the pinion stop. When released, the drive should return without hesitation.

No Load Test

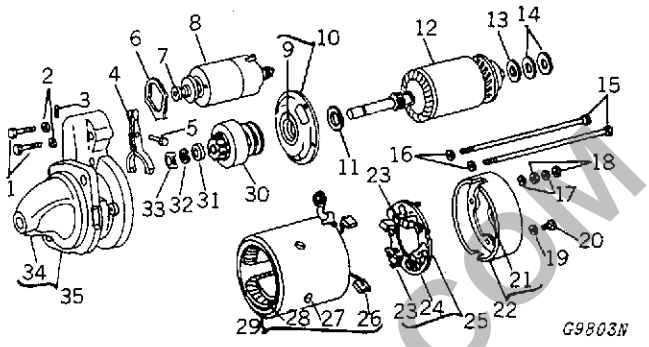


A—12 Volt Battery
B—Voltmeter
C—Carbon Pile
D—Switch
E—Ammeter
F—Tachometer

Fig. 4-No Load Test

Make connections shown in Fig. 4. Replace field frame connector. The starting motor current draw should be less than 70 amps at 12 volts. The armature speed should be more than 6000 rpm.

Repair



1—Cap Screw
2—Lock Washer
3—Cotter Pin
4—Lever
5—Pin
6—Cover
7—Nut
8—Solenoid
9—Bearing
10—Bearing
11—Shim
12—Armature
13—Shim
14—Shim
15—Bolt
16—Washer
17—Washer
18—Nut
19—Washer
20—Screw
21—Cover
22—Cover
23—Spring
24—Brush (−)
25—Holder
26—Brush (+)
27—Set Screw
28—Coil
29—Yoke
30—Pinion
31—Stopper
32—Clip
33—Washer
34—Bushing
35—Housing

Fig. 5-Starter

Disconnect the lead wire. Remove solenoid by removing cotter pin (3), pin (5) and cap screw (1). Remove through bolts (15) to remove rear cover (22).

Remove brushes and holder. Separate housing (35). Remove clip (32) to remove pinion.

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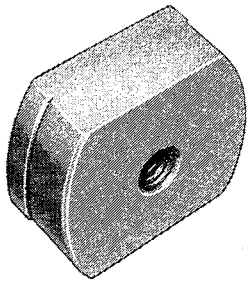
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CYLINDER BLOCK

SPECIAL TOOLS

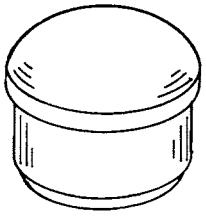
Essential Tools

Tool Number	Use
JDZ-33	Cylinder liner remover - to remove liners.
JDZ-36	Cylinder liner remover grip (Not shown).
JDZ-37	Cylinder liner installer - to install cylinder liners.
JDZ-32	Valve guide driver - to remove and install valve guides.



G9824N

Fig. 17-Cylinder Liner Remover



G10599N

Fig. 18-Cylinder Liner Installer



G9825N

Fig. 19-Valve Guide Driver

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CHARGE CIRCUIT TEST

NOTE: Ground the voltmeter negative probe and touch the terminals indicated with the positive probe.

TEST	TERMINAL WIRE COLOR	CORRECT READING	INCORRECT READING— POSSIBLE CAUSE OR REMEDY
Key OFF—Test	Green (Field) (Alt.)	0 Volts	If reading is indicated, regulator is defective.
	Yellow (Stator Tap) (Alt.)	0 Volts	If reading is indicated, positive diode in alternator is shorted.
	Black (Ground) (Alt.)	0 Volts	None
	Red (Output) (Alt.)	Battery Voltage	If reading is low or 0 volts, check output cable for open lead.
	Orange (Indicator Lamp) (Reg.)	0 Volts (Lamp Out)	If reading is indicated, regulator or ignition switch is defective (lamp on).
	Purple or Violet (Ignition) (Reg.)	0 Volts	If reading is indicated, ignition switch is defective.
Key ON—Engine Not Running	Green (Field) (Alt.)	0.60 to 0.80 Volts	If higher or lower reading is indicated, regulator or field circuit in alternator is defective. Check brushes.
	Yellow (Stator Tap) (Alt.)	2.6 to 3.0 Volts	If reading is lower, positive diode is shorted. If reading is higher, positive diode is open.
	Black (Ground) (Alt.)	0 Volts	None
	Red (Output) (Alt.)	Battery Voltage	Check output cable for open lead.
	Orange (Indicator Lamp) (Reg.)	4.0 to 5.0 Volts (Lamp on)	If meter indicates high or low voltage, ignition switch may be defective or lamp may be burned out. If lamp is off, replace lamp and retest.
	Purple or Violet (Reg.)	Battery Voltage	If no voltage is indicated, check ignition switch and violet wire between regulator and ignition switch.

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Group III
GENERAL SPECIFICATIONS

(Specifications and design subject to change without notice. Wherever applicable, specifications are in accordance with IEMC and SAE standards. Except where otherwise noted, these specifications are based on a unit equipped with 10 x 16.5, 4 ply rating steel-ply tires and standard equipment.)

POWER	SAE
(@ 2800 Engine rpm)	
Gross	37
Net	35

Net engine flywheel power is for an engine equipped with fan, air cleaner, water pump, lubricating oil pump, fuel injection pump, alternator and muffler. The gross engine power is without fan. Gross and net flywheel power ratings are under SAE standard conditions of 500-ft (152 m) altitude and 85°F (29.5°C) temperature and DIN 70 020 conditions (non-corrected). No derating is required up to 10,000 feet (3000 m) altitude.

**In the international system of units power is expressed in kilowatts (kW).

ISUZU ENGINE

Diesel, 4-Cylinder, 4-stroke cycle	
Bore and Stroke	3.37 x 3.31 in. (86 x 84 mm)
Piston Displacement	119 cu. in. (1951 cc)
Compression Ratio	20.1 to 1
Maximum Torque @ 2000 RPM	79.6 lb-ft (107.9 Nm)
MACC or AMA (U. S. Tax)-horsepower	18.34
Cooling	Pressurized with Single Thermostat and Control By Pass
Fan	Blower
Air Cleaner with Restriction Indicator	Dry

CONTINENTAL ENGINE

Gasoline - 4 Cylinder	
Bore and Stroke	3.188 x 3.50 (81 x 89 mm)
Piston Displacement	112 Cu. In. (1836 cm^3)
Compression Ratio	6.0761
Maximum Torque @1500 RPM	90 lb-ft (122 Nm) (12.2 kgm)

TRAVEL SPEED - (2800 Engine rpm no Tire Slip)
Forward or Reverse . . . . . 0 to 6.5 mph (0 to 10.5 km/hr)

DRIVE AXLES
Axles are specially treated, forged 2.56 in (65 mm) diameter steel. Chain and sprocket primary and final drive.

BRAKES

Service	Dry Disc Type on Two Front Wheels
Emergency	Foot Operated Mechanical
Parking	Hand Operated Center Pull Mechanical

STEERING
T-Bar controls forward and reverse, right and left movements through two axial variable piston pumps and two axial fixed piston motors.
Turning Radius . . . . . 360 Degrees in its own length

HYDRAULIC SYSTEM
Open center, constant flow hydrostatic pump driven from crankshaft - 15 gpm (60.51 lpm) 2000 psi (140.6 kg/cm^2) at 2800 engine rpm.

TIRES
10 x 16.5, 4 ply rating, steel cap
15.5 x 15, 8 ply rating, terra
6.50 x 16, solid rubber
7 x 15, 6 ply rating, steel cap

CAPACITIES	U.S.	Liter
Fuel Tank	24 Gal.	90.8 l
Cooling System	12 Qts.	11.3 l
Engine Lubrication with Filter	5-1/4 Qts.	4.9 l
Hydraulic System	18 Gal.	68.1 l

ELECTRICAL SYSTEM:
12-Volt totally enclosed alternator, belt-driven

Battery 12-volt (Diesel) . . . . . (95 amp-hr.)
(Gas) . . . . . (61 amp-hr.)

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JD24A Skid-Steer Loader

JOHN DEERE

TECHNICAL MANUAL

JD24A Skid-Steer Loader

TM1157 (01NOV76) English

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John Deere
Lawn & Grounds Care Division
TM1157 (01NOV76)

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Governor Adjustment

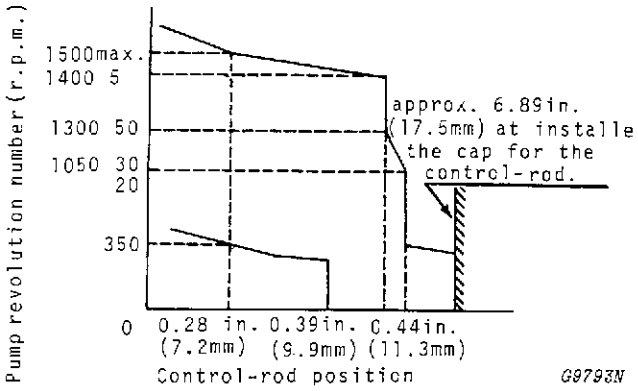


Fig. 2-Governor Adjustment

Timing Advance Specifications

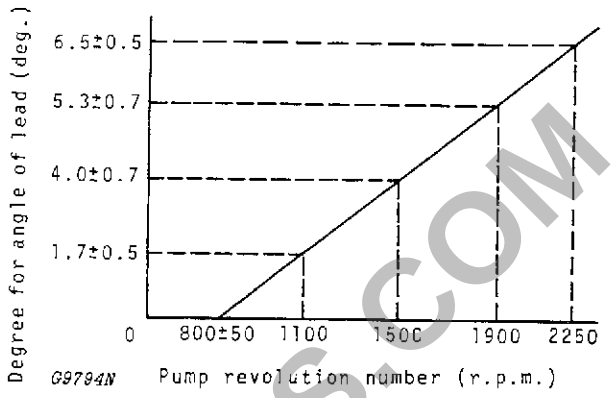


Fig. 3-Timing Advance

DIESEL KIKI SERVICE CENTERS

ALABAMA

ALABAMA DIESEL CO.
3628 - 6th Ave.
Birmingham, Alabama 35222

SAUNDERS ENGINE & EQUIPMENT CO. LTD.
840 Duman Rd.
P.O. Box 1824
Mobile, Alabama 36601

ALASKA

ALASKA DIESEL SERVICE
403 East Firewood Lane
Anchorage, Alaska 99503

ARIZONA

*SOUTHWEST DIESEL & ELECTRIC
1830 N. 27th Avenue
Phoenix, Arizona 85009

DIESEL ELECTRIC SERVICE
917 North Pinal Avenue
Casa Grande, Arizona 85222

PERKINS DIESEL SERVICE
747 South County Club Drive
Mesa City, Arizona 85201

ARKANSAS

CALIFORNIA

*DIESEL CONTROLS CORPORATION
226 Marine Avenue
Wilmington, California 90744

AUTOMOTIVE DIESEL & ELECTRIC
1300 Golden State Highway
Bakersfield, California 93301

AUTOMOTIVE DIESEL & ELECTRIC
2374 E. Date
Fresno, California 93716

COAST FUEL INJECTION INC.
1590 Industrial Avenue
San Jose, California 95112

NATIONAL PUMP & INJECTOR SALES & SERVICE
2307 E. Belt Street
San Diego, California 92113

DIESEL FUEL SYSTEMS
18016 South Vermount Avenue
Gardena, California 90248

UNITED DIESEL SERVICE
1903 Penn Mar Avenue
South El Monte, California 91733

COLORADO

*THE BRUHN CO.
3655 Brighton Blvd.
Denver, Colorado 80216

CENTRAL MOTIVE POWER
6301 N. Broadway
Denver, Colorado 80217

CONNECTICUT.
DISTRICT OF COLUMBIA

FLORIDA

*INTERSTATE DIESEL SERVICE INC.
4220 N. Orange Blossom Trail
Orlando, Fl 32804

DADE DIESEL CO-INC.
2747 N.W. 34 St.
Miami, Fl 33142

ATLANTIC DIESEL SERVICE INC.
621 State Rd.
Lake Placid, Fl 33852

EVERGLADES DIESEL INJECTION SERVICE, INC.
243 S. W. 33rd Court
Fort Lauderdale, Florida 33315

GULF COAST DIESEL INJECTION SERVICE
3750 Palm Beach Blvd.
Fort Myers, Florida 33905

INLAND DIESEL FUEL INJ.
685 Industrial Drive
Downtown Ind. Park
Talahassee, Florida 32304

L & J DIESEL SERVICE
832 Cassett Avenue
Jacksonville, Florida 32205

R.P.M. DIESEL ENGINE COMPANY
2551 St. Road No. 84
Fort Lauderdale, Florida 33312

STUART DIESEL SERVICE, INC.
6515 Adamo Drive
Tampa, Florida 33619

WILLIAMS DIESEL PUMP SERVICE
1921 North Magnolia Street
Ocala, Florida 32670

TAYLOR DIESEL SERVICE, INC.
228 N. Myrtle Avenue
Jacksonville, Florida 32204

GEORGIA

*AUTO ELECTRIC & DIESEL CO.
800 Lambert Drive N.E.
Atlanta, Georgia 30324

DIESEL INJECTION OF GA. INC.
4767 Clark Howell Hwy
College Park, Ga. 30349

HAWAII

IDAHO

HOGUE DIESEL INJECTION
916 Sherwood
Boise, Idaho 83701

*Central Distributor

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Group 0404A
CYLINDER BLOCK AND VALVES

GENERAL INFORMATION

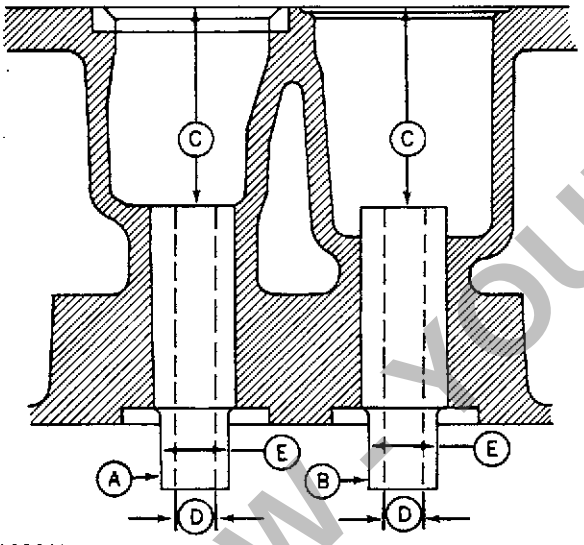
The cylinder block is a one-piece casting with pressed-in valve guides, camshaft bushings, and exhaust valve seats.

REMOVAL

Refer to pages 0400A-3 through 0400A-8 for removal.

REPAIR

Valve Guides



A—Exhaust
B—Intake
C—0.875 (22.23 mm)
D—0.3159 - 0.3169 inch (8.024 - 8.049 mm)
E—0.5635 - 0.5645 inch (14.313 - 14.338 mm)

Fig. 1-Valve Guides

Check the valve guides for the dimensions given. Replace the valve guides when the inside diameter (D) is 0.3182 inch (8.082 mm).

Valve Seat

The valve seat inserts are held in place by shrink fit. The exhaust inserts are replaceable only.

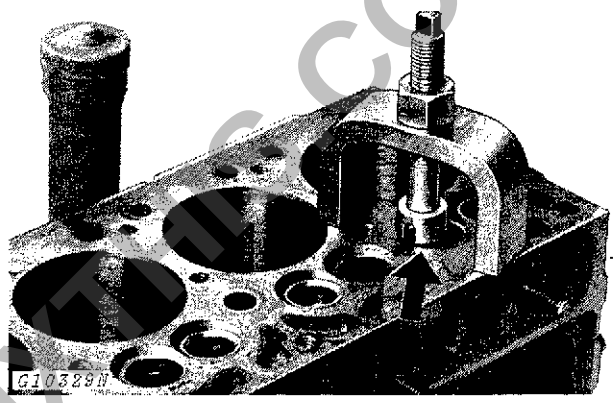


Fig. 2-Removing Exhaust Insert

Use a puller (Fig. 2) for removing faulty exhaust insert.

To replace exhaust insert, clean and counterbore for 0.010 inch (0.25 mm) larger insert using counterbore tool with correct fitting pilot.

NOTE: Be sure to go deep enough with the tool to clean up the bottom, so insert will have full contact to carry away the heat.

New insert must have a press fit of 0.003 - 0.005 inch (0.076 - 0.127 mm). Chill insert in dry ice for 20 minutes before installation.

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ELECTRICAL SYSTEMS

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TESTING AND ADJUSTMENT

Basic Engine

Compression Pressure Test

Clean the engine thoroughly, preferably by steam cleaning.

Warm the engine to operating temperature.

When engine has reached operating temperature, turn ignition switch off.

CAUTION: High pressure from the injection pump will have sufficient force to penetrate skin. Do not, at any time, while the engine is cranking, place hands or arms in front of the injection nozzles.

Remove all four injection nozzles and seal gaskets or spark plugs from the head.

Install a compression gauge adapter in bore to be tested. A new seal gasket (diesel) should be inserted before the adapter is installed.

Connect a compression gauge to the adapter.

Crank engine with the starting motor.

Observe the pressure reading on the compression gauge. If the reading is 284 psi (20 bar) (20 kg/cm²) (diesel), 115 psi (8 bar) (9 kg/cm²) (gasoline) or lower, the engine is in need of service.

ENGINE LUBRICATION SYSTEM

Checking Engine Oil Pressure

Engine oil pressure should be checked before and after a major overhaul or anytime it is necessary to remove the oil pump.

With engine at normal operating temperature, oil pressure reading should be 65-85 psi (3-4 bar) (4-5 kg/cm²) at 2800 rpm for diesel, and 30-40 psi (2-3 bar) (2-3 kg/cm²) at 2950 rpm for gasoline.

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