WORKSHOP MANUAL

INDUSTRIAL ENGINE SYSTEMS

LPG 3.0 Engine

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LUBRICATION SYSTEM

OIL PRESSURE (MIN. HOT):	28 kPa (4 psi) @ 700 RPM 207 - 414 kPa (30 - 60 psi) @ 2000 RPM
OIL TEMPERATURE:	Upper Limit: 130°C (266°F) Recommended: 99 - 110°C (210 - 230°F) Lower Limit: 80°C (176°F)

NOTE: Oil Cooler Required w/Standard Oil Pan (Stationary Applications Only)

CRANKCASE CAPACITY:	Standard Pan: 4.7 L (5.0 qts.) Optional Pan: 26.5 L (28 qts.) Oil Filter: 0.9464 L (1 qt.)
ENGINE OIL SPECIFICATION:	API - SG/SH, SAE 10W30 - All Temperatures SAE 15W40 - Above -18°C (0°F) SAE 30W - Between 5° and 27°C (40° and 80°F) SAE 40W - Above 27°C (80°F)

ENGINE ELECTRICAL

IGNITION TYPE:	Delco EST w/Electronic Advance
STARTER MOTOR:	Delco SD300 / 12 volt Negative Ground (-) (12.75" Flywheel) Delco PG260 / 12 volt Negative Ground (-) (14.00" Flywheel)
FLYWHEEL TEETH:	12.75 in. Flywheel 153 14.00 in. Flywheel 168
BATTERY REQUIREMENT:	12 volt - 485 CCA (90 AH)
ALTERNATOR:	12 volt - Mando 51 Amp

INSTALLATION LIMITS

MAXIMUM ANGULARITY LIMITS ON ENGINE:	Front of engine down:	8.5°
	Rear of engine down:	18°
	Side to side:	20°

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ENGINE STARTING PROBLEMS (CONTINUED)

Symptom	*Cause*
1. No spark.	A. Distributor cap or spark plug leads arcing. B. Spark plugs fouled, burned or cracked porcelain. C. Spark plug wires are broken or have faulty insulation. D. Battery, electrical connections, damaged wiring. E. Ignition switch. F. Faulty ignition components. G. Cracked or dirty distributor cap. H. Shorted tachometer. (Disconnect tachometer and try again).
2. Engine will not crank over.	A. Battery charge low, damaged wiring or loose electrical connections. B. Circuit breaker tripped (if equipped). C. Bad ignition switch. D. Bad starter solenoid. E. Defective starter motor.

CHARGING SYSTEM PROBLEMS

Symptom	*Cause*
1. Gauges indicate no battery charge.	A. Loose or broken drive belt. B. Loose or corroded electrical connections. C. Faulty ammeter or voltmeter. D. Battery will not accept charge. E. Faulty alternator or regulator.
2. Noisy alternator.	A. Loose mounting bolts. B. Worn, frayed or loose drive belt. C. Loose drive pulley. D. Worn or dirty bearings. E. Faulty diode trio or stator.

INSTRUMENT PROBLEMS

Symptom	*Cause*
1. Malfunctioning instruments or gauges.	A. Faulty wiring, loose or corroded terminals. B. Bad key switch. C. Faulty gauge. D. Faulty sender.

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TEST OUTPUT CIRCUIT

Figure 5-3

1. Connect positive voltmeter lead to alternator output terminal and negative lead to ground terminal on alternator (figure 5-3).
2. Wiggle engine wiring harness while observing voltmeter. Meter should indicate approximate battery voltage and should not vary. If no reading is obtained, or if reading varies, check alternator-output circuit for loose or dirty connections or damaged wiring.

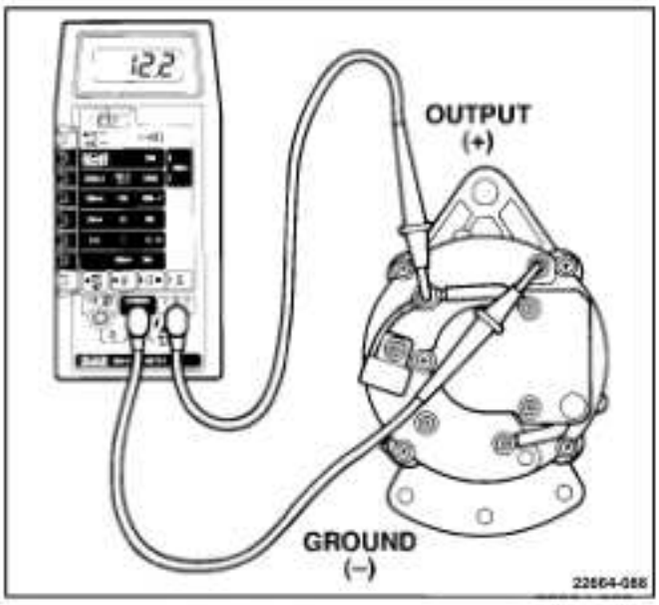


Figure 5-3 *Testing Alternator Output Circuit*

TEST EXCITATION CIRCUIT

Figures 5-4 and 5-5

1. Connect positive (+) voltmeter lead to excitation terminal on alternator and negative (-) lead to ground terminal on alternator.
2. Turn ignition switch to "ON" position and note voltmeter reading. Reading should be 1.3 to 2.5 volts (figure 5-4).
3. If reading is between 0.75 and 1.1 volts, field circuit probably is shorted or grounded. Disassemble alternator and test rotor as outlined under "Clean and Test Alternator Components" in this chapter.
4. If reading is between 6.0 and 7.0 volts, rotor field circuit probably is open. Remove regulator and inspect for worn brushes or dirty slip rings. Replace brushes if less than 6.6 mm (0.260 in.) long. If brushes and slip rings are in good condition, disassemble alternator and test rotor, as outlined under "Clean and Test Alternator Components" in this chapter.
5. If no reading is obtained, an open exists in alternator excitation lead or in excitation circuit of regulator. Disconnect yellow lead from regulator. Connect positive voltmeter lead to yellow lead and negative voltmeter lead to ground. If voltmeter now indicates approximate battery voltage, voltage regulator is defective and must be replaced (figure 5-5). If no voltage is indicated, check excitation circuit for loose or dirty connections or damaged wiring.

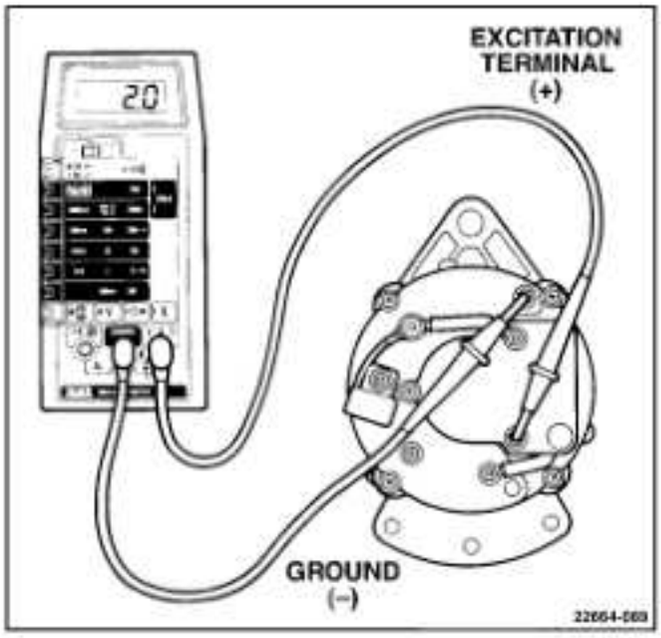


Figure 5-4 *Testing Exciter Circuit*

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