MECHANISM

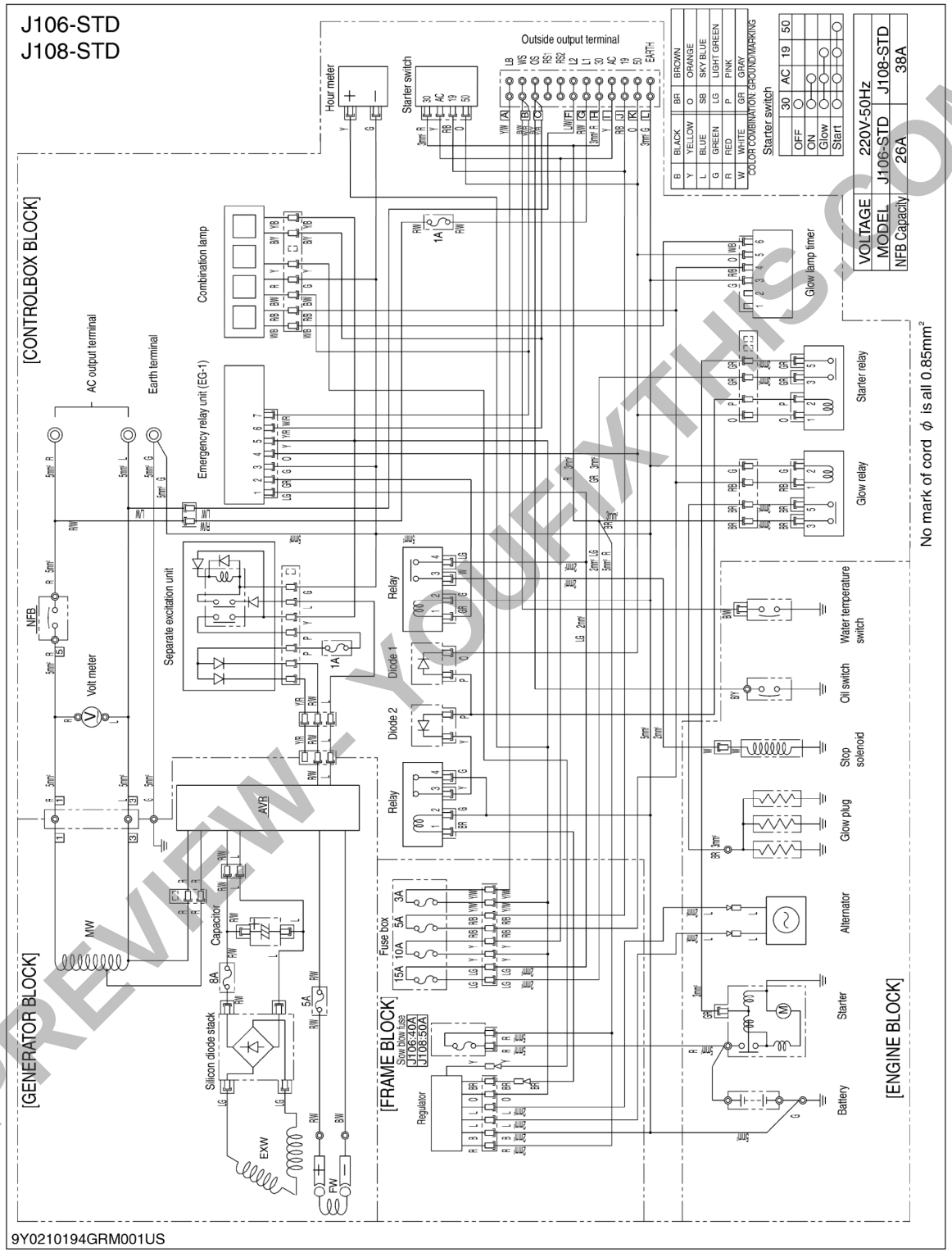
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[5] WIRING DIAGRAM

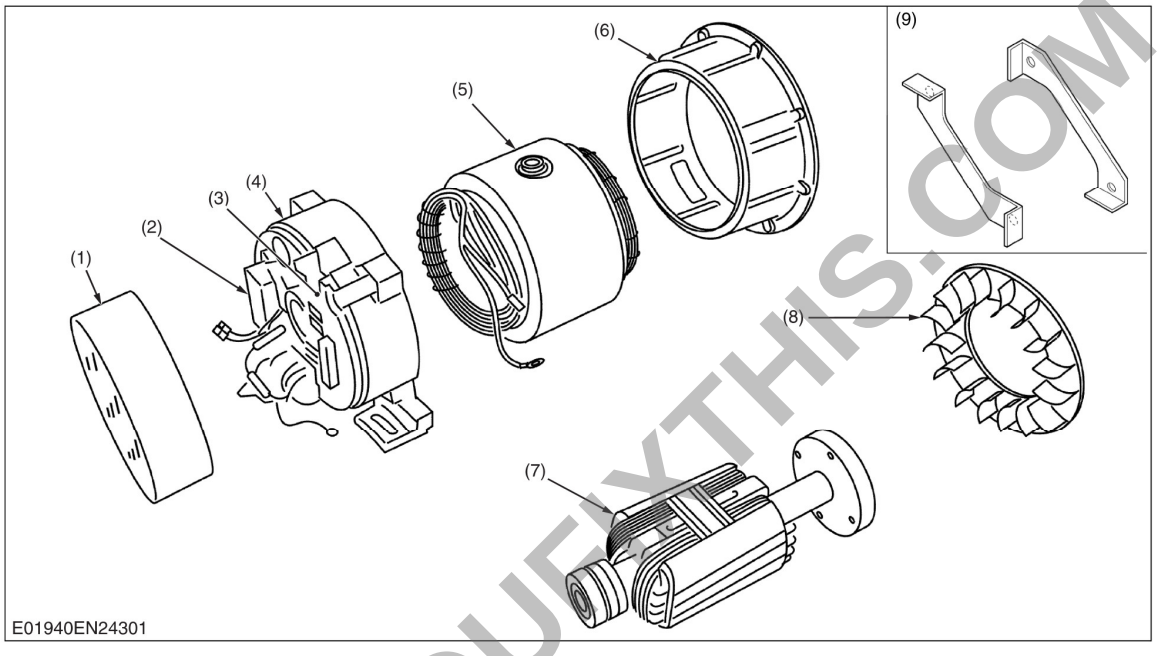


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1. GENERATOR

[1] STRUCTURE



(1) Rear Cover
(2) A.V.R. Assembly
(3) Brush Holder Assembly
(4) Rear Bracket
(5) Stator Assembly
(6) Stator Housing
(7) Rotor Assembly
(8) Fan
(9) Fan (Z482 only)

1. Stator Assembly
   The main coil and sub coil for power generation are wound in the slots provided in the core.
   The main coil generates the AC output and supplies A.V.R. assembly with a sensing voltage
   The sub coil, working as an excitation coil, supplies the field current to the rotor through A.V.R. assembly.
2. Rotor Assembly
   The coils are wound to magnetize the entire core.
3. Brush Holder Assembly
   The excitation voltage from sub coil of the stator assembly is applied to the rotor coil through the A.V.R. assembly rectifying circuit and the brush holder assembly.
4. Automatic Voltage Regulator (A.V.R.) Assembly
   The A.V.R. assembly maintains the AC output voltage at a constant level.

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[4] TROUBLESHOOTING

(1) Generator

■ **NOTE**

- **In order to replace the parts in safety, remove negative terminal of battery so as to prevent the battery and the parts from short-circuiting.**
- **To avoid errors on delivery of spare parts, all information marked on nameplates should be supplied on parts orders, in particular model and serial number of the alternator. Also give the parts numbers from the parts list.**

(A) Evident Physical Defects (Overheating, Noise, Vibrations...)

Fault	Action	Origin of fault
Excessive overheating of bearing (temp. of bearing over 80 °C (176 °F)) (With or without abnormal bearing noise).	Replace bearing.	• If the bearing has turned blue or if the grease has turned black,change the bearing. • Bearing race badly locked (moving in its housing). • Bracket misalignment.
Excessive overheating of alternator frame (temperature 30 °C (8 °F) above ambient).	Check • Air inlets and outlets of alternator. • Measuring equipment (Voltmeter-Ammeter). • Ambient temperature.	• Air flow (inlet-outlet) partially clogged or hot air is being recycled either from alternator or prime mover. • Alternator overloaded. • Fan belt slips.
Excessive vibration and humming noise coming from the alternator.	Stop the gen-set and check the installation and others.	• Three phase alternator is single phase loaded in excess of acceptable level.
	Start up with no-load: if humming persists...	• Short-circuit in the alternator stator.
Alternator damaged by a significant impact which is followed by humming and vibration.	Stop the gen-set immediately.	• Short-circuit in external circuit. • Break or deterioration in the coupling. • Break or twist in shaft extension. • Shifting or short-circuit of the main field winding. • Bursting or unlocking of the fan. • Diode burnt, regulator, rectifier bridge damaged.
Smoke, sparks of flames issuing from the alternator.	Stop the gen-set immediately.	• Short-circuit in external circuit (including wiring between alternator and control board). • Object fallen into the machine. • Short-circuit or flash in stator winding

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SPECIFICATIONS

[50Hz]

Model		J106		J108		J112		J116	
		-STD	-AUS	-STD	-AUS	-STD	-AUS	-STD	-AUS
Generator	Type	Revolving-field, brush type, separate and self - excitation system, AC generator							
	Insulation class	Rotor coil: F Stator coil: B							
	Frequency	50 Hz							
	Standby output	6.0 kVA (6.0 kW)		8.8 kVA (8.8 kW)		13.2 kVA (13.2 kW)		17.6 kVA (17.6 kW)	
	Prime output	5.5 kVA (5.5 kW)		8.0 kVA (8.0 kW)		12 kVA (12 kW)		16 kVA (16 kW)	
	Voltage	220 V	240 V	220 V	240 V	220 V	240 V	220 V	240 V
	Rated amperage	25.0 A	22.9 A	36.4 A	33.3 A	54.5 A	50.0 A	72.7 A	66.7 A
	Number of phases	Single							
	Number of poles	2							
	Power factor	100 %							
Engine	Model	Z482-B-SEC		D722-B-SEC		D1005-BG-SEC		V1305-BG-SEC	
	Design	Vertical, liquid cooled, 4 cycle, diesel engine							
	Number of cylinders	2		3				4	
	Bore x Stroke	67 x 68 mm (2.52 x 2.68 in.)				76 x 73.6 mm (2.99 x 2.90 in.)			
	Displacement	479 cm^3 (29.23 cu.in.)		719 cm^3 (43.89 cu.in.)		1001 cm^3 (61.08 cu.in.)		1335 cm^3 (81.46 cu.in.)	
	Combustion system	Spherical combustion chamber							
	Compression ratio	23:1				22:1			
	Cooling system	Pressurized radiator, forced circulation with water pump							
	Lubricating system	Forced lubrication by trochoid pump							
	Lubricating oil	Higher than CD class (API)							
	Starting system	Electric type							
	Stop solenoid	Energized to stop				Energized to run			
	Battery	38B20R		55B24R		80D26R (S)			
	Fuel tank capacity	37 L (9.8 U.S.gals, 8.1 Imp. gals.)				79 L (20.9 U.S. gals, 17.4 Imp. gals.)			
	Cooling system capacity	2.3 L (2.4U.S.qts.,2.0 Imp.qts.)		3.0L (3.2U.S.qts.,2.6 Imp.qts.)		3.3 L (3.5U.S.qts.,2.9 Imp.qts.)		3.5 L (3.7U.S.qts.,3.1 Imp.qts.)	
	Crankcase oil capacity	2.2 L (2.3U.S.qts.,2.0 Imp.qts.)		3.4 L (3.6U.S.qts.,3.0 Imp.qts.)		4.3 L (4.6U.S.qts.,3.8 Imp.qts.)		5.7 L (6.0U.S.qts.,5.0 Imp.qts.)	
Continuous operating hours (at 3/4 load)		19.0 Hr		13.5 Hr		20.0 Hr		16.5 Hr	
Net weight		225 kg (496 lbs)		255 kg (562 lbs)		340 kg (750 lbs)		380 kg (838 lbs)	
Emergency stop mechanism		During engine operation, automatic shutdown will occur when either the oil pressure or the water temperature is abnormal.				During engine operation, automatic shutdown will occur when either the oil pressure or the water temperature is abnormal or when the fan belt breaks.			
With Caster		Option				None			

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[6] TIGHTENING TORQUES

Screws, bolts and nuts must be tightened to the specified torque using a torque wrench, Several screws, bolts and nuts such as those used on the cylinder head must be tightened in proper sequence and at the proper torque.

(1) Tightening Torques for Special Use Screws, Bolts and Nuts

■ **NOTE**

- **In removing and applying the screws, bolts and nuts marked with "*", pneumatic wrench or similar pneumatic tool, if employed, must be used with enough care not to get them seized.**
- **For "*" marked screws, bolts and nuts on the table, apply engine oil to their threads and seats before tightening.**

[Z482, D722]

Section	Item	N·m	kgf·m	ft-lbs
Generator	Rear bracket mounting screw	24.5 to 34.3	2.5 to 3.5	18.1 to 25.3
	Stator housing mounting screw	19.6 to 27.4	2.0 to 2.8	14.5 to 20.3
	Cooling fan mounting screw	19.6 to 27.4	2.0 to 2.8	14.5 to 20.3
	Rotor assembly mounting screw	19.6 to 27.4	2.0 to 2.8	14.5 to 20.3
Engine	* Cylinder head cover cap nut	3.9 to 5.9	0.4 to 0.6	2.9 to 4.3
	Injection pipe retaining nuts	24.9 to 34.3	2.5 to 3.5	18.1 to 25.3
	Nozzle holder assembly	49.0 to 68.6	5.0 to 7.0	36.2 to 50.6
	Over flow pipe assembly retaining nut	19.6 to 24.5	2.0 to 2.5	14.5 to 18.1
	Glow plug	7.8 to 14.7	0.8 to 1.5	5.8 to 10.8
	* Roker arm bracket nuts	9.8 to 11.3	1.00 to 1.15	7.2 to 8.3
	* Cylinder head screw	37.2 to 42.1	3.8 to 4.3	28.0 to 31.7
	Fan drive pulley retaining screw	118 to 127	12.0 to 13.0	86.8 to 94.0
	* Idle gear shaft mounting screw	9.8 to 11.3	1.00 to 1.15	7.2 to 8.3
	* Connecting rod screw	26.5 to 30.4	2.7 to 3.1	19.5 to 22.4
	* Flywheel screw	53.9 to 58.8	5.5 to 6.0	39.8 to 43.4
	* Bearing case cover mounting screw	9.8 to 11.3	1.00 to 1.15	7.2 to 8.3
	* Main Bearing case screw 2	26.5 to 30.4	2.7 to 3.1	19.5 to 22.4
	* Main Bearing case screw 1	12.7 to 15.7	1.3 to 1.6	9.4 to 11.6
	Oil switch	14.7 to 19.6	1.5 to 2.0	10.8 to 14.5
	Starter **B** terminal nut	8.8 to 11.8	0.9 to 1.2	6.5 to 8.7

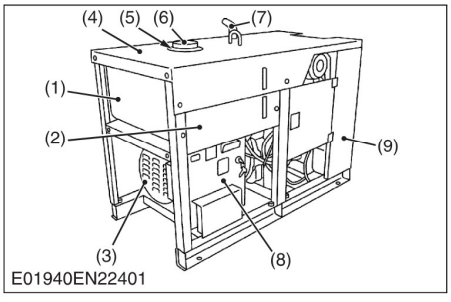
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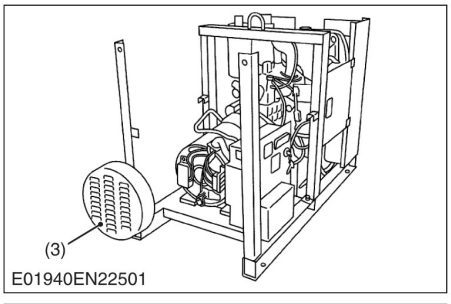
2. GENERATOR

[1] DISASSEMBLING AND ASSEMBLING

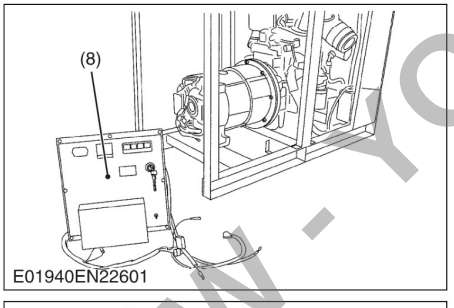
(1) External Component



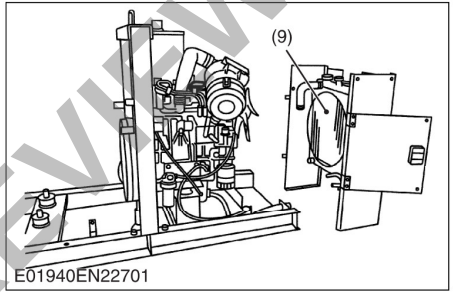
E01940EN22401



E01940EN22501



E01940EN22601



E01940EN22701

Cover, Panel, Control Panel, Bonnet and Fuel Tank

1. Place the machine on firm and level surface.
2. Remove the both side cover (2).
3. Remove the negative wire from the battery and disconnect the lead wire from the stop solenoid, the glow plug, the water temperatur sensor, oil switch, the alternator (AC dynamo), the fuse box, and the earth.
4. Drain the coolant and engine oil, and remove each fuel hose.
5. Remove the muffler pipe (7), fuel tank cap (6), rubber seal (5), and the bonnet (4).
6. Remove the fuel tank (1).
7. Remove the generator's rear cover (3) and disconnect the lead wire from the stator coil.
8. Remove the control panel (8).
9. Remove the radiator hose both side and the panel with the radiator (9).

(1) Fuel Tank
(2) Side Cover
(3) Generator's Rear Cover
(4) Bonnet
(5) Rubber Seal
(6) Fuel Tank Cap
(7) Muffler Pipe
(8) Control Panel
(9) Panel with the Radiator

W12445040

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SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and decals on the generator itself to warn of the possibility of personal injury. Read these instructions carefully.

It is essential that you read the instructions and safety regulations before you attempt to repair or use this unit.

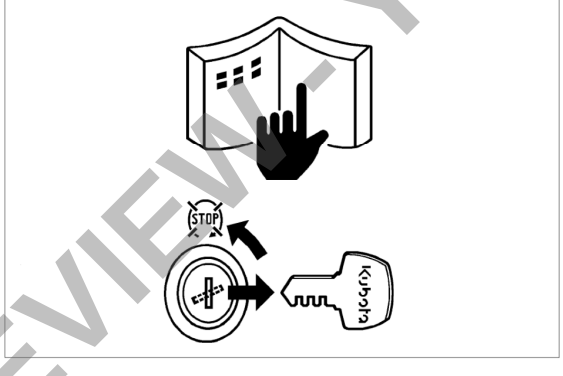
DANGER : **Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

WARNING : **Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**

CAUTION : **Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**

■ **IMPORTANT** : **Indicates that equipment or property damage could result if instructions are not followed.**

■ **NOTE** : **Gives helpful information.**

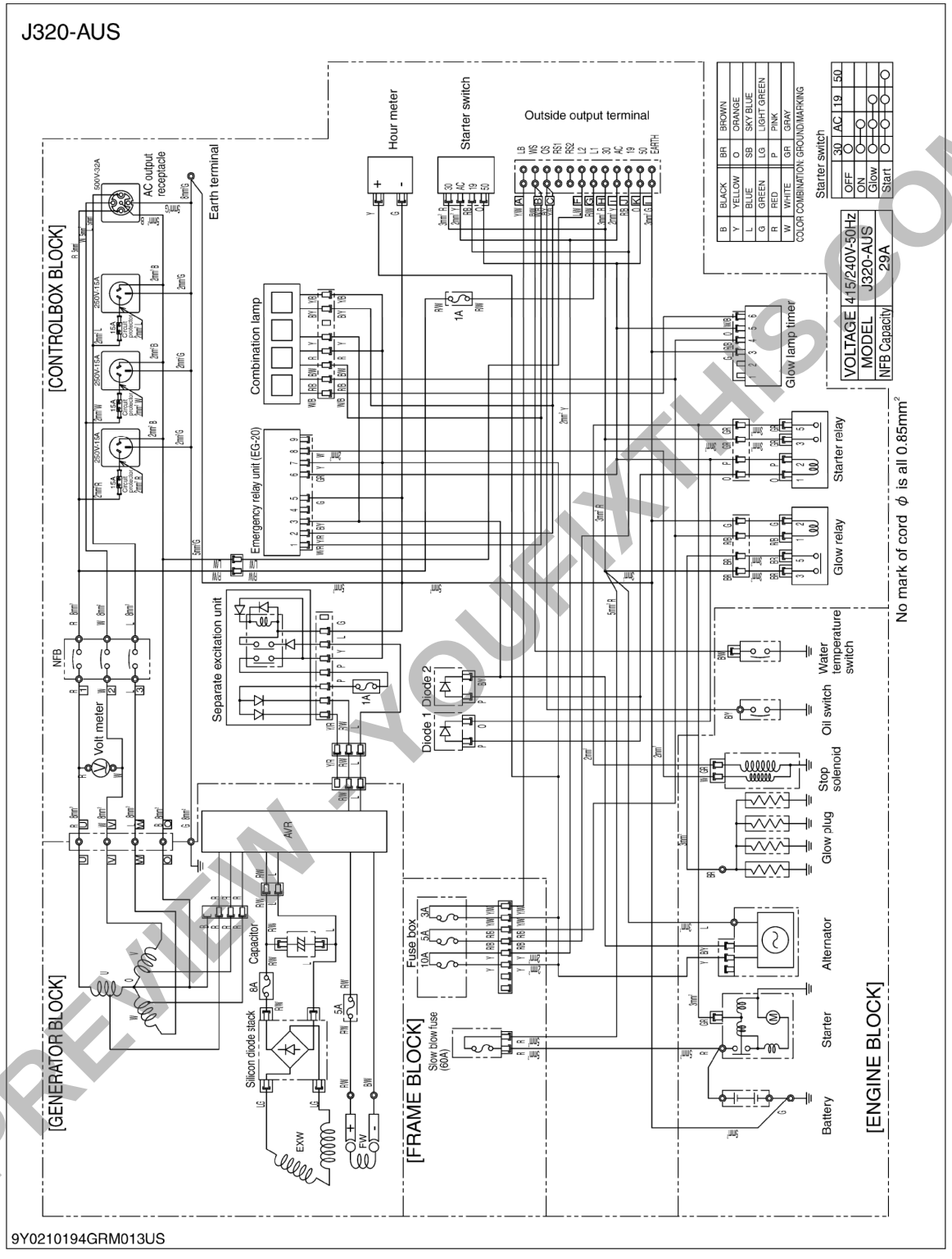


BEFORE SERVICING AND REPAIRING

- Read all instructions and safety instructions in this manual and on your generator safety decals.
- Clean the work area and generator.
- Place the generator on a firm and level ground.
- Allow the engine to cool before proceeding.
- Stop the engine, and remove the key.
- Disconnect the battery negative cable.

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For Saudi Arabia (60Hz)

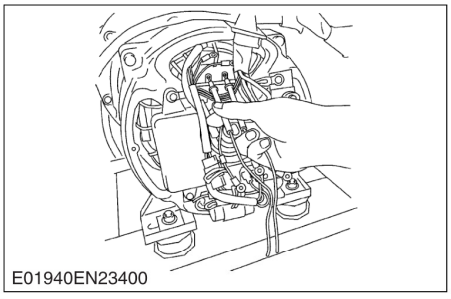
Item \ Model		J107 -SA	J110 -SA	J114 -SA	J119 -SA
Frequency (Hz)		60			
Voltage (V)		127 / 220	127 / 220	127 / 220	127 / 220
Current (A)		51.2 / 29.5	78.7 / 45.5	90.6 / 63.6	90.6 / 85.5
Main coil (Ω)	1-3	0.32	0.20	0.13	0.07
	1-2	0.19	0.12	0.07	0.03
	2-3	0.13	0.08	0.06	0.04
	3-4	–	–	–	–
	U-O	–	–	–	–
	V-O	–	–	–	–
	W-O	–	–	–	–
Sub coil (Ω)	LG-LG	2.2	1.6	←	1.5
Detecting coil (Ω)	R-R	0.05	←	0.04	←
	R-B	–	–	–	–
	R-B	–	–	–	–
	R-B	–	–	–	–
Rotor coil (Ω)		24.3	29.2	33.5	39.6
Air gap (mm)		0.8	←	←	←
Slip ring (mm)	Outside diameter	64	←	←	←
	Correction limit	62.5	←	←	←
	Standard run out	0.1	←	←	←
	Limit run out	0.15	←	←	←
Brush length (mm)	Standard	15	←	←	←
	Limit	7.5	←	←	←
Bearing		6306 DDUNCX	←	←	←
Regulated voltage value (%)		7	←	8	←
Circuit breaker capacity (A)		51 / 30	79 / 46	91 / 64	91 / 86

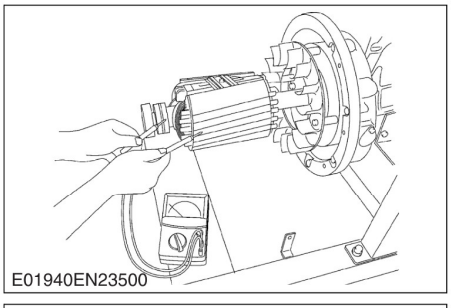
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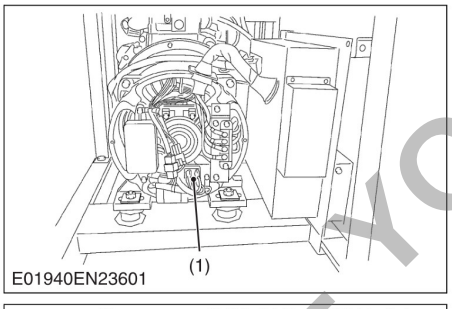
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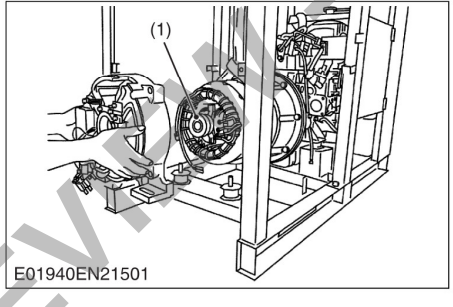
(3) Rotor Coil


E01940EN23400


E01940EN23500



E01940EN23601



E01940EN21501

Main Field Winding (Rotor Coil)

1. Measure the coil resistance between each end of field coil.
2. If the resistance is not as specified, replace the rotor assembly or contact service station.

Resistance	Factory spec.	Rotor field coil	See page S-18, S-19

(1) Rotor Field Coil

W1109744

Grounding of Rotor Coil

1. Connect leads of a mega ohm meter between each lead and exciter rotor laminations.
2. Reading should be more than 1 MΩ at 500 V.
3. If continuous, replace the rotor assembly or contact service station.

(1) Lead (2) Lamination

W1111150

Silicon Diode Stack

1. Disconnect all leads at the connection terminal on diode board.
2. Check the polarity of diode stack leads carefully. It is a good idea to tag them (+,-,~) during disassembly.
3. A diode in a good condition enables the current to flow in only one direction from anode to cathode.
4. If the diode is faulty, contact service station or replace with revolving rectifier assembly.

(1) Silicon Diode Stack

W1111526

Checking Ball Bearing

1. Measure radial dislocation of the outer ring.
2. If the axial dislocation exceeds the allowable limit, replace the bearing.

Axial dislocation	Allowable limit	0.05 mm 0.002 in.

3. Measure the I.D. of the bearing housing.
4. If the wear exceeds the allowable limit, replace the end bracket.

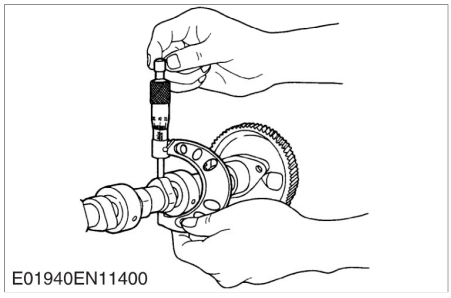
I.D. of bearing housing	Allowable limit	90.02 mm 3.54 in.

(1) Ball Bearing

W1111877

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E01940EN11400

Cam Height

1. Measure the height of the cam at its highest point with an outside micrometer.
2. If the measurement is less than the allowable limit, replace the camshaft.

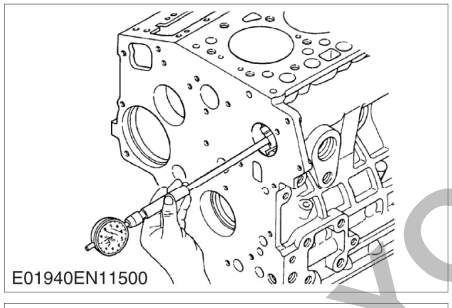
[Z482, D722]

Cam height of intake and exhaust	Factory spec.	26.88 mm 1.0583 in.
	Allowable limit	26.83 mm 1.0563 in.

[D1005, V1305]

Cam height of intake	Factory spec.	28.80 mm 1.1339 in.
	Allowable limit	28.75 mm 1.1319 in.
Cam height of exhaust	Factory spec.	29.00 mm 1.1417 in.
	Allowable limit	28.95 mm 1.1398 in.

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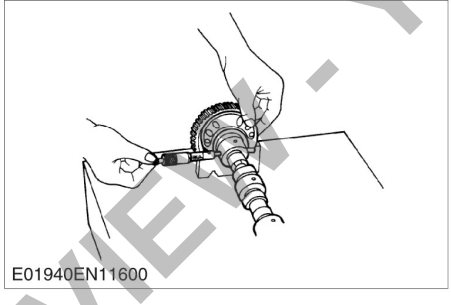

E01940EN11500

Oil Clearance of Camshaft Journal

1. Measure the camshaft journal O.D. with an outside micrometer.
2. Measure the cylinder block bore I.D. for camshaft with a cylinder gauge, and calculate the oil clearance.
3. If the oil clearance exceeds the allowable limit, replace the camshaft.

[Z482, D722]

Oil clearance of camshaft journal	Factory spec.	0.050 to 0.091 mm 0.00197 to 0.00358 in.
	Allowable limit	0.15 mm 0.0059 in.
Camshaft journal O.D.	Factory spec.	32.934 to 32.950 mm 1.2966 to 1.29724 in.
Camshaft Bearing I.D. (Cylinder block bore I.D.)	Factory spec.	33.000 to 33.025 mm 1.29921 to 1.30020 in.


E01940EN11600

[D1005, V1305]

Oil clearance of camshaft journal	Factory spec.	0.050 to 0.091 mm 0.00197 to 0.0358 in.
	Allowable limit	0.15 mm 0.0059 in.
Camshaft journal O.D.	Factory spec.	35.934 to 35.950 mm 1.41473 to 1.41535 in.
Cylinder block bore I.D.	Factory spec.	36.000 to 36.025 mm 1.41732 to 1.41830 in.

W11335580

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